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Congress Proceedings

Index:

ROLE OF SALPINGOPHARYNGEAL FOLD (SPF) IN LATERAL PHARYNGEAL COLLAPSE CAUSING OBSTRUCTIVE SLEEP APNEA (OSA)- V. Agrawal pag. 15

SUBMUCOSAL MIDLINE ENDOSCOPIC LINGUALBASE LYSIS (SMELL)—A MODIFICATION OF SUBMUCOSAL MINIMALLY INVASIVE LINGUAL EXCISION (SMILE) PROCEDURE FOR OBSTRUCTIVE SLEEP APNEA- V. Agrawal pag. 17

COMPARATIVE GENE EXPRESSION PROFILING OF PHARYNGRAL TISSUES FROM PATIENTS WITH OBSTRUCTIVE SLEEP APNEA AND CHRONIC TONSILITIS-WA. Ahmed, Y. Nishimura, K. Suzuki pag. 19

EVALUATION OF NASAL AIRFLOW: A STUDY OF EXPERIMENTAL AND COMPUTATIONAL MODELING- T. Atsumi, T. Takeo, K. Saito, M. Hamada, Y.Takakura, M. Iida pag. 20

HYPOGLOSSAL NERVE STIMULATION FOR THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA: IMPROVEMENTS IN OBJECTIVE MEASURES AND DAYTIME SYMPTOMS- M. Barnes, DR. Hillman, R. McEvoy, JR. Wheatley,et al. pag. 21

LATERAL CEPHALOMETRIC MEASUREMENTS AND PREVALENCE OF MAXILLOMANDIBULAR DEFFICIENCIES IN OSA ELECTIVE PATIENTS FOR ORAL APPLIANCE THERAPY-MF. Barriales, A. del Valle Zapico, MG. Martínez, SS. Santolino et al. pag. 23

THE ROLE OF SLEEP ENDOSCOPY IN THE DIAGNOSIS OF PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME- P. Benedek , G. Kiss , L . Zs , G. Katona pag. 24

COMPARISON EFFECTS OF CPAP, ORAL APPLIANCE AND EXERCISE TRAINING IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME-LR. Azeredo Bittencourt, TC. Barros Schütz, TC. Abrahão Cunha, T. de Moura Guimarãeset al. pag. 25

QUALITY OF LIFE-INSTRUMENT OSA-18 HAS LOW SENSITIVITY WHEN COMPARED TO POLYSOMNOGRAPHY IN PEDIATRIC OBSTRUCTIVE SLEEP APNEA (OSA)-AM. Borgström, D. Friberg pag. 26

SUCCESS PREDICTORS IN UVULOPALATOPHARYNGOPLASTIES FOR THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME-A. Braga,TH. Grechi, LH. Carboni, T. da Lago et al. pag. 27

SKUP3 UVULOPALATOPHARYNGOPLASTY IN OBSTRUCTIVE SLEEP APNOEA PATIENTS, A RANDOMIZED CLINICAL TRIAL OF EFFICACY-*N. Browaldh, P. Nerfeldt, M. Lysdahl, D. Friberg* pag. 28

TIME BUT NOT DOSE DEPENDENT AMELIORATION OF OBSTRUCTIVE SLEEP APNEA BY DRONABINOL-DW. Carley, B. Prasad , M. Radulovacki pag. 29

PREVALENCE OF OBSTRUCTIVE SLEEP APNEA SYNDROME IN CHILDREN WITH HEMIFACIAL MICROSOMIA-CJJM. Caron, KFM. Joosten, B. Pullens, I. Mathijssen et al. pag. 30

MONOBLOC FRONTOFACIAL ADVANCEMENT BY DISTRACTION OSTEOGENESIS USING INTERNAL DISTRACTORS IN CROUZON SYNDROME WITH OBSTRUCTIVE SLEEP APNEA-LK. Cheung, J. Lo, SC. Fung pag. 31

EFFECT OF CPAP THERAPY ON SLEEP STRUCTURE IN PATIENTS WITH SLEEP APNEA-A. Chikadze, L. Khuchua, I. Burduladze, A. Sagura et al. Pag. 32

3-DIMENSIONAL AIRWAY ANALYSIS OF DENTOFACIAL DEFORMITIES BY CONE BEAM COMPUTED TOMOGRAPHY-MM. Chong, HDP. Chua, LK. Cheung Pag. 33

COMPUTATIONAL FLUID DYNAMICS STUDY OF UPPER AIRWAY IN DIFFERENT DENTOFACIAL DEFORMITIES-MM.Chong, F.Yi, HDP. Chua, KW. Chow et al. Pag. 34

IDIOPATHIC HYPERSOMNIA: RARE OR NON-EXISTENT?-G. Cossa, P.Rogers, J. Enger, D. Richards et al. Pag. 35

SLEEP QUALITY IN NURSING STUDENTS AT THE UNIVERSITY OF VALE DO PARAÍBA, BRAZIL-TC. de Mattos Moraes dos Santos, MM. Figueiredo De Martino, M. dos Santos Feitosa,AL. De Faria et al. Pag. 36

OXIDATIVE STRESS, SYSTEMIC INFLAMMATION AND SYMPATHIC ACTIVATION IN PATIENTS WITH CRANIOFACIAL ANOMALIES-C. Driessen , RG. Plomp , IMJ. Mathijssen , KFM. Joosten Pag. 37

THE NATURAL COURSE OF OSAS IN CHILDREN WITH SYNDROMIC CRANIOSYNOSTOSIS-C. Driessen, KFM. Joosten, IMJ. Mathijssen Pag. 38

A 3D VOLUME PREVIEW IN OBSTRUCTIVE SLEEP APNEA (OSA) SINDROME FOLLOWING MAXILLOMANDIBULAR ADVANCEMENT (MMA) EXPERIENCE-A.Fabrizi, A. Bianchi, L. Lancellotti, C. Marchetti Pag. 39

SLEEP DISORDERED BREATHING (SDB) IN PATIENTS UNDERGOING DETOXIFICATION FROM OPIOIDS WITH BUPRENORPHINE/NALOXONE-RJ. Farney, AM. McDonald, KM. Boyle, TJ. Wander et al. Pag. 40

VALIDATION OF A SLEEP APNEA SCREENING DEVICE (APNEALINK™) IN MORBIDLY OBESE SUBJECTS-JM. Fredheim, J. Hjelmesæth Pag. 41

EFFICACY AND SAFETY OF ULTRASONIC ADENOTONSILLECTOMY FOR OBSTRUCTIVE SLEEP APNEA IN INFANTS AND TODDLERS–COMPARISON WITH PRESCHOOL CHILDREN-M. Hamada, J. Nota, N. Matsumoto Pag. 43

RESULTS OF A PROSPECTIVE RANDOMISED PLACEBO CONTROLLED STUDY TO EVALUATE THE EFFECT OF RADIOFREQUENCY SURGERY OF THE SOFT PALATE IN SNORERS-T. Holmlund, K. Franklin , E. Levring Jäghagen , D. Berggren Pag. 44

CHARACTERISTICS OF REM (RAPID EYE MOVEMENT) SLEEP RELATED OBSTRUCTIVE SLEEP APNEA (REM OSA)-IH. Hong , JH. Lee Pag. 45

LOWER BORDER MANDIBULAR ADVANCEMENT BY PIEZO SAW- MAJOR IMPROVEMENT IN THE TREATMENT OF OSAS-M. Jagielak, A. Jagielak, M. Socha, M. Szałwiński Pag. 46

OUTCOMES OF MAJOR AIRWAY RECONSTRUCTIVE SURGERY IN A CONTEMPORARY AUSTRALIAN OTOLARYNGOLOGY PRACTICE... BEYOND THE "MODIFIED UPPP"-N. Jefferson, S. Mackay Pag. 47

DOES A LARGE VENTILATORY RESPONSE TO AROUSAL PREDISPOSE TO UPPER AIRWAY COLLAPSE ON THE RETURN TO SLEEP?-AS. Jordan, JM. Cori, CL. Nicholas, FJ. O'Donoghue et al. Pag. 48

ENT SURGERY IN PATIENTS WITH SLEEP APNEA SYNDROME. - THE ICELANDIC SLEEP APNEA COHORT (ISAC)-S. Juliusson, S. Gudmundsdottir, ES. Arnardottir, B. Benediktsdottir et al Pag. 49

COBLATION UVULOPALATOPHARYNGOPLASTY IMPROVES SLEEP APNEA OUTCOMES IN CPAP FAILURES-S. Juliusson, H. Petersen, E. Hjaltested, T. Gislason et al. Pag. 50

OPTIMIZATION OF OSAS TREATMENT IN PATIENTS WITH PHARYNGEAL LEVEL OF OBSTRUCTION-V. Kaliadzich Zhanna, E. Makarina-Kibak Ludmila, S. Tishkevich Ekaterina Pag. 52

THE USAGE OF PALATAL IMPLANTS FOR OSAS TREATMENT IN PATIENTS AFTER LASER-ASSISTED UVULECTOMY-V. Kaliadzich Zhanna, S. Tishkevich Ekaterina, E. Makarina-Kibak Ludmila Pag. 53

ANALYSIS OF THE CORRELATION BETWEEN SLEEP HYGIENE AND CLINICAL SYMPTOMS IN OBSTRUCTIVE SLEEP APNEA PATIENTS-SW. Kim, SY. Shin, YC. Lee, KH. Lee, JS. Cho Pag. 54

IMPACT OF CPAP TREATMENT ON HbA1C IN PATIENTS WITH SEVERE OBSTRUCTIVE SLEEP APNEA AND TYPE 2 DIABETES MELLITUS-CM. Lam Jamie, YK. Lai Agnes, CL. Lam David, CC. Tam Terence et al. Pag. 55

GENDER DIFFERENCES IN THE EFFECT OF COMORBID INSOMNIA ON DEPRESSION, ANXIETY, FATIGUE, AND SLEEPINESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA-MH. Lee, SA. Lee, SH. Chung, YS. Jung, WS. Kim Pag. 56

MODIFIED UVULOPALATOPHARYNGOPLASTY AND COBLATION CHANNELING OF THE TONGUE FOR OBSTRUCTIVE SLEEP APNEA: A MULTI-CENTRE AUSTRALIAN TRIAL-SG. MacKay, CS. FRA, AS. Carney, CS. FRA et al Pag. 57

VALUATION OF ORTHOAPNEA DEVICE EFFECTIVENESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA SYNDROME-M. Martín Romero, N. Amecrane, S. Díaz Muñoz, R. Hidalgo Sánchez et al. Pag. 58

"ASSESSING AIRFLOW PATTERNS AND PRESSURE IN THE PHARYNGEAL AIRWAY AS AN INDICATOR OF OBSTRUCTIVE SLEEP APNEA SEVERITY"-M. Mihaescu, NB. Powell, G. Mylavarapu , EJ. Gutmark , C. Guilleminault Pag. 59

PHARYNGEAL FLAP CONSTRUCTION SURGERY WITH TONSILLECTOMY IN VELOPHARYNGEAL INCOMPETENT CHILD ACCOMPANYING OSAS - A CASE REPORT-K. Naito, S. Horibe, A. Inuzuka, N. Suzuki, H.Kato Pag. 60

DOES THE MANDIBULAR ADVANCING DEVICE (MAD) WORK INDEPENDENT OF OBSTRUCTION LEVEL?-AH. Nilsen , S. Nordgård , BK. Stene , TH. Midtlyng et al. Pag. 61

PREDICTIVE VALUE OF DRUG INDUCED SLEEP ENDOSCOPY COMPARED TO SNORING-SOUND TEST AND MÜLLER MANEUVER IN ADULT OSAS PATIENTS-Y. Nishimura, S. Nakata, T. Hirata, T. Kojima et al. Pag. 62

ENDOTHELIAL FUNCTION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: ASSOCIATIONS WITH NIGHTTIME OXYGENATION AND BLOOD METABOLIC PARAMETERS-G. Pilkauskaite, S. Miliauskas, R. Verseckaite, T. Lapinskas et al. Pag. 63

OBSTRUCTIVE SLEEP APNEA IN TREACHER-COLLINS SYNDROME: PREVALENCE, SEVERITY, CAUSE AND SCREENING-RG. Plomp, HH. Bredero-Boelhouwe, KFM. Joosten, EB. Wolvius et al. Pag. 64

PECULIAR SLEEP POSITION IN DOWN SYNDROME PATIENTS AS A PROTECTIVE MECHANISM AGAINST NOCTURNAL OXYGEN DESATURATION-A. Rahmawati, A. Suyama-Chishaki, H. Sawatari, N. Hashiguchi et al. Pag. 65

UVULOPALATAL FLAP WITH AND WITHOUT LATERAL PHARYNGOPLASTY: A CLINICAL PROSPECTIVE RANDOMIZED STUDY IN ASIAN ADULTS-R. Ping-Ying Chiang, CY. Chi Pag. 66

SURGERY AS FIRST-LINE TREATMENT FOR OBSTRUCTIVE SLEEP APNEA-B. Rotenberg, J. Theriault Pag. 67

DIAGNOSTIC ACCURACY OF THE STOP, STOP-BANG AND SIMPLIFIED STOP-BANG FOR DETECTION OF OBSTRUCTIVE SLEEP APNEA IN CLINICS-K. Sadeghniiat-Haghighi, A. Montazeri, A. Khajeh Mehrizi, O. Aminian Pag. 68

IMPACT OF OSA ON INFLAMATORY MARKERS, ADIPOKINES AND ENDOTELIAL DYSFUNCTION IN MORBIDLY OBESE PATIENTS WITH METABOLIC SYNDROME: A MATCHED STUDY-N. Salord, M. Gasa , AM. Fortuna , M. Mayos et al. Pag.69

SATISFACTION WITH A SINGLE EDUCATION SESSION FOR CPAP USAGE-R. Sampaio, M. Drummond , A. Marinho , T. Pinto Pag. 71

ERECTILE DYSFUNCTION IN OBSTRUCTIVE SLEEP APNEA PATIENTS-T. Santos, M. Drummond F. Botelho Pag. 72

RATE AND CLINICAL FEATURES OF OBSTRUCTIVE SLEEP APNEA IN THAI HYPERTENSIVE PATIENTS-K. Sawanyawisuth, J. Chindaprasirt , A. Domthong , P. Limpawattana , S. Chumjan Pag. 73

NATION-WIDE SURVEILLANCE ABOUT THE RELATIONSHIP BETWEEN SLEEPING POSTURE AND SYMPTOMS OF SLEEP DISORDERED BREATHING AMONG THE PATIENTS WITH DOWN SYNDROME-H. Sawatari, A. Suyama-Chishaki, A. Rahamawati, N. Hashiguchi et al. Pag. 74

PREDICTIVE UTILITY OF A RISK ASSESSMENT FOR NONADHERENCE TO CPAP: NAP INDEX- AM. Sawyer, A. Hanlon, L. Sweer, A. Rizzo Pag. 75

TRANSORAL ROBOTIC SURGERY (TORS) FOR OBSTRUCTIVE SLEEP APNEA - INITIAL EXPERIENCE IN AN ACADEMIC MEDICAL SLEEP CENTRE IN SINGAPORE-T. Song-Tar, T. Hin-Ngan, H. Hong-Juan Pag. 76

SAFETY OF SINGLE STAGE MULTI LEVEL PROCEDURES FOR MILD TO MODERATE OSA-INDIAN PERSPECTIVE-S. Srinivas Kishore Pag. 77

THE BISPECTRAL INDEX (BIS) AS AN INSTRUMENTAL METHOD FOR THE MEASUREMENT OF THE EXCESSIVE DAYTIME SLEEPINESS (EDS). PILOT STUDY-J. Svaza, I. Indriksone, M. Vitola, A. Aleksejevs Pag. 78

OXYHOLTER - GOOD SCREENING TOOL IN HIGH RISK OSA PATIENTS-M. Tomaszewska-Kiecana, M. Rostek, J. Rawdanowicz, I. Załęska-Zydlewska et al. Pag. 79

MODIFICATION OF AIRWAYS ANATOMY AFTER ORTHOGNATHIC SURGERY: VOLUMETRIC , AREAL AND LINEAR STUDY WITH CONE BEAM CT-L. Trevisiol, F. Terranova, A. Invento, A. D'Agostino, PF. Nocini Pag. 80

MAXILLO-MANDIBULAR DISTRACTION OSTEOGENESIS USING INTERNAL DISTRACTORS IN CHILDREN WITH SEVERE RETROGNATHIA AND OBSTRUCTIVE SLEEP APNEA-*IWK***-**Tsui, HDP. Chua, LK. Cheung Pag. 81

AMBIENT TEMPERATURE AND OBSTRUCTIVE SLEEP APNEA – EFFECTS ON SLEEP, SLEEP APNEA AND MORNING ALERTNESS-F. Valham, C. Sahlin , H. Stenlund, KA. Franklin Pag. 82

DIAGNOSIS AND TREATMENT OF INFANTS WITH SUSPECTED ROBIN SEQUENCE, A REVIEW OF 89 CASES-MJS. Van Lieshout, KFM. Joosten, MJ. Koudstaal, LJ. Hoeve et al. Pag. 83

PREVALENCE AND SEVERITY OF OBSTRUCTIVE SLEEP APNEA IN INFANTS WITH ROBIN SEQUENCE-MJS. Van Lieshout, KFM. Joosten, MJ. Koudstaal, B. Pullens et al Pag. 85

CPAP THERAPY IN OSA PATIENTS: THE EFFECTS ON HEALTHCARE USE AND MEDICAL COSTS RELATED TO CARDIO- AND CEREBROVASCULAR DISEASES-JK. Varga, G. Horvath, ZI. Komlosi, G. Boszormenyi-Nagy et al Pag. 86

MATERNAL SLEEP-DISORDERED BREATHING AND FOETAL OUTCOMES-DL. Wilson, AM. Fung H. Esdale, M. Barnes et al Pag. 87

THE FEASIBILITY OF USING TELEMONITORING AS A SUPPLEMENTARY SERVICE OF THE SLEEP LABORATORY-WC.Chan Pag. 88

SLEEP IMPAIRMENT AND CHRONIC RHINOSINUSITIS-Y. Ando, T. Okushi, D. Asaka, T. Nakayama et al. Pag. 89

THE ASSOCIATION BETWEEN SLEEP APNEA AND YOUNG ADULT WITH HYPERTENSION: A CASE-CONTROL STUDY IN MALAYSIA-ZA. Asha'ari, HM. Hasmoni, J. Rahman, RA. Yusof, R. Ahmad Pag. 90

DOES RAPID PALATAL EXPANSION DECREASE SLEEP BRUXISM IN CHILDREN? A PILOT STUDY-A. Bellerive, A. Montpetit, H. El-Khatib, MC. Carra et al. Pag. 91

SLEEP DISORDERED BREATHING IN FRIEDREICH'S ATAXIA-J. Copland, M. Ho , LA. Corben, G. Tai , MB. Delatycki Pag. 92

DETECTION OF ANTICARDIOLIPIN ANTIBODIES IN OBSTRUCTIVE SLEEP APNEA PATIENTS- PL. Coutinho, MC. Feres, WAS. Moraes, FD. Cintra et al. Pag. 93

ISCHEMIC HEART DISEASE AND OBSTRUCTIVE SLEEP APNEA SYNDROME-P. Cuellar-Raya, EJ. Soto-Hurtado , JM. Garcia-Jimenez , N. Benitez-Parejo et al. Pag. 94

INFLUENCE OF GENDER IN PATIENTS WITH SLEEP APNEA SYNDROME-P. Cuellar-Raya, EJ. Soto-Hurtado, JM. Garcia-Jimenez, N.Benitez-Parejo et al. Pag. 95

A 10-YEAR FOLLOW-UP OF A MANDIBULAR PROTRUDING DEVICE IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA AND SNORING-EW. Eriksson, L. Leissner, G. Isacsson, A. Fransson Pag. 96

THE ROLE OF SLEEP DEPRIVATION IN EATING HABITS AND WEIGHT-A. Henriques Faria Eduarda, CA. Rodrigues Santos, DP.Leal Tavares, FJ.Moutinho dos Santos, F.Teixiera Pag. 97

PULSOXYMETRICAL EVALUATION OF SURGICAL TREATMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME-T. Grochowski, M.Tomaszewska, W. Kukwa, A. Krzeski Pag. 98

UPPER AIRWAY VOLUME CHANGES AFTER MONO AND BIMAXILLARY ADVANCEMENT: PILOT STUDY USING CONE-BEAM COMPUTERIZED TOMOGRAPHY-R. Guijarro-Martínez, M. Fernández-Barriales, J. Mareque-Bueno, F. Hernández-Alfaro. Pag. 99

THE INFLUENCE OF BODY MASS INDEX BETWEEN OXYHEMOGLOBIN INDICES AND AROUSAL INDEX FOR PATENTS WITH OBSTRUCTIVE SLEEP APNEA-*LW*-Hang, CL. Lin, TM. Hsieh Pag.100

SIGNIFICANCE OF PLASMA VASPIN LEVELS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME: A NEW BIOMARKER FOR SEVERITY AND TREATMENT RESPONSES K. Hosokawa, T. Nishijima, T. Kizawa, S. Takahashi et al. Pag.101

WHAT IS THE COMPLIANCE OF PATIENTS WITH SEVERE SLEEP APNOEA AND HYPOPNOEA SYNDROME WHO STARTED TREATMENT WITH CPAP IN THE 1990S?-I. Jurikovic. Pag.102

USEFULNESS OF NASAL AIRWAY RESISTANCE IN PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME-A. Kihara, S. Horibe, T. Horibe, K. Naitou Pag.103

USEFULNESS OF POSTURAL CHANGE OF PREOPERATIVE NASAL RESISTANCE IN PATIENT WITH PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME-A. Kihara, S. Horibe, T. Horibe, K. Naito Pag.104

THE ROLE OF SLEEP POSITION IN OBSTRUCTIVE SLEEP APNEA SYNDROME IN KOREAN PEOPLE- *TW-* Kim, B. Yoo, J. Choi, L. Hyun-Kook Pag.105

EFFECTS OF GENIOGLOSSUS ADVANCEMENT PLUS UVULOPALATOPHARYNGOPLASTY FOR OBSTRUCTIVE SLEEP APNEA HYPOPNEA SYNDROME-K. Kitamura, M. Shimizu, M. Yatomi, K. Otsuka, M. Suzuki Pag.106

PREVALENCE OF SLEEP DISORDERED BREATHING IN JAPANESE YOUNGER ELEMENTARY SCHOOL CHILDREN-T. Kitamura, S. Miyazaki, T. Kanemura, M. Okawa et al. Pag.107

UNEQUAL IMPACT OF CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY ON COMPLIANCE AND SLEEPINESS DOMINANT MIXED VS. PREDOMINANT OBSTRUCTIVE VS. PURE OBSTRUCTIVE-DL. Koo, EY. Joo, SB. Hong Pag.108

INFLAMMATORY MYOFIBROBLASTIC TUMOR (IMT) BY METHICILLIN-RESISTANT S. AUREUS (MRSA) MIMICKING A LUNG CANCER: A CASE REPORT-JM. Lebrón-Ramos, T. Pérez-Romero, A. Padilla-Galo, LF. de Rota-García et al. Pag.109

EXPERIENCE WITH OMALIZUMAB IN THE TREATMENT OF PATIENTS WITH SEVERE ALLERGIC ASTHMA: A FIRST APPROACH AT 16 WEEKS-JM. Lebrón-Ramos, LF. de Rota-García, A. Padilla-Galo, MV. Núñez-Rodríguez et al. Pag.110

MIXED SLEEP APNEA IN DIAGNOSTIC POLYSOMNOGRAPHY IS RELATED TO COMPLEX SLEEP APNEA SYNDROME AND FAILURE OF CPAP TITRATION STUDY-GH. Lee, MJ. Kim, EM. Lee, CS. Kim, SA. Lee Pag.113

ESTABLISHMENT OF RABBIT MODEL OF OBSTRUCTIVE SLEEP APNEA USING BOTULINUM TOXIN AND RADIOLOGICAL IDENTIFICATION OF UPPER AIRWAY OBSTRUCTION-WH. Lee, CH. Lee, JE. Lee, MC. Lee , JW. Kim Pag.114

THE INFLUENCE OF BODY MASS INDEX BETWEEN OXYHEMOGLOBIN INDICES AND AROUSAL INDEX FOR PATIENTS WITH OBSTRUCTIVE SLEEP APNEA-LW. Hang , CL. Lin , TM. Hsieh Pag.115

THE EFFECT OF GENDER, DAYTIME SLEEPINESS, AND INSOMNIA ON DEPRESSION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA-SM. Hyun, HJ. Kim, BJ. Lee, YS. Chung Pag.117

"IMPORTANCE OF NURSE INTERVENTION IN THE ADAPTATION OF PATIENT TREATED WITH CPAP. EXPERIENCE IN THE HOSPITAL COSTA DEL SOL"-A. Mochon Doña, JA. Piña Fernandez, JJ. Cebrian Gallardo Pag.118

CYCLIC ALTERNATING PATTERN ANALYSIS IN CHILDREN WITH OSA BEFORE AND AFTER ADENOTONSILLECTOMY-H. Moriwaki , A. Uchida , T. Yagi , S. Chiba Pag.119

IMPROVEMENT OF ADHERENCE TO THE TREATMENT WITH ADAPTIVE SERVO-VENTILATION BY A SPECIALIZED PROCEDURE IN PATIENTS WITH CONGESTIVE HEART FAILURE-M. Motomura, M. Yoshida, N. Kawamura, H. Momii, SI. Ando Pag.120

VOCAL CORD ABDUCTOR PARALYSIS IN THE EARLY STAGE OF MULTIPLE SYSTEM ATROPHY: A REPORT OF TWO CASES-A. Numao , K. Suzuki , M. Miyamoto , T. Miyamoto et al. Pag.121

THE ASSESSMENT OF MICRODEBRIDER TECHNIQUE FOR ADENOTONSILLECTOMY IN PEDIATRIC PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME-H. Otake, S. Nakata , M. Tagaya , T. Nakashima Pag.122

A REVEALING POLYSOMNOGRAPHY: AN UNEXPECTED TYPE I CHIARI MALFORMATION-F. Pendola, MG. Baglietto, MP. Ivaldi Pag.123

OBSTRUCTIVE SLEEP APNEA SYNDROME AND METABOLIC SYNDROME IN OBESE CHILDREN AND ADOLESCENTS-F. Pendola , MF. Bravo , S. Babbini , MP. Ivaldi Pag.124

"MANAGEMENT OF THE OSA PATIENT IN A SPECIFIC SLEEP NURSE DEPARTMENT IN THE AGENCIA PUBLICA EMPRESARIAL SANITARIA COSTA DEL SOL"-JA. Piña Fernandez, A. Mochon Doña, JJ. Cebrian Gallardo Pag.125

PILLAR IMPLANT REDUCING SPECTRAL POWER OF SNORING-Lieber Po-Hung Li, MD, PhD, Po-Lei Lee, PhD, Joshua Kuang-Chao Chen, MD Pag.126

SLEEP BREATHING SCALE REFLECTS THE OBJECTIVE SEVERITY OF OBSTRUCTIVE SLEEP APNEA-HS. Ryu, GH. Lee, SA. Lee Pag.127

SLEEP-RELATED BREATHING DISORDERS IN PATIENTS WITH MULTIPLE SYSTEM ATROPHY- H. Sakuta , K. Suzuki , M. Miyamoto , T. Miyamoto et al. Pag.128

STUDY OF AMBULATORY BLOOD PRESSURE MONITORING, CIRCADIAN RYTHM AND CARDIOVASCULAR FACTORS IN HYPERTENSIVE PATIENTS WITH AND WITHOUT SLEEP APNEA SYNDROME-EJ. Soto Hurtado 1, P. Cuéllar Raya 2, JM. García Jiménez 2, FJ. Cabello Rueda et al. Pag.129

PRESENCE OF METABOLIC SYNDROME AND CHARACTERISTICS IN HYPERTENSIVE PATIENTS WITH AND WITHOUT SLEEP APNEA SYNDROME-EJ. Soto Hurtado, P. Cuéllar Raya, JM. García Jiménez, FJ. Cabello Rueda et al. Pag.131

SNORING IS ASSOCIATED WITH IMPAIRED MOTOR FUNCTION, DISEASE SEVERITY, AND QUALITY OF LIFE, BUT NOT DAYTIME SLEEPINESS, IN PARKINSON'S DISEASE-K. Suzuki, M. Miyamoto, T. Miyamoto, S. Suzuki et al. Pag.132

NASAL SURGERY FOR MILD OSAS WITH NASAL OBSTRUCTION-H. Tada, N. Terada, S. Miyazaki Pag.133

GLYCATED HEMOGLOBIN IMPROVEMENT BY ORAL APPLIANCE THERAPY IN OBSTRUCTIVE SLEEP APNEA SYNDROME PATIENTS WITH DIABETES MELLITUS-K. Yoshida Pag.134

FUNCTIONAL BRAIN IMAGING IN RESPONSE TO ORAL AND COGNITIVE TASKS ASSESSED BY NEAR-INFRARED SPECTROSCOPY IN OBSTRUCTIVE SLEEP APNEA SYNDROME-K. Yoshida Pag.135

SUB MUCOSAL UVELOPLASTY, A PAINLESS SURGICAL PROCEDURE-MN. Daouk, M. Hammad Pag.136

DIAGNOSTICS AND SURGERY OF OBSTRUCTIVE SLEEP APNEA HYPOPNEA IN ADULTS-E. Olszewska, M. Rogowski Pag.137

RADIOFREQUENCY SURGERY FOR SNORING AND SLEEP APNOEA-NP. Shah Pag.138

COBLATION ASSISTED SOFT PALATAL WEBBING FLAP PALATOPLASTY: A NEW TECHNIQUE FOR THE TREATMENT OF SNORING- Ahmed Mohamed Mohye El Din Elbassiouny Pag.140

ACCEPTANCE AND COMPLIANCE TO VENTILATION TREATMENT IN OSAS PATIENTS- Eibenstein A., Fusetti M., Casto V., Di Fulvio F et al. Pag.141

EVALUATION OF LINGUAL TONSIL HYPERTROPHY IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: MAGNETIC RESONANCE IMAGING STUDY- Jeong-Whun Kim, Woo Hyun Lee Pag.142

THE EFFECT OF AN EXTERNAL MECHANICAL STIMULUS DEVICE TO TREAT OBSTRUCTIVE SLEEP APNEA- Miyasato S., Shippey K.F., Nakata R., Mostafanezhad I., Vossman E. Pag.143

TONSILLOTOMY OF OSAS TREATMENT CONFIRMED BY POLYSOMNOGRAPHY IN CHILDHOOD-Ondrová M. , Ryzí M., Máchalová M., Kraus J., Floriánová L. Pag.144

SCREENING OF SLEEP APNEA THROUGH NOVEL AMBULATORY TELEMEDICAL POLYSOMNOGRAPHY FOR PRIMARY HEALTH CARE-Peltomaa M, Larsen A., Schwensson M., Partanen J., Lehti H. Pag.145

SLEEPING APNEA AND THE METABOLIC DISORDERS-Quintaneiro C.,Jorge J. , Lopes M., Pereira I. Et al. Pag.146

EFFECT OF NASAL AIRWAY STENT (NAS) ON OBSTRUCTIVE SLEEP APNEA-Satoh M., Komada I., Hioki K., Yamada H. Pag.147

PREVALENCE AND SEVERITY OF OBSTRUCTIVE SLEEP APNEA IN INFANTS WITH ROBIN SEQUENCE-Van Lieshout M.J.S., Joosten K.F.M., Koudstaal M.J., Pullens B., et al. Pag.148

THE DIFFERENCE OF POLYSOMNOGRAPHY BETWEEN MAN AND WOMEN, YOUNG AND OLD PEOPLE IN OBSTRUCTIVE SLEEP APNEA GROUP-Boo-Young K. Pag.149

A SEVERE OCULAR COMPLICATION OF OSAS DUE TO MANDIBULAR RETHROGNATHIA- Fabiani C, Fabiani V Pag.150

ANATOMICAL ANALYSIS OF STUFFY PATIENT WITH SNORING-Lee D.C., Yoo H.J., Park C. S. Pag.151

POLYGRAPHY VS. POLYSOMNOGRAPHY: MISSING OSAS DIAGNOSIS IN SYMPTOMATIC SNORERS – A WAKE-UP CALL FOR CLINICINAS-Nerfeldt Pia, PhD, MD; Aoki Fumi, PhD, MD; Friberg Danielle, PhD, MD Pag.152

ADVANTAGE OF POWER ASSISTED PARTIAL TONSILLECTOMY VS.CONVENTIONAL "TOTAL"TONSILLECTOMY IN THE POINT OF OBSTRUCTED AIRWAY-Deak L., Hyder J., Kumar S., Katona G. Pag.153

HIGH PREVALENCE OF SLEEP BREATHING DISORDERS IN ORTHODONTIC PATIENTS- NG At, Aras B, Papadopoulos D. Pag.154

COMPUTED TOMOGRAPHY IN THE EVALUATION OF RAPID MAXILLARY EXPANSION: SKELETAL EFFECTS IN OSAS CHILDREN-Pirelli P., De Rosa C., Fanucci E. Pag.155

COBLATION ASSISTED TONGUE BASE EXCISION – A NOVEL TECHNIQUE- Ramakrishnan V. Pag.156

AUTOADJUSTING PAP OR PRESSURE CHANGE OF FIXED CPAP IN PATIENTS WITH SEVERE OSA AFTER ADEQUATE CPAP TITRATION-Woo Sung K. Pag.157

MODIFIED EXPANSION SPHINCTER PHARYNGOPLASTY: SURGICAL TECHNIQUE AND RESULTS-Martone C., Gobbi R., Marra F., Fernandez I.J., et al. Pag.158

MULTI LEVEL UPPER AIRWAY IMPLANTS FOR TREATMENT OF OBSTRUCTIVE SLEEP APNEA: TOLERANCE IN CANINES AND FINITE ELEMENT ANALYSIS OUTCOMES-Pavelec V., Anderson J.M., Buscemi P., de Vries N et al. Pag.159

CLINICAL AND POLYSOMNOGRAPHIC EVALUATION OF OBSTRUCTIVE SLEEP APNEA IN ADULT-Rahman Al-Ghareeb A. Pag.160

SAFETY IN PERFORMING SINGLE STAGE MULTILEVEL PROCEDURES FOR OSA-Srinivas Kishore S Pag.161

QUALITY OF LIFE OUTCOMES FOR ADULT OBSTRUCTIVE SLEEP APNEA: COMPARISON STUDY OF UPPER AIRWAY SURGERY, CPAP AND MANDIBULAR ADVANCEMENT SPLINTS-Gunawardena I., Robinson S., Hobson J., Chia M., et al. Pag.162

TONSILLOTOMY OF OSAS TREATMENT CONFIRMED BY POLYSOMNOGRAPHY IN CHILDHOOD-Ondrová M., Ryzí M., Máchalová M.1, Kraus J., Floriánová L. Pag.163

SLEEP ENDOSCOPY : MONITORING THE ANESTHETIC DEPTH USING ENTROPY-Plasman C, Verdoodt H , Khamakhtchian M, Bisschop P, Van der Linden P Pag.164

EXPANSION SPHINCTER PHARYNGOPLASTY (ESP) PLUS ANTERIOR PHARYNGOPLASTY (AP) IN THE TREATMENT OF OSAHS-Sorrenti G., Pelligra I., Marra F., Scaramuzzino G et al. Pag.165

REVISION PALATOPLASTY BY SOFT PALATAL FLAP: A NEW SURGICAL TECHNIQUE FOR TREATMENT OF FIBROSED POST PALATOPLASTY SOFT PALATE- AM. Mohye, ED. Elbassiouny Pag.166

IT SHOULD BE A: SNORING CLINIC-AM. Mohye, ED. Elbassiouny Pag.167

MANDIBULAR ADVANCE INTRAORAL APPLIANCES. REVISION-MM. Barrionuevo Pag.168

SURGICAL TREATMENT OF SLEEP RELATED BREATHING DISORDERS: HANDLING OPTIMIZATION USING DRUG INDUCED SLEEP ENDOSCOPY-P. Bisschop, D. Neu, M.Khamaktchian Pag.169

TREATMENT OF OBSTRUCTIVE SLEEP APNEA WITH A NOVEL HYPOGLOSSAL NERVE STIMULATION SYSTEM: SINGLE CENTER EXPERIENCE WITH RECRUITMENT, SCREENING AND ENROLLMENT-AL. Collins, MC.Campbell, J.Kaiser, FJ.O'Donoghue et. al. Pag.170

FURTHER OBSERVATIONS BETWEEN NEUROPSYCHIATRIC DISORDERS AND OSAS-L. D'Angelo , G. Salerno , G.Buongiorno , M.Troiano et. al. Pag.171

A COMPREHENSIVE REHABILITATION PROGRAM TO IMPROVE SLEEP APNOEA SYNDROME. A PILOT STUDY-M.Desplan, Y. Dauvilliers, J.Mercier, G.Ninot , C.Prefaut Pag.172

RANDOMIZED CLINICAL TRIAL EVALUATING COMBINATION THERAPY WITH SLEEP POSITION TRAINER AND MANDIBULAR ADVANCEMENT DEVICE IN RESIDUAL POSITIONAL SLEEP APNEA PATIENTS-M. Dieltjens , AV. Vroegop, M. Willemen, JA. Verbraecken et al. Pag.173

SENSORY AUDITORY HAIR CELLS ALTERATIONS AND RETINAL NERVE CHANGES DUE TO OSAS-C. Fabiani, A. Rea, V. Fabiani Pag.175

CPAP THERAPY CAUSE OCULAR AND ACOUSTIC DISCOMFORT-C. Fabiani, V. Fabiani, A. Rea Pag.176

INTER-PTERYGOID DISTANCE AS A PREDICTOR OF SUCCESS IN MODIFIED EXPANSION SPHINCTER PHARYNGOPLASTY -IJ. Fernandez, R . Gobbi., O. Piccin, G. Scaramuzzino, G. Sorrenti Pag.177

MAD SIMULATOR DURING DRUG INDUCED SLEEP ENDOSCOPY IN OSAS PATIENTS: OUR EXPERIENCE AND COMPARISON WITH ESMARCH MANOUVRE-R.Gobbi, F. Milano, IJ. Fernandez, CO. Martone Piccin, G. Scaramuzzino, G. Sorrenti, Pag.178

THE USAGE OF PALATAL IMPLANTS FOR OSAS TREATMENT IN PATIENTS AFTER LASER-ASSISTED UVULECTOMY-Z V. Kaliadzich, E S. Tishkevich, L E. Makarina-Kibak Pag.179

EVALUATION OF TEMPERATURE – CONTROLLED RADIOFREQUENCY TREATMENT OF TONSILLAR AND TURBINATE HYPERTROPHY IN PATIENTS WITH SLEEP DISORDERED BREATHING-G. Khandanyan , A. Matevosyan , A. Shukuryan, P. Zelveian Pag.180

12-MONTH FOLLOW-UP OF UPPER AIRWAY STIMULATION (UAS) FOR OBSTRUCTIVE SLEEP APNEA-M. Kryger, K. Strohl, J. Maurer , BT.Woodson , W. De Backer Pag.181

APNOEA LOAD - A NEW SUPPLEMENTARY INDEX FOR ASSESSING SLEEP APNOEA-A Larsen, MD, PhD Pag.183

MIXED SLEEP APNEA IN DIAGNOSTIC POLYSOMNOGRAPHY IS RELATED TO COMPLEX SLEEP APNEA SYNDROME AND FAILURE OF CPAP TITRATION STUDY-GH. Lee , MJ. Kim , EM. Lee , CS. Kim , SA. Lee Pag.184

BIPOLAR QUANTUM MOLECULAR RESONANCE® TONSILLECTOMY VERSUS COLD-STEEL DISSECTION TONSILLECTOMY: A PROSPECTIVE STUDY-F. Lorusso, R. Speciale, A. Ballacchino, S. Gallina Pag.185

ROLE OF SALPINGOPHARYNGEAL FOLD (SPF) IN LATERAL PHARYNGEAL COLLAPSE CAUSING OBSTRUCTIVE SLEEP APNEA (OSA)

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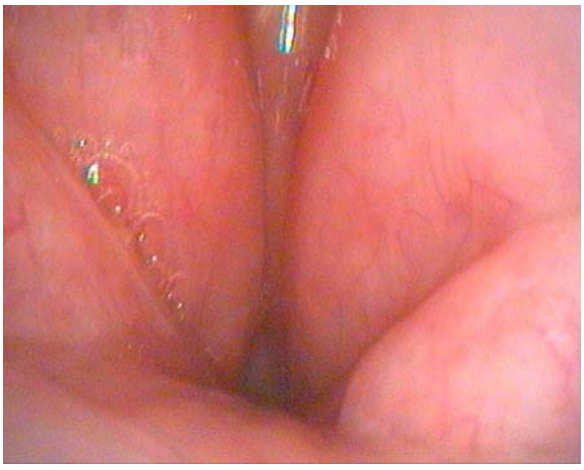
Introduction

Lateral pharyngeal collapse has been found to be a major contributor in obstructive sleep apnea (OSA), and is an important cause of failure of UPPP surgery, as classical UPPP fails to address the lateral pharyngeal collapse. Salpingopharyngeal fold (SPF), which is a vertical fold of mucous membrane, that stretches from the lower part of the torus tubaris to the palate, contains the salpingopharyngeus muscle. Hypertrophy of the salpingopharyngeal fold was found to be an important contributor in the lateral pharynx causing collapse and obstruction, and was shrunk by coblation plasma wand. This was done as an adjunctive procedure along with UPPP, to address the lateral pharyngeal collapse with significant results. The role of the Salpingopharyngeal folds (SPF) has not been described in the literature so far in lateral pharyngeal collapse.



Objective

To recognize and evaluate the role of salpingopharyngeal fold in lateral pharyngeal collapse causing obstructive sleep apnea (OSA), and the effect of coblation treatment for the same, on the efficacy of UPPP procedure.

Methods

Sleep nasal endoscopy with propofol sedation using flexible distal chip videonasopharyngoscope from Karl Storz, Germany, was performed in 40 subjects with moderate to severe obstructive sleep apnea (OSA) confirmed as predominant upper obstruction on overnight study with Apneagraph by MRA medical, London. Lateral pharynx was evaluated for hypertrophic salpingopharyngeal folds causing obstruction during the apnea spell. 28 out of 40 subjects were found to have hypertrophic salpingopharyngeal folds resulting in lateral pharyngeal collapse. Out of these 18 patients were treated with coblation wand ultra sp from Arthrocare, USA for 10 seconds in the lower part of the salpingopharyngeal folds along with classical UPPP, and in 10 patients, classical UPPP was performed. The success rate of classical UPPP was 70 percent, whereas, with SPF coblation it was 90 percent. The success rate was defined as more than 50 percent reduction in apnea hypopnea index (AHI) and an AHI of less than 20, measured at the end of 6 months.

Results

70 percent of patient showed lateral pharyngeal collapse due to hypertrophied salpingopharyngeal folds (SPF). It was found that patients with similar BMI, but with Salpingopharyngeal fold hypertrophy were having higher AHI as compared to the patients without SPF hypertrophy. The results of UPPP surgery improved significantly when salpingopharyngeal fold (SPF) coblation was combined with it.

Conclusions

Salpingopharyngeal fold (spf) is an important contributor in lateral pharyngeal collapse causing obstructive sleep apnea (OSA). This should be actively looked for and treated to increase the efficacy of palatal surgery. Further study and data is required to understand this entity better.

SUBMUCOSAL MIDLINE ENDOSCOPIC LINGUALBASE LYSIS (SMELL)—A MODIFICATION OF SUBMUCOSAL MINIMALLY INVASIVE LINGUAL EXCISION (SMILE) PROCEDURE FOR OBSTRUCTIVE SLEEP APNEA

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Introduction

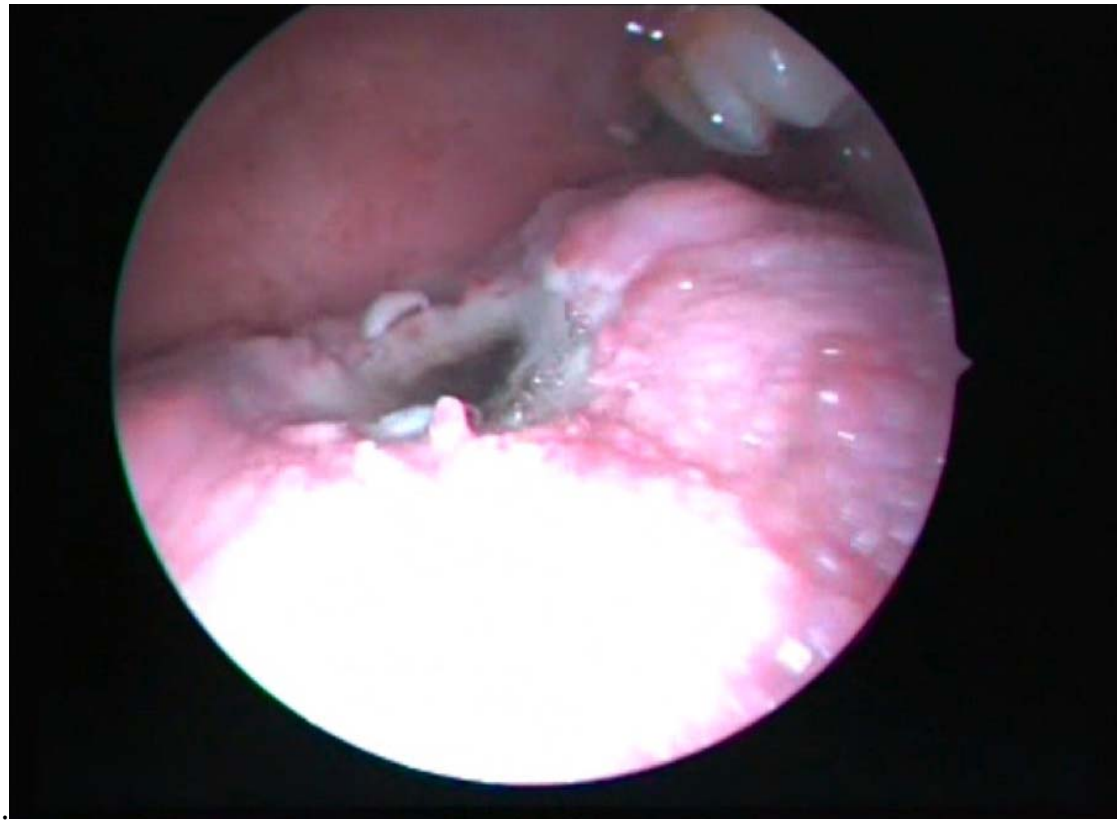
SMILE (submucosal minimally invasive lingual excision), originally described for pediatric patients with obstructive macroglossia (such as Beckwith-Wiedemann and Down syndrome),is a known procedure for reduction of tongue volume in OSA, in which the tongue tissue is ablated submucosally in the midline with coblation wand .It has been shown to be more effective than radiofrequency of base of tongue(RFBOT). However, the complication rates are higher as compared to RFBOT. The reasons for the high rate of complications could be the anterior position of the incision on the tongue in midline, where the lingual neurovascular bundle is closer to midline and long course of the tunnel. The term also does not completely explain the procedure, i.e. midline, tongue base, endoscopic guidance .In tongue base obstructions causing obstructive sleep apnea, the area requiring reduction is only the base of tongue behind the foramen caecum, so, we can start the incision at foramen caecum. In this area, the lingual neurovascular bundle is far away from midline and deep (at least 1.5 cm from midline and at least 2 cm deep). So, we propose a modification in the original SMILE technique, where we start making the tunnel at the foramen caecum in the midline and keep going backwards submucosally under endoscopic guidance.

Objective

To introduce a new technique called SMELL, a modification of earlier technique SMILE, for tongue base obstruction causing obstructive sleep apnea (OSA) without generalized macroglossia in adults.

Method

SMELL (Submucosal Midline Endoscopic Lingualbase Lysis)was performed in 3 adult patients of severe obstructive sleep apnea(OSA) with proven tongue base obstruction on sleep nasal endoscopy and apneagraph test showing lower level obstruction. Lingual tonsils hypertrophy was ruled out in all 3 patients. After written informed consent, patients were given general anesthesia with nasotracheal intubation .The tongue was pulled with a central stitch. Lingual vascular bundles were mapped with color doppler probe at the level of foramen caecum and behind. Submucosal tunnel was created starting at the foramen caecum in the midline with coblation plasma wand procize EZview from arthrocare, USA,and extended backwards within I cm of midline on either side of the midline till the valleculae. This was performed under direct vision with Karl Storz endoscopy system and camera using 0 degree telescope. Hemostasis was achieved .The tunnel was kept open for drainage. Patient was kept in the high dependency unit in all 3 cases with nasotracheal intubation ,for 24 hours, after which the tube was removed. A CPAP was kept ready for a possible airway compromise.



Results

There was more than 50 percent reduction in the apnea-hypopnea index (AHI) in all 4 patients. None of the patients had any bleeding, swelling of base tongue leading to respiratory compromise, any change of taste, or significant pain. We could stop the analgesics in all forms by third day.

Conclusions

Submucosal Midline Endoscopic Lingualbase Lysis (SMELL),a modification of Submucosal Minimally Invasive Lingual Excision(SMILE),can be a prudent minimally invasive technique for tongue base ostructruction causing obstructive sleep apnea in adult patients. Further studies and continuous color doppler monitoring intraoperatively will improve the safety of the procedure further.

COMPARATIVE GENE EXPRESSION PROFILING OF PHARYNGRAL TISSUES FROM PATIENTS WITH OBSTRUCTIVE SLEEP APNEA AND CHRONIC TONSILITIS

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Introduction

The pathogenesis of obstructive sleep apnea (OSA) is not fully understood at the molecular level. It is thought to be a complex disorder that includes multiple genes, environmental influences and developmental factors. There are 4 primary (intermediate) pathogenic pathways through which genetic factors might act to increase the susceptibility to OSA. These pathways include; upper airway anatomy and craniofacial form, ventilatory control and upper airway collapsibility, body fat distribution and sleep-wake control. There are three general approaches have been used to investigate the molecular genetics of OSA which include; Candidate gene approach, gene expression studies and, whole genome screen followed by positional cloning. Gene expression studies using microarray technology has many advantages. It can provide valuable insight into important biological and pathological mechanisms and aid in the identification of novel biological markers of the disease.

Objectives

The objectives of present study were to examine the changes in gene expression profile in adult patients with OSA in comparison with the expression profile of chronic tonsillitis patients.

Methods

Our study group included 7 OSA patients as diagnosed with over night polysomnography and treated with uvulopalatopharyngoplasty (UPPP).A control group included 5 patients without OSA as proved by polysomnography have been complaining of chronic tonsillitis and treated with tonsillectomy. At the time of the operation, a small piece of tissue 0.53 was removed from palate-pharyngeal arch (Anterior tonsiller pillar) then the tissue was rapidly transferred to RNAlater solution till the time of RNA extraction. After RNA extraction, the quantity and quality of the extracted RNA were evaluated. Samples were hybridized to the Affymetrix Genechips overnight. The chip then washed and stained followed by scanning of the stained chip with the Genechip scanner. The data were analyzed using Genespring software. To validate the microarray data for selected genes, we used quantitative real-time PCR analysis.

Results

There were no significant differences between patients and control group as regard both age and body mass index (BMI). To identify the genes those are expressed in statistically significant manner, we performed a t-test between the data obtained from the OSA patients and chronic tonsillitis patients. A total of 1820 genes showed significant difference ($p<005$) in the gene expression level between both groups. Further filtering of the data using 1.5 fold changes, the number of genes decreased to 150 genes. Of these genes 67 genes were up-regulated while 83 genes were down regulated. Further analysis of the biological pathways revealed that Antigen process and presentation, immune response and B- cell mediated immune response are important biological process in the pathogenesis of OSA.

Conclusions

So far, our study is the first to study the gene expression profile from pharyngeal tissues in OSA patients. Of 47,000 studies genes on microarray chip, only 150 genes showed significant differences between OSA patients and control with1.5 fold changes. Antigen process and presentation and Immune response are important biological processes which may be involved in the pathophysiology of OSA.

EVALUATION OF NASAL AIRFLOW: A STUDY OF EXPERIMENTAL AND COMPUTATIONAL MODELING

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Background

The nasal cavity consists of very complicated anatomical structures and is prone to obstruction. Nasal obstruction is well known to be closely related to sleep-disordered breathing. Patients with obstructive sleep apnea syndrome (OSAS) usually need treatment with continuous positive airway pressure (CPAP), but nasal obstruction reduces CPAP adherence in patients with this syndrome. Unfortunately, the only objective method currently available to evaluate nasal obstruction is rhinomanometry. This study establishes a novel easy method to assess nasal airflow using computer simulation.

Objectives

The final purpose of this study is to carry out numerical simulations of airflows within the nasal cavity using three-dimensionally reconstructed images of the nasal cavity of patients obtained from CT. As the first step, the effectiveness of flow computations using simple models of the nasal cavity was investigated in this paper.

Methods

Two-dimensional acrylic resin nasal cavity models were constructed. In vitro experiments and computer simulations of airflow patterns were then conducted. Computations were completed on steady flows with the average airflow at the anterior aperture (nostril) set at +2.3 [m/s] and −2.3 [m/s] for inspiration and expiration, respectively. The pressure at the posterior end of the nasal cavity (choana) was set at −4 [Pa] and +4 [Pa] for inspiration and expiration, respectively. Air was used as the working fluid, the Reynolds number was calculated as 1640 using the equation $Re = u \times dh / v$ (u: flow velocity, dh: hydraulic diameter, v: kinematic viscosity), and therefore the flow was assumed to be laminar. In the experiments, water was used as the working fluid, flows were visualized by particle image velocimetry (PIV), and the condition of the volume rate at the anterior or posterior aperture was 0.93 [l/min]. Differences in the airflow pattern depended on the presence or absence of the middle and inferior turbinates in both the in vitro experiments and computational simulations.

Results and Conclusions

In both experimental and computational models with no nasal turbinates, the fluid entered from the anterior aperture into the nasal cavity, after which a whirl was generated in the nasal cavity due to inspiration. There was consequently a flow found going forward in the lower location of nasal cavity. During expiration, a whirl was generated in the reverse direction, after which airflow turned backward in the lower portion of the nasal cavity. In both models with the two turbinates, no large whirl, but a few tiny vortices and small reverse flows were generated during inspiration and expiration. These results may indicate that turbinates play an important role in decreasing whirl and reverse flow in the nasal cavity and securing smooth and sufficient ventilation. Results in experimental and computational models were very similar. Therefore, computation was considered a reliable and useful method to simulate airflow in the nasal cavity and to investigate the nasal cavity anatomically.

HYPOGLOSSAL NERVE STIMULATION FOR THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA: IMPROVEMENTS IN OBJECTIVE MEASURES AND DAYTIME SYMPTOMS

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Introduction

Reduced upper airway muscle activity during sleep contributes to obstructive sleep apnea (OSA) pathogenesis. Hypoglossal nerve (HGN) stimulation has previously shown promise in reducing OSA severity and symptoms. This study evaluated a novel HGN stimulation (HGNS®; Apnex Medical, Inc.) system for the treatment of OSA.

Objective

To evaluate the safety and effectiveness for up to one year following the implantation of the HGNS system.

Methods

Thirty-two subjects (66% male, mean age 52.8 ± 9.6 years) with moderate to severe OSA and unable to tolerate positive airway pressure (PAP) underwent surgical implantation of the HGNS system. This device stimulates the hypoglossal nerve at the onset of inspiration during sleep (sensed by change in thoracic impedance). All participants had therapy activated 1 month post-implant. OSA severity at baseline and response to therapy at 6 and 12 months were assessed by apnea-hypopnea index (AHI) during in-laboratory polysomnography (PSG) and scored by a central laboratory utilizing modified 1999 American Academy of Sleep Medicine criteria. Symptoms of OSA, including subjective sleepiness, sleep-related quality of life, sleep quality and mood were assessed using validated questionnaires: Functional Outcomes of Sleep Questionnaire (FOSQ), Epworth Sleepiness Scale (ESS), Sleep Apnea Quality of Life Index (SAQLI), Pittsburgh Sleep Quality Index (PSQI) and Beck Depression Inventory (BDI).

Results

With HGNS therapy, there was a significant improvement in mean AHI, 4% oxygen desaturation index (ODI4%) and arousal index at 6 and 12 months (Table 1). There was no associated change in weight.

Table 1: Objective PSG Measures (Events/Hr)

Measure		Baseline	6 months	12 months
AHI	Mean ± SD	44.7±17.7	21.3±18.0*	20.8±16.3*
	Median (IQR#)	42.2 (25.2)	14.2 (18.5)	14.0 (16.0)
ODI4%	Mean ± SD	20.4±17.2	11.1±17.6*	12.0±14.3
	Median (IQR)	14.2 (22.7)	5.1 (8.4)	7.8 (14.1)
Arousal Index	Mean ±SD	43.8±17.7	24.7±13.5*	25.4±11.1*
	Median (IQR)	40.7 (25.0)	21.1 (13.3)	23.7 (8.7)

* p<0.05 compared to baseline

Interquartile range

Sleep-related symptoms and sleep-related quality of life also improved with HGNS (Table 2).

Table 2: Subjective Symptom Assessment.

Scale	Baseline	6 months	12 months
ESS	12.0±4.6	8.4±3.8*	7.1±3.6*
FOSQ – Total	14.3±2.0	16.6±2.4*	17.4±2.0*
SAQLI	3.2±1.1	4.8±1.4*	5.2±1.1*
PSQI	10.5±3.0	8.4±4.2*	8.0±4.0*
BDI	15.3±9.1	9.0±8.0*	8.2±7.9*

Mean ± SD

* P value <0.001 are relative to baseline

Conclusions

HGNS therapy significantly decreased AHI, arousal index and symptoms. These data suggest that HGNS therapy may be a viable alternative for treating OSA in patients who do not tolerate PAP. A controlled, parallel group, randomized trial is currently underway.

LATERAL CEPHALOMETRIC MEASUREMENTS AND PREVALENCE OF MAXILLOMANDIBULAR DEFFICIENCIES IN OSA ELECTIVE PATIENTS FOR ORAL APPLIANCE THERAPY

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Introduction

Upper airway imaging provides information about soft tissue and craniofacial anatomy that might be important in understanding the pathogenesis of Obstructive Sleep Apnea (OSA). It is widely accepted that enlargement of upper airway soft tissue structures and reduction in the size of craniofacial structures are important risk factors for OSA. Lateral cephalometry is an accessible, readily available imaging method that gives excellent information on maxillomandibular deficiencies that might be treated with specific surgical therapy with excellent life-lasting results. We perform lateral cephalometric analysis on 58 consecutive OSA patients selected for treatment with oral appliances in order to describe the prevalence of maxillomandibular deformities that might be related to the pathologic cause and could subsequently result in potential candidates for surgical correction.

Objectives

To describe the prevalence of maxillomandibular deformities in our environment among patients initially selected as candidates for oral appliance therapy.

Methods

Lateral cephalometric measurements according to Steiner, Rickets and McNamara profile analysis were performed in 58 consecutive patients initially selected for treatment with oral appliances.

Results

72,4% of patients showed a mandibular defficiency that might have some causative role in OSA symptomathology and might therefore benefit from surgical advancement therapy. Further analysis on maxillomandibular relations and craniofacial measurements are shown on tables. Most of the patients had a retrusive profile with only five patients showing a true prognathic cephalometric profile, thus reinforcing the probable implication of maxillomandibular deficiencies in the pathogenesis of OSA.

Conclusions

Maxillomandibular defficiencies are more prevalent in OSA patients initially selected for oral appliance therapy in our environment than in normal population controls. Surgical maxillomandibular advancement therapy might offer a potentially life-lasting solution to most severe cases of maxillomandibular deficiency that should be properly assessed in multidisciplinary sleep disorders units and in future well designed prospective trials.

THE ROLE OF SLEEP ENDOSCOPY IN THE DIAGNOSIS OF PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

The most common cause of paediatric obstructive sleep apnea syndrome is the andenotonsillar hypertrophy. However, in some cases adenotonsillectomy does not cure OSAS, and the level of obstruction has to be identified. By means of sleep endoscopy sites of the obstruction can be localized such as the hypertrophy of the basal pole of tonsils, which cannot be diagnosed by conventional oral examination.

Objective

To summarize our experience gained with sleep endoscopy in children examined for obstructive sleep apnea syndrome (OSAS), and to determine the role of the sleep endoscopy within the rank of the diagnostic tools in paediatric OSAS.

Methods

Data from sleep endoscopic examination were collected between 1 June 2007 and 30 May 2011 in children with previously diagnosed OSAS. Out of the 1045 patients who underwent polysomnography 444 were diagnosed as OSAS and 28 were then checked by sleep endoscopy. This method was introduced in children in whom adenotonsillectomy was unsuccessful or the size of the tonsils did not exceed stadium G2+ and suffered from OSAS. All patients underwent a detailed patient's history questionnaire procedure, physical examination including laryngofiberoscopy, followed by a polysomnography in the sleep laboratory of the Heim Pál Children's Hospital. Sleep endoscopy was performed using a Fuji naso-pharyngo-laryngoscope with digital photographic and video documentation.

Results

444 children were diagnosed with OSAS during polysomnography, and sleep endoscopy was performed in 28 cases (6.3%; 18 males, 10 females). Grade III (serious) OSAS was diagnosed in 3, grade II in 5 and mild in 20 patients. In 3 cases a complete collapse of the pharyngeal wall was observed during breathing. The treatment in those cases was CPAP /BIPAP therapy. Laryngomalatia was detected in 3 children (1 needed a supraglottoplasty), 3 tongue retraction was observed in which an oral applicator was the solution. 6 patients had allergic rhinitis with hypertrophy of inferior and/or middle nasal concha, they were treated with conservative therapy or radiofrequency mucotomy. In 13 cases the cause of OSAS was the hypertrophy of the basal pole of the tonsils.

Conclusions

In conclusion, sleep endoscopy provides accurate data on the location of obstruction in children with OSAS. Together with the "gold standard" diagnostic method (polysomnography), sleep endoscopy can enable the physician to achieve the correct diagnosis and identify the most appropriate individual therapeutic plan, especially in cases with no visible hypertrophy of the tonsils.

COMPARISON EFFECTS OF CPAP, ORAL APPLIANCE AND EXERCISE TRAINING IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

There are several forms of Obstructive Sleep Apnea Syndrome (OSAS) treatments such as weight loss, oral appliances and CPAP that can be used to reduce the signs and symptoms of OSAS. Few studies have evaluated the effectiveness of a physical training program comparing with others treatments in reducing the symptoms of OSAS.

Objective

To assess the effects of physical exercise on subjective and objective sleep parameters, quality of life and mood in the OSAS and to compare these effects with CPAP and oral appliance.

Methods

Male patients with moderate to severe OSAS and BMI below 30 Kg/m2 were assigned randomly in three groups: CPAP (n=8), OA (n=8) and Physical Exercise (n=7). Polysomnographic recordings, blood sample and daytime sleepiness were obtained prior to and after two months of physical exercise (three times a week and one hour per session) or treatment with CPAP or OA.

Results

Subsequent to the treatment with CPAP or OA, patients presented a significant reduction in apnea-hypopnea index-AHI (25.06±10.54 to 1.86±1.16 and 30.76±19.00 to 9.59±10.27, respectively). In physical exercise group, we did not observe changes in the sleep parameters studied. In this group, there was a reduction in the following parameters: T leukocytes, VLDL and triglycerides. Two months of concurrent exercise training three times a week and one hour per session causes a positive impact on subjective daytime sleepiness, the Epworth Sleep Scale reduced from 14.14±5.64 to 9.57±4.24.

Conclusions

Our results suggest that physical exercise resulted in marked blood alterations and subjective daytime sleepiness modifications, but no change in the objective variables of sleep.

QUALITY OF LIFE-INSTRUMENT OSA-18 HAS LOW SENSITIVITY WHEN COMPARED TO POLYSOMNOGRAPHY IN PEDIATRIC OBSTRUCTIVE SLEEP APNEA (OSA)

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Objectives

To evaluate the sensitivity and specificity of the quality-of-life instrument OSA-18, compared to objective data from polysomnography (PSG) in children. PSG is considered golden standard to diagnose OSA.

Methods

Data were obtained from 240 children, 151 boys and 89 girls, median age 4,5 years (range 1-17), who underwent full-night PSG (EEG, EOG, EMK, video-audiometry, respiratory recordings). Their caregivers also responded to the OSA-18 quality of life instrument, a questionnaire with 18 items and 5 subscales, and range of total symptom score (TSS) was 0-126. The polysomnographic data were compared to the results from the OSA-18 questionnaire and statistically analyzed.

Results

The median TSS was 62 (range 20-120), the median Apnea-Hypopnea-Index (AHI) was 6 (range 0-117). The sensitivity and specificity were calculated with different degrees of OSA . With TSS at 60 and above and AHI levels of >1 and ≥5 the sensitivity was 54% and 58% respectively and the specificity 47% and 50% respectively. With TSS at 80 and above and AHI levels of ≥5 and≥10 the sensitivity were 27% and 33% respectively and the specificity 86% and 85% respectively.

Conclusions

The OSA 18 questionnaire showed a low sensitivity with different degrees of OSA when compared to objective data from PSG. A majority of the children with OSA and especially those with severe OSA would be undiagnosed if only the OSA 18 was used.

SUCCESS PREDICTORS IN UVULOPALATOPHARYNGOPLASTIES FOR THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

Both surgical and clinical option have been proposed to treat obstructive sleep apnea syndrome (OSAS). Uvulopalatopharyngoplasty (UPPP) is described as a treatment option to treat this disease, with variable reported results. The influence of facial bony and muscular structures on this rate of success has been poorly reported in literature.

Objective

The objective of the present study is to evaluate the influence of cervico-facial structures as the muscular integrity on the rate of success of UPPP.

Methods

Patients have undergone UPPP for the last 7 years have enrolled this study. Inclusion criteria included full clinical evaluation, including body mass index and age at the moment of surgery and pre and post-operative polysomnography (PSG). They were also submitted to lateral cephalometry to evaluate 11 skeletal measures, a clinical myofunctional protocol and muscular strength force. Patients were divided into two groups, based on AHI (apnea and hypopnea index): those with UPPP success and those that failed with UPPP treatment.

Results

The rate of success of UPPP was not influenced by the measures age, BMI, pre-operative AHI and any of the cephalometric measures. Among the muscular evaluations, the muscle strength of the tip of tongue was significantly different between the groups. All the other measures were similar between groups.

Conclusions

OSAS has a multifactorial origin, and depends on the combination of various factors rather than an isolated one. It is still difficult to predict the patient that will have a better outcome on UPPP, based on simply clinical and radiological factors.

SKUP3 UVULOPALATOPHARYNGOPLASTY IN OBSTRUCTIVE SLEEP APNOEA PATIENTS, A RANDOMIZED CLINICAL TRIAL OF EFFICACY

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Objective

To assess the effect of treatment with Uvulopalatopharyngoplasty (UPPP) in patients with Obstructive sleep apnoea syndrome (OSAS).

Design

Single centre, two parallel arms, stratified randomization, controlled trial.

Setting

ENT clinic, Karolinska University Hospital, Stockholm, Sweden.

Participants

64 patients with moderate to severe OSAS (Apnoea-hypopnoea index (AHI) ≥15), Body mass index (BMI) < 36, Friedman stage I or II. All patients but three had failed treatment with CPAP and mandibular retaining device.

Intervention

The intervention group had surgical treatment with UPPP (including tonsillectomy) and the control group had no treatment for six months. All patients had undergone polysomnography (PSG) at baseline and after the six months of follow-up.

Outcomes

AHI, Oxygen desaturation index 4 % (ODI4), modified Osler test (vigilance test), Epworth sleepiness scale (ESS) and other questionnaires.

Results

32 patients were randomized to each group. All patients completed the trial. In the intervention group the AHI was reduced from median 51 to 15.8 at the follow-up. The corresponding change for the control group was reduced from median 47.5 to 43.3 at the follow-up, a significant difference between the groups ($p<0.001$). The ESS value was reduced from median 12 to median 6 in the intervention group, ($p<0.001$), and in the control group from median 12.5 to median 12 (n.s). There were no severe complications after surgery.

Conclusions

RCT studies to evaluate UPPP treatment has been called for. This RCT shows that UPPP treatment is efficient and safe and it improved OSAS in these patients after six months.

TIME BUT NOT DOSE DEPENDENT AMELIORATION OF OBSTRUCTIVE SLEEP APNEA BY DRONABINOL

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Introduction

We previously showed that cannabimimetic agents reduced sleep disordered breathing in an animal model, and that the cannabinoid agonist dronabinol lowered the apnea/hypopnea index (AHI) in patients with obstructive sleep apnea (OSA).

Objectives

To examine the time-dependent versus dose-dependent effects of dronabinol on AHI in subjects with OSA.

Methods

After confirmatory diagnostic polysomnography, 14 subjects with AHI between 15 and 75 completed a three-week course of dronabinol treatment, with repeat polysomnography every 7th night. All subjects received an initial dose of 2.5 mg QD dronabinol 30 minutes before bedtime. This dose was escalated to 5 mg QD and 10 mg QD on days 8 and 15, as tolerated. Eight subjects fully escalated to the 10 mg dose, 4 subjects escalated to the 5 mg dose and 2 subjects remained at the 2.5 mg dose throughout.

Results

Average AHI was reduced from 41.0±5.1 (SE) to 33.3±7.3 ($p = 0.08$; paired t-test) after one week of treatment with 2.5 mg dronabinol and was further reduced to 26.0±5.2 after three weeks of treatment (all doses; $p = 0.008$; paired t-test). Final on-treatment AHI did not differ according to final dose ($F = 0.001$; $p = 0.99$): 25.9±9.0 (10 mg); 26.5±4.3 (5 mg); 25.9±9.4 (2.5 mg). Further, the change in AHI from baseline to final on-treatment value was equivalent for all three final doses ($F = 1.03$; $p = 0.39$).

Conclusions

These findings suggest that cannabimimetic agents such as dronabinol may be useful in ameliorating obstructive sleep apnea severity. Further, they demonstrate that the impact of dronabinol on AHI severity increases with time-on-treatment for a period of at least several weeks, pointing to the potential importance of neural plasticity in the treatment response. We speculate that even lower doses of dronabinol may have beneficial effects with longer treatment durations.

PREVALENCE OF OBSTRUCTIVE SLEEP APNEA SYNDROME IN CHILDREN WITH HEMIFACIAL MICROSOMIA

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Introduction

Hemifacial microsomia (HFM) is a congenital anomaly affecting the first and second pharyngeal arches and is characterized by asymmetric underdevelopment of the mandible, the maxilla, the ear, the soft tissue and facial nerve. According to a few studies children with HFM are more likely to have obstructive sleep apnea (OSA) as a result of the underdevelopment of the craniofacial skeleton but the exact prevalence is unknown.

Objective

To identify the prevalence of OSA in children with HFM who were screened with polysomnography (PSG).

Methods

Retrospective study among 90 children with HFM (including 10 patients with Goldenhar syndrome) born between 1993 and 2011. All patient records were screened for demographic data, affected side and history presence and treatment of airway difficulties.

Results

In 88 of 90 HFM children the mandible was involved unilaterally, in 1 bilaterally (Goldenhar syndrome) and in 1 the affected side was unknown. In only 5 of the 90 children a PSG was performed at mean age 3.8 years (range: 8 days to 7 years). In 4 of these 5 children OSA was diagnosed (prevalence 4.4 %). In 2 a severe OSA (both unilateral HFM) and in 2 a mild OSA (unilateral HFM) was seen. Treatment consisted of CPAP in 2 children, adenotonsillectomy in 1 child and a conservative (sleep position) approach in 1 child.

Conclusions

In this study the prevalence of OSA in children with HFM was 4.4 %. Prospective clinical studies are currently constructed to identify children with HFM who are possible at risk for OSA.

MONOBLOC FRONTOFACIAL ADVANCEMENT BY DISTRACTION OSTEOGENESIS USING INTERNAL DISTRACTORS IN CROUZON SYNDROME WITH OBSTRUCTIVE SLEEP APNEA

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Introduction

Children born with craniofacial syndromes associated with severe midface retrusion are frequently complicated by obstructive sleep apnea (OSA). Crouzon syndrome is a common syndrome related to premature fusion of coronal sutures. The severe frontofacial retrusion can cause elevated cranial pressure, exophthalmos and OSA. Distraction osteogenesis is a clinical tissue engineering method of bone regeneration by dividing a bone segment gradually stretching using a mechanical distractor device. There are only few reports of the application of distraction for managing OSA of children with Crouzon syndrome. External extractors were used in most cases, which commonly resulted in unsightly facial scars and accidental intrusion of skull pins. Few cases of have been reported using internal distractors in children with Crouzon syndrome suffering from OSA and management of distraction complications.

Objective

The aim of this presentation is to present our experience of monobloc Le Fort III and frontal advancement by distraction osteogenesis using internal distractors followed by external distractor to resolve the OSA in a child with Crouzon syndrome.

Methods

A 3-year old boy with Crouzon syndrome was presented with exopthmalmos, increased intra-cranial pressure and severe OSA. The airway was analyzed by Surgicase software in confirming the site of obstruction at the nasopharyneal region. A simultaneous frontal advancement and monobloc Le Fort III osteotomy by distraction osteogenesis was planned to resolve these problems and to prevent the need for tracheostomy. A simulation surgery was conducted based on a stereomodel and four internal craniofacial distractors were planned to advance the fronto-facial skeleton. The soft tissue changes of the airway and ocular proptosis was simulated by Surgicase software. A multi-disciplinary team consisting of neurosurgeons, ENT surgeons and maxillofacial surgeons were involved in the operation. The surgical procedures were conducted uneventfully.

Results

The distractors were activated after 3 days of latency and at 1mm per day for 19 mm. The forehead and zygomas were well advanced. However, the nose became flattened and the maxilla was found advanced only for 9.4mm. The palatine process of the maxilla was found separated from the horizontal plate of the palatine bone, which suggested that the naso-septal osteotomy was performed in front of the vomer. A re-operation with a 2-piece Le Fort II osteotomy was performed specifically in completing the vomer cut and correcting the nasal prominence. The Le Fort II fragment was advanced by the use of a rigid external distractor. The midface and occlusion was overcorrected into a class II occlusion in anticipation of reduced midfacial growth. The post-surgical airway was significantly enlarged and OSA was resolved, the intra-cranial pressure was normalized and the eyes were protected.

Conclusions

Crouzon syndrome with increased intra-cranial pressure, exophthalmos and OSA can be effectively resolved by monbloc Le Fort III and frontal advancement by distraction osteogenesis. Inadequate separation of the vomer by naso-septal osteotomy can result in nasal retrusion and limitation of maxillary advancement. The use of Le Fort II distraction can correct this complication resulting in good outcomes.

EFFECT OF CPAP THERAPY ON SLEEP STRUCTURE IN PATIENTS WITH SLEEP APNEA

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Intruduction

The syndrome of sleep apnea appears to be one of the most spread forms of sleep disorders. Sleep apnea is a disorder in which there is a break or pause (apnea) in breathing during sleep.

Objective

The goal of the research was to study the peculiarities of sleep structure in patients with the syndrome of sleep apnea before CPAP therapy and at the background of CPAP.

Methods

Total of 17 patients with sleep apnea were examined at the age of 28-65. According to sleep questionnaire ESS and MBI were determined in all the patients. For differential diagnostics of sleep apnea PSG was carried out using Dr. Sagura Medizintechnik P59 polygraph. PSG investigation was performed accompanying by full video synchronized recording. For CPAP therapy CPAP(IPAP) Machine was used.

Results

According to the questionnaire all the patients have a high rate of night sleep disorders. Epworth Sleepness Score (20-22, maximum 24) and body mass index (BMI) overall maximum (31-45>31).

The patients were characterized by night sleep disorder, loud snore, headache, apathy, the problems of concentration, excess daytime sleep.

PSG has shown that the patients with both obstructive sleep apnea (OSA) 14 and central sleep apnea (CSA) 3 are characterized by significant decrease in sleep architecture, which results in full absence of the NREM3 stage of sleep (superficial sleep), the increase of REM stage, frequent EEG and EMG awakenings and defragmentation of sleep as a whole. It should be noted that a separate part of OSA patients (both women and men) was characterized by clearly expressed REM behavioral disorders. Central sleep apnea was characterized by relative low index of snore SI (80-120) and relative high indices of the Sp02 (87-93) in case of obstructive sleep apnea (SI>200, Sp02-(36-91).

At the background of CPAP therapy the first significant effect was received after 2 hours resulting in the regulation of respiration and snore index. The progressive increase of Sp02 within the limits of 92-95%. Sleep architecture considerably changed, EEG and EMG awakenings sharply decreased, NREM stages increased, in rare cases NREM3 stage was noted, sleep defragmentation significantly decreased.

Conclusion

Thus, Sleep Apnea (both CSA and OSA) is characterized by significant disorder of sleep atchitecture. At the background of CPAP therapy a significant improvement of sleep architecture and the regulation of symptomocomplex characteristic of sleep apnea take place.

3-DIMENSIONAL AIRWAY ANALYSIS OF DENTOFACIAL DEFORMITIES BY CONE BEAM COMPUTED TOMOGRAPHY

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Introduction

Various dentofacial deformities can present with malocclusion, aesthetic problems, and airway obstruction, all of which can have a negative psychological impact on the patient. The relationship between upper airway and dentofacial and craniofacial structures have been reported. For many years, 2-demensional (2D) cephalometric images have been used to look for anatomic differences among patients with different dentofacial deformities. Cephalometry is able to provide skeletal information for upper airway surgery. However, it provides only a 2D representation of a 3D structure and is unable to provide volumetric data. With the advancement of technology, three-dimensional (3D) imaging is widely being used in the field of medicine and dentistry. Cone beam CT (CBCT) images provide good representation of the airway structure and allow geometric measurements. It is a valuable tool to help evaluate airway dimensions and volumetric differences.

Objective

The aim of this study was to compare the upper airway dimensions of patients presented with three different patterns of dentofacial deformities using digital reconstruction software on the cone beam computed tomography (CBCT) images.

Method

This was a cross-sectional observational study of patients presented with three different patterns of dentofacial deformities. The patient sample consisted of 101 normal facial skeletal Class I , 24 class II and 52 class III patterns. These patients received CBCT scans as part of their treatment planning. The airway dimensions extending from the nose to the hypopharynx were measured by 3dMD Vultus software. Axial sectional measurements were taken from the level of the hard palate to the epiglottis. The linear distance, surface area, and volume of the upper airway dimensions were compared among the three groups.

Results

There was a statistically significant difference in the airway volume among the three dentofacial skeletal groups. The airway volume was found to be smallest in Class II group and largest in Class III. Significant differences in linear distance were found at the level of hard palate, soft palate, base of tongue and epiglottis region among the three groups. Linear dimension in the antero-posterior plane was significantly less at the soft palate and base of tongue in Class II patients when compared with Class III pattern. However, there was no significant difference in the antero-posterior linear airway dimension at the hard palate and epiglottis region between Class II and Class III groups. A significant difference in airway volume was detectable between the genders, with the upper airway dimension of the males group larger than the females.

Conclusion

The airway dimensions of different dentofacial deformities have been confirmed by CBCT to be different with class II being smallest and class III being largest. This corresponds well with the differences in jaw relationship of the dentofacial deformities. Statistical differences are also present at the different anatomical landmarks along the upper airway. There is also notable gender difference in the airway volume.

COMPUTATIONAL FLUID DYNAMICS STUDY OF UPPER AIRWAY IN DIFFERENT DENTOFACIAL DEFORMITIES

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Introduction

Various skeletal features have been concluded to affect size of the airway and ventilation. Features such as deficiency of the maxilla and mandible may lead to narrower anteroposterior dimensions of the airway. As well, the upper airway has been hypothesized to affect the growth of the craniofacial structure. Until recently, the subject of obstructive sleep apnea (OSA) has received increasing attention in the medical literature. It has been shown that OSA patients have characteristic skeletal and soft tissue patterns and reduced airway space. This suggests that variations in the skeletal pattern has possible predisposition to upper airway obstruction. Therefore, upper airway imaging is a valuable technique to study the mechanisms underlying the pathogenesis and biomechanics in OSA. One of the most important and recently developed techniques that allow such function is the biomedical application of computational fluid dynamics (CFD). Several authors have described the use of CFD models to simulate the airway of patients with OSA. However, the CFD findings among patients with different dentofacial deformities have never been reported.

Objective

The aim of this study is to perform flow computations on upper airway models of patients with dentofacial deformities and describe the role of fluid dynamics in the human upper airway.

Method

Cone-beam computed tomography records of 12 patients were used to evaluate the upper airway. This sample consisted of patients with facial skeletal Class I, II and III subjects. The upper airway models were reconstructed and converted to patient-specific, three-dimensional models to allow for computational fluid dynamics (CFD) simulations. The inhalation process was simulated using a constant volume flow rate of 0.3 liter per second (L s-1), at the nostrils and the airway of interest was from the hard palate to the epiglottis. The cross-sectional area at the hard palate, soft palate, base of tongue, epiglottis, air pressure distribution, velocity and resistance were investigated based on the reconstructed meshed models. The differences in these measurements were compared between the groups.

Results

There was a statistically significant difference in the pressure change and resistance of the airway between the three facial skeletal groups. The airway resistance for the Class II subjects was significantly different from the Class III. Airway resistance was significantly increased in Class II compared with Class III subjects. Similarly, the pressure change in airway for the Class II group was significantly higher compared to the Class I and Class III groups. However, there was no significant difference in the airway resistance and pressure change detected between the Class I and Class III subjects nor Class I and Class II subjects.

Conclusion

The airway in facial skeletal class II patients show higher pressure distribution and resistance compared to those of class I and class III patients. This difference in airway characteristics may be due to skeletal features common in this group of patients. This has an important implication to treatment for patients with different dentofacial deformities, especially those with obstructive sleep apnea. The application of CFD suggests a possible diagnostic and prognostic tool for evaluating the airway.

IDIOPATHIC HYPERSOMNIA: RARE OR NON-EXISTENT?

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Introduction

Idiopathic hypersomnia, as defined by International Classification of Sleep Disorders 2 (ICSD2 -2005), is diagnosed in patients who have a latency to sleep of 8 minutes or less on Multiple Sleep Latency Tests (MSLT), not related to the presence of another primary sleep disorder causing sleep fragmentation, other medical conditions, drugs or chronic sleep deprivation. In clinical practice the process of excluding sleep deprivation is difficult. For this reason, it is possible that idiopathic hypersomnia is either overdiagnosed or misdiagnosed if sleep deprivation is not objectively excluded.

Objectives

1. To characterise a population referred to a clinical sleep laboratory for the investigation of excessive daytime somnolence, with strictly applied exclusions criteria as described by ICSD 2.
2. To correlate actigraphy and patient self reported sleep diaries.
3. To investigate the correlation between MSLT and Psychomotor Vigilance Testing (PVT).

Methods

Patients attending Concord Hospital Sleep Unit and the Australian Diagnostic Sleep Centre from April 2010 to March 2012 for a diagnostic sleep study (DSS) and MSLT were recruited. Exclusion criteria were RDI > 15, minimum saturation < 88%, known depression and co-morbidities which may result in sleepiness. Following consent, subjects wore an actigraphy arm band for up to 7 days prior to a DSS and MSLT. Comprehensive polysomnography (PSG) was recorded overnight followed by a 20-minute MSLT protocol the next morning and PVT after each MSLT nap. Subjects also completed the Depression Anxiety Stress Scales (DASS).

Results

27 subjects (15F) met the inclusion and exclusion criteria. Mean age was 39years and a BMI of 28.1. Mean total sleep time (TST) 378.3 minutes and mean SE% 79.7 was recorded on PSG.

18/27 subjects had TST (PSG)>360 minutes, 11/27 had MSL<8 minutes. Only 7/27 subjects TST (PSG)>360 minutes, MSL<8minutes and a DASS D scores < 20. Of these 7 subjects, sleep deprivation was excluded in only 1 subject (mean TST>360 minutes on actigraphy in the preceding week). However, 6/7 subjects self reported mean TST>360 minutes on their sleep diaries in the preceding week. There was no correlation between sleep diary and actigraphy (p=0.72). A significant correlation was found between PVT and MSL (p<0.00010 (R2 =0.29).

Conclusions

1. The incidence of idiopathic hypersomnia in this preselected group of subjects with clinically significant daytime sleepiness appears to be low after strict exclusion criteria were applied.
2. There is poor correlation between objectively measured nocturnal sleep duration using actigraphy and self reported nocturnal sleep duration. Actigraphy may be a preferred way of excluding chronic sleep deprivation.
3. PVT may be a useful tool in identifying patients with decreased concentration among clinically sleepy patients. This would require further investigation.

SLEEP QUALITY IN NURSING STUDENTS AT THE UNIVERSITY OF VALE DO PARAÍBA, BRAZIL

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Keywords: Sleep quality, student, nursing.

Introduction

Sleep is a physiological and behavioral state that implies in the interruption of awareness and diminution of response to the environment. The wake-sleep cycle is regulated by an internal pacemaker, the biological clock, which may be observed in isolation situations, when there is no environmental variation. Sleep disorders may cause problems to health, relationships and studies. Students tend to have a reduction in the wake-sleep cycle, impairing their performance during the classes and obligatory internships. This reduction is related to the large hourly load, tests, drug and alcohol abuse, inadequate diet, irregular physical activities and anxiety about having a good school performance. It is interesting to highlight that many university students need to work, aiming to obtain financial resources to support their own studies.

Objective

To measure sleep quality in nursing undergraduate students at the University of Vale do Paraiba.

Method

This is a descriptive and qualitative study approved by the Research Ethics Committee of the University of Taubaté, State of São Paulo, under protocol n. 452/2009, comprising 58 third-year nursing students who signed the free and clarified consent term. Data were collected during the months of November and December, 2009, by applying a questionnaire composed of open, close and mixed questions, which was divided into two parts: Part A – Sample identification, and Part B – Pittsburgh Sleep Quality Index Questionnaire (PSQI). The data were tabulated and submitted to the descriptive statistics.

Results

The results obtained for the sample identification indicated prevalence of the female sex (53) (91.38%); the age group varied from 17 to ≥ 32 years; and regarding civil status, 40 (68.97%) were single; 36 (62.07%) of them worked, prevailing 26 (72.22%) night shifts. Out of these 36 (100%), 21 (58.33%) reported that they used to sleep after class; out of these, 18 (85.71%) slept less than six hours; and 3 (14.28%), from six to eight hours. It was recorded that 5 (23.80%) reported being satisfied with the sleeping hours, and 16 (76.19%) reported being unsatisfied. It was evidenced that most of them slept after class, trying to compensate the delayed sleep. In relation to difficulty concentrating during the day, out of the 36 (62.07%) students who worked, 23 (66.89%) answered affirmatively. Among them, 26 (72.22%) worked at night, 9 (25%) worked during the day and 1 (2.78%) worked day and night shifts; respectively, 18 (69.23%), 4 (44.44%) and 1 (2.78%) had difficulty concentrating. Concerning sleep quality, scores greater than five were obtained in 39 (67.24%) of the nursing students, indicating bad sleep quality.

Conclusion

Students showed bad sleep quality and many of them, because of irregular sleep hours, had their sleep affected in a negative way, not being able to compensate for it the next day, impairing their school and work performance.

OXIDATIVE STRESS, SYSTEMIC INFLAMMATION AND SYMPATHIC ACTIVATION IN PATIENTS WITH CRANIOFACIAL ANOMALIES

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Introduction

Obstructive sleep apnea syndrome (OSAS) is a common entity in craniofacial anomalies. Up to 40% of all patients with syndromic craniosynostosis and up to 46% of patients with Treacher-Collins syndrome have OSAS. Significant associations between sleep and neurocognitive dysfunction and cardiovascular morbidity have been observed, possibly due to oxidative stress and increased systemic inflammation.

Objectives

To study oxidative stress, systemic inflammation and sympathic activation as a result of OSAS in patients with craniofacial anomalies.

Methods

A random selection of 48 patients was drawn from a larger ongoing study. All patients underwent a sleep study, which was considered abnormal if the oAHI was ≥ 1 for children aged < 18 years old or if the AHI was ≥ 5 for adults. Venous blood samples were taken at daytime and stored at -80°. Malondialdehyde (MDA) which resembles lipid peroxidation was used to analyse oxidative stress. Inflammation was analysed using TNFα, IL-6 and high sensitivity (h) CRP. Sympathic activation was studied by daytime blood pressure measurements, which were compared to gender and height-controlled 95th percentiles for children aged < 18 years old and to an upper limit of 140/90 mm Hg for adults.

Results

Syndromic craniosynostosis was diagnosed in 34 patients and 14 patients had Treacher-Collins syndrome. Eleven were adults, median age 29.2 years (18.6 – 59.22), 37 were children, median age 9.2 years(0.4 - 17.2). Patients were not obese; median BMI of 20.5 (15.2 - 29.4) in adults and a median standard deviation of the BMI of 0.70 (-1.82 - 2.48) in children. OSAS was diagnosed in 23/48 patients; mild (median oAHI: 2.3; ODI: 0.9) in 16 patients and moderate/severe in 7 patients (median oAHI: 10.8; ODI: 5.0). No significant correlation was found for the oAHI and MDA (R 0.18; p = 0.24), TNFα (R 0.069; p = 0.69), IL-6 (R -0.17; p = 0.33) and hCRP (R 0.063; p = 0.72) and ODI and MDA (R 0.14; p = 0.36), TNFα (R -0.070; p = 0.67), IL-6 (R -0.27; p = 0.097) and hCRP (R 0.79; p = 0.63). There were no significant differences for MDA (p = 0.52), TNFα (p = 0.44), IL-6 (p = 0.76) and hCRP (p = 0.42) between patients with and without OSAS. Hypertension was found in 12.5% of the subjects. Systolic (oAHI R = 0.078, p = 0.65; ODI R = 0.23, p = 0.18) and diastolic (R = 0.088, p = 0.61; ODI R = 0.17, p = 0.31) blood pressure was not significantly correlated with sleep study outcomes when correcting for age.

Conclusions

This study shows that OSAS does not result in increased oxidative stress, systemic inflammation and sympathic activation at daytime in a population of non-obese patients with craniofaci

THE NATURAL COURSE OF OSAS IN CHILDREN WITH SYNDROMIC CRANIOSYNOSTOSIS

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Introduction

Patients with syndromic craniosynostosis have a 40%-risk to develop obstructive sleep apnea syndrome (OSAS), mainly due to midface hypoplasia.

Objectives

Our aim is to describe the natural course of OSAS in patients with syndromic craniosynostosis.

Methods

This prospective study was conducted from January 2007 to January 2012 in children with syndromic craniosynostosis. Overnight ambulant sleep study data were recorded to screen for OSAS annually up to the age of 6 years old and once every 3 years hereafter. In children with an untreated airway, we determined the natural course using repeated measurements analyses and a signed rank test for dependent variables. OSAS was considered to be present if the obstructive apnea-hypopnea index (oAHI) was bigger than 1.

Results

A total of 97 patients were included. Sixty-eight percent of all patients had at least one sleep study that was positive for OSAS in which the median (range) oAHI was 2.3 (1.0 – 17.2). Seventeen patients were treated for OSAS by adenotonsillectomy (ATE; n = 13), second ATE (n =1), hyrax expander (n = 1), midface advancement (n = 6), tracheostomy (n = 3) or ventilation (n = 2). Eighty patients (36 patients with midface hypoplasia) were included in repeated measurements analyses using a total of 241 sleep studies. A linear mixed effects model of the oAHI logarithm showed higher values for the patients with midface hypoplasia, but the longitudinal evolutions for the oAHI was not significantly different for patients with midface hypoplasia compared to those without using the omnibus likelihood ratio test (LRT) (LRT = 7.9, p = 0.095). In paired measurements, the oAHI (Z = -3.4, p = 0.001) significantly decreased over time. Post-hoc analyses showed that improvement in oAHI mainly occurred during the first 3 years of life (Z = -3.3, p = 0.001). The oAHI generally did not improve in patients with midface hypoplasia (Z = -1.5, p = 0.14). Thirteen of 80 patients had a second sleep study which outcome was worse than the first one. In 4 (3 patients with midface hypoplasia)/13 patients an ATE was performed to treat OSAS. None of the patients developed severe OSAS during follow up.

Conclusions

We confirm a very high OSAS-prevalence. Furthermore, we demonstrated that OSAS remains stable or improves over time without treatment in the majority of the patients. If moderate or severe OSAS was not yet diagnosed at the start of the study, it was highly unlikely that it would develop over time.

A 3D VOLUME PREVIEW IN OBSTRUCTIVE SLEEP APNEA (OSA) SINDROME FOLLOWING MAXILLOMANDIBULAR ADVANCEMENT (MMA) EXPERIENCE

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Introduction

The conventional protocol treatment of patients with Obstuctive sleep apnea (OSA) is represented by nasal continuous positive airway pressure(CPAP) or several upper airway intervention such as uvulo-palato-pharyngoplasty(UPPP) or maxillomandibular advancement (MMA). While CPAP is almost always effective when clinically tolerated, the therapeutic outcome of surgery is difficult to predict.

Objectives

To improve the capability of results prediction after surgery, the objective of this study was to analyze by 3D-CT DICOM data (digital image comunication medicine), morphological and volumetric changes of the upper airways in obstructive sleep apnea (OSA) patients following maxillomandibular advancement (MMA) and to correlate them with the apnea index decrease.

Method

Eleven consecutive patients whit severe OSA, were treated with MMA from July 2008 to Marc 2012 at Maxillofacial Surgery Unit of S.Orsola-Malpighi Hospital in Bologna-Italy. All patients included in the study were diagnosed by polysomnography (PSG), Muller's maneuver, sleep endoscopy and cephalometric analysis. Pre-operative and six month after treatment helical CT scan, and PSG were performed to study respectively airway volume and apnea index. Trough a 3D CT and a particolar set rebuilding software, we were able to extrapolate the volume range augmentation after surgery.

Results

After a maxillomandibular advancement of 10 mm we attested an enlargement of lateral (LAT) andanteroposterior (AP) diameters for all patients at all levels. LAT dimensions were enhanced greater than AP in the retroglossal region. Trough the 3D volumetric reconstruction we were able to accurately measure the air way augmentation volume with an average result in the study group of 70,1%. The average apnea index decrease was of 78,6%. Three-dimensional volumetric reconstruction allows an accurate measurement of the volumes of the airway resulted to be notably increase in all cases treated with MMA, together with an important linear increase of the PAS and reduce symptoms of OSA. We appreciate in these case series a correlation between volume range augmentation and reduction of sleep apnea index. Final observation is that to achieve a final mean AHI post operative 11,9/h we have to achieve a volume of 20.6 post operative. In OSAS pts. to advance the maxillo-mandibular complex in a different way to achieve a final Upper Aiway Volume of approximatively 20-22 cc starting with a "new" approach based on the volume preview wich give us the tailored amount of sagittal advancement overwhelming the standard 1 cm forward movement.

SLEEP DISORDERED BREATHING (SDB) IN PATIENTS UNDERGOING DETOXIFICATION FROM OPIOIDS WITH BUPRENORPHINE/NALOXONE

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Introduction

Patients using chronic opioids are at risk for exceptionally complex and potentially lethal disorders of breathing during sleep including central and obstructive apneas, hypopneas, ataxic breathing and non-apneic hypoxemia. Although methadone and oxycodone are the most often held responsible, all opioids have been implicated. Buprenorphine, a semisynthetic opioid partial μ-agonist, has become widely used for therapy of opioid dependency especially in France and the United States since it was patented in 1969. Buprenorphine is considered to be relatively safe because of its unique pharmacologic profile and ceiling effect regarding respiratory suppression.

Objectives

(1) characterize the prevalence, severity and types of sleep disordered breathing in hospitalized patients receiving buprenorphine for detoxification from opioids; and (2) identify potential risk factors that might be used in the future to select patients for sleep testing.

Methods

Every adult patient admitted for therapy of opioid dependence was examined by a sleep medicine clinician. Unless medically unstable, attended polysomnography was performed after beginning sublingual buprenorphine-naloxone (usually > 12 hours). Standard clinical, demographic, sleep and respiratory data were recorded. Respiratory events were classified as central or obstructive. Severity was categorized by the apnea/hypopnea index (AHI) as None (AHI < 5/hr), Mild (AHI ≥ 5 to < 15/hr), Moderate (≥ 15 to < 30/hr) and Severe (AHI > 30/hr). The presence of ataxic respiratory patterns and degree of hypoxemia were assessed. Relationship between selected risk variables computed with Spearman's Rank correlation (rho).

Results

40 patients were studied (27 females/13 males). Mean age: 34.6 years (range 19-62). BMI (Mean ± SD) 25.9 ± 6.3 kg/m2 (range 17-41). Total buprenorphine dose (Mean ± SD) 19.5 ± 14.4 mg (range 2.0-56.0). Total group AHI (Mean ± SD) 27.0 ± 43.5/hr (range 0.0-180.0/hr). Severity categories: None 32.5% (13/40); Mild 22.5% (9/40); Moderate 20.0% (8/40); Severe 25% (10/40). Central apnea index (Mean ± SD) 14.4 ± 37.4/hr. Obstructive apnea index (Mean ± SD) 2.9 ± 5.9/hr. Percent sleep time SpO2 < 90% (Mean ± SD) 32.3 ± 36.6%.

Conclusions

(1)clinically significant sleep disordered breathing occurred in many patients being initiated on buprenorphine/naloxone for opioid withdrawal therapy; (2) respiratory disturbances consisted predominantly of central apneas, ataxic breathing (Biot's respiration), and hypoxemia as seen with other opioids; (3) the presence and severity of breathing disturbances was not predicted by concomitant use of benzodiazepines, neuroleptics, buprenorphine dose or by standard risk factors for sleep apnea. The risk for SDB with buprenorphine-naloxone may be under-recognized. Further studies are needed to assess the prevalence and define risk factors for SDB in these patients.

VALIDATION OF A SLEEP APNEA SCREENING DEVICE (APNEALINK™) IN MORBIDLY OBESE SUBJECTS

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Introduction

The ApneaLink™, a portable screening device for obstructive sleep apnea (OSA), has been validated in the general population. However, to the best of our knowledge, it has not been validated in morbidly obese patients, among whom the prevalence of OSA could be as high as 60 to 70 %.

Objectives

The main objective of this study was to validate the ApneaLink™ as a screening tool for OSA in morbidly obese patients, using the Embletta™ somnograph as reference.

Methods

A total of 104 consecutive morbidly obese (BMI ≥ 40 kg/m2, or BMI ≥ 35 kg/m2 with obesity related comorbidity) adults (67 females), with mean (SD) age 44.2 (11.5) years and body mass index 43.2 (5.7) kg/m2, were recruited from the Morbid Obesity Centre, a tertiary care centre in the southern part of Norway. The patients underwent sleep registrations at home with both the Embletta™ and the ApneaLink™. The ApneaLink™ is a three channel sleep apnea screening device, measuring nasal flow, oximetry and pulse.

The equipment setup was performed by a trained study nurse and the sleep registrations were all scored by the main author (JMF). Epworth sleepiness scale (ESS) was used to evaluate daytime sleepiness.

Results

According to the reference method, 58 patients (56%) had OSA (apnea-hypopnea index (AHI) ≥ 5 events/hour), 45% of women and 76% of men. A total of 26 patients (25%) had mild (AHI 5-15 events/hour), 13 (13%) moderate (AHI 15-30) and 19 (18%) severe (AHI≥30) OSA. Mean (SD) AHI was 16.4 (22.7) events/hour on the Embletta™ and 16.5 (21.3) events/hour on the ApneaLink™. The AHI obtained by ApneaLink™ closely correlated with that obtained by the Embletta™, Pearson correlation, $r=0.975$, $p<0.001$ (figure 1).

ApneaLink™ misclassified 13 non-OSA patients to have OSA and five OSA patients as non-OSA. Four out of five OSA patients misclassified as healthy had an AHI below seven events/hour and one had moderate OSA (AHI 27 events/hour). Accordingly, only one patient in need of OSA treatment (AHI≥15) of the 104 study subjects was missed. All patients with severe OSA were identified by the ApneaLink™.

The sensivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the ApneaLink™ at various AHI cut off levels were: AHI cut off 5 (sensitivity 0.92, specificity 0.78, PPV 0.82 and NPV 0.92), AHI cut off 15 (sensitivity 0.92, specificity 0.95, PPV 0.89 and NPV 0.95) and AHI cut off 30 (sensitivity 0.90, specificity 1.0, PPV 1.0 and NPV 0.98). The mean (SD) ESS score was 10.4 (4.6) and there was no significant correlation between ESS and AHI, all p-values > 0.2.

Conclusions

Our results suggest that the ApneaLink™ is a useful and reliable instrument in the screening of OSA in morbidly obese patients. Compared with Embletta™ as reference, the ApneaLink™ was also highly sensitive in identifying patients with various severity of OSA.Using this simple device for screening may be cost-effective and an appropriate alternative to more expensive and time consuming methods of sleep registration.

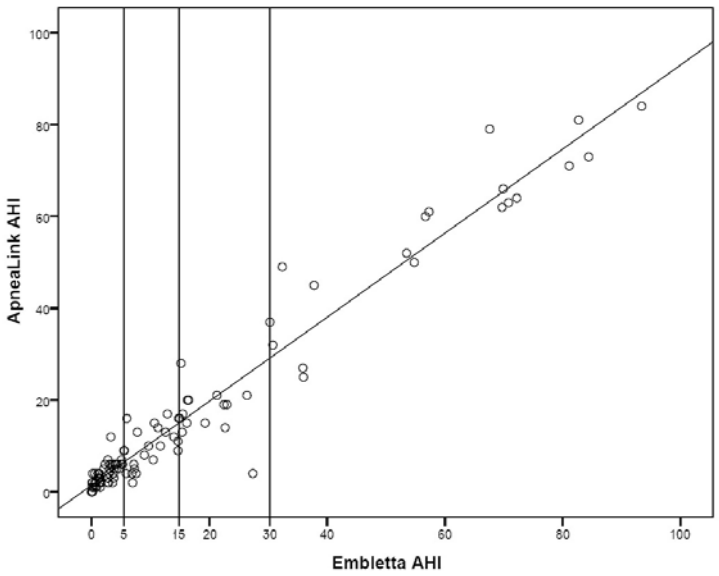

Figure 1 - Scatterplot with AHI derived from the Embletta™ on the x-axis and AHI derived from the ApneaLink™ on the y-axis based on sleep registrations from 104 morbidly obese patients. Pearsons correlation coefficient r=0.975, p<0.001.

EFFICACY AND SAFETY OF ULTRASONIC ADENOTONSILLECTOMY FOR OBSTRUCTIVE SLEEP APNEA IN INFANTS AND TODDLERS –COMPARISON WITH PRESCHOOL CHILDREN

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Introduction

Obstructive sleep apnea syndrome (OSAS) is now well known to disturb physical and mental development of children, and early medical intervention is therefore necessary for children with severe OSAS. Although adenotonsillectomy has been widely accepted as gold standard treatment for OSAS in children, its efficacy has not been well verified in infants and toddlers yet. Furthermore, little attention has been paid to safety of adenotonsillectomy especially in infants and toddlers.

Objectives

The present study aimed to know if adenotonsillectomy still had sufficient efficacy on OSAS in infants and toddlers and if there was higher risks of surgery in these children.

Methods

Charts were reviewed of 147 cases of OSAS children (0-6 years old) who had undergone adenotonsillectomy operated by the use of Harmonic ScalpelTM (Ethicon Endosurgery, Cincinnati, OH, USA) from 2004 through 2008 in the Kochi Medical School hospital. Tonsillectomy was performed extracapsularly by the curved shears (CS 14C) under general anesthesia. Adenoidectomy was then carried out by the curette first and the ball coagulator (HBC 05) finally. Apnea-hypopnea indices (AHI) in the preoperative and postoperative assessment by the portable device of polygraphy (SleeptesterTM, Fukuda Lifetech Inc., Tokyo, Japan) of both infants and toddlers (IT, 0-3 years old) group and preschool children (PS, 4-6 years old) group were analyzed. In addition, the duration of surgery, the amount of intraoperative hemorrhage, and the incidence of postoperative hemorrhage and respiratory complications of IT group were compared to those of PS group. Statistical analyses were conducted using student t-test and Fischer's exact test, and p value <0.05 was considered significant.

Results

The preoperative mean AHI in the IT group was 13.5 +/-7.1, and it changed down to 4.7 +/- 3.4 postoperatively ($p<0.001$). The mean AHI decreased from 16.0 +/- 10.2 to 4.4 +/- 2.4 in the PS group ($p<0.001$). The duration of surgery and the amount of intraoperative hemorrhage in IT group were statistically shorter and smaller than those of PS group in adenoidectomy (19.5 min. vs 22.9 min. and 18.9 g vs 26.2 g, $p<0.01$), and are almost same in tonsillectomy (12.8 min. vs 14.5 min. and 6.0 g vs 6.4 g). There was no statistically difference between IT and PS in the incidence of postoperative hemorrhage (8% vs 4%) and of abnormal findings in the postoperative chest X-ray (18% vs 11%). No difference was found also in the length of stay in the hospital between two groups (8.4 days vs 8.4 days).

Conclusions

Adenotonsillectomy still has a similar impact on OSAS of infants and toddlers as on that of preschool children. This surgical intervention can be performed without major perioperative complications.

RESULTS OF A PROSPECTIVE RANDOMISED PLACEBO CONTROLLED STUDY TO EVALUATE THE EFFECT OF RADIOFREQUENCY SURGERY OF THE SOFT PALATE IN SNORERS

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Keywords: Snoring, radiofrequency, sham surgery.

Objectives

To evaluate the effect of radiofrequency surgery in the soft palate in snorers and individuals with mild sleep apnoea.

Methods

Thirty men were consecutively recruited among patients referred to ENT due to snoring. Inclusion criteria were AHI below 15 in a nocturnal sleep evaluation. The patients were randomized to radiofrequency or sham surgery and each patient received 1 to 3 treatments with radiofrequency or 1 to 3 sham surgery procedures in the soft palate. At follow-up 12 months after the last radiofrequency or sham surgery treatment, all patients underwent a new nocturnal sleep evaluation. Questionnaires including SF-36 and ESS were answered. This study protocol and informed consent were approved by the ethics committee of Umeå University.

Results / Conclusion

No statistically significant differences between the two groups concerning changes in AHI or ESS values were found at the12 month follow-up. Body mass index did not change significantly during the observation period. Only 1 of 30 patients regretted their participation the study. Results show that the study protocol with sham procedure is feasible.

CHARACTERISTICS OF REM (RAPID EYE MOVEMENT) SLEEP RELATED OBSTRUCTIVE SLEEP APNEA (REM OSA)

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Introduction

REM sleep related obstructive sleep apnea is defined in many different ways, and its clinical significance remains unclear.

Objectives

Traditional REM OSA is defined as overall AHI (Apnea Hypopnea Index) ≥5, AHIREM/AHINREM ≥2, AHINREM <15. However, previous studies compared REM OSA and non stage dependent OSA (NSD OSA) including severe OSA (AHI≥30) data. Severe OSA data weighed on NSD OSA, which makes confusion if those results come from severity dependent results or genuine NSD OSA characteristics. Our aim of this study is to suggest characteristics of REM OSA in mild to moderate OSA patients (5≤AHI<30).

Methods

In order to minimize the contribution of AHINREM, we used traditional criteria for REM OSA suggested above, and selected mild to moderate OSA cases through review of overnight polysomnography data in sleep clinic in Seoul from Jan 2010 to Mar 2011. Total 357 overnight data were used for analysis. (n(NSD OSA)=199, n(REM OSA)=158). SPSS 17.0 was used for analysis.

Results

There was no age, or sex differences between REM OSA and NSD OSA group (p=.270 p=.524). BMI (Body Mass Index) was high in REM OSA group (REM OSA group mean±SD(24.1±3.34) vs NSD OSA group mean±SD(25.0±3.72, p=.013) but neck circumference were not significantly different. Daytime symptoms such as ESS(Epworth Sleepiness Scale), insomnia symptom complaint proportion was not significantly different. Polysomnographic data revealed that overall AHI was significantly low (10.6±4.44 vs 16.4±7.10, p=.000), minimum O2 saturation was low (84.3 vs 85.7, p=0.006), and total arousal index was low in REM OSA group. Other gross polysomnographic index was not different in both groups (N1, N2, N3, SL, REM latency, WASO, SE, mean O2 saturation) except for longer REM sleep duration in REM OSA group (61.2 vs 52.6, p=0.006).

Conclusions

REM OSA patients were known to be younger, and more female dominant which were not replicated in our investigation. No more frequent insomnia or sleepiness complaints were observed in NSD OSA group. AHI is low, however saturation drop is more steep in REM OSA group. Other polysomnographic data could be explained by disperse apnea or hypopnea events throughout all stages of sleep. Explanation for longer REM sleep in REM OSA group remains uncertain.

It is considered that REM OSA was an early form of OSA, but its concept needs further investigation. Severe OSA confounded as it occupied significant portion of NSD OSA in the previous studies. Whether REM OSA is initial representation of full blown OSA needs more attention.

LOWER BORDER MANDIBULAR ADVANCEMENT BY PIEZO SAW- MAJOR IMPROVEMENT IN THE TREATMENT OF OSAS

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Introduction

Contemporary surgery of OSAS presents over 15 methods of operative treatment of hard and/or soft tissues in the areas of upper, lower jaws, nasal septum and turbinates the pharynx, hyoid bone, tonsils and tongue. Orthognathic surgery with major advancement of the maxillary complex proved very successful as a treatment method.

The upper jaw advancement improves the airway in the retropalatal region, whereas the mandibular advancement can markedly advance the retroglossal area. The combination of these methods can produce the biggest improvement. The disadvantages of such method are: orthognathic preparation, the necessity of extensive and long surgery, high risk of complications and relatively long recovery period. It has also been reported the osteotomies only within the chin area could have some positive influence to diminish the OSAS signs and symptoms.

Objectives

The authors having the reasonable experience and expertise in the field of orthognatic surgery checked the effectives of the modified genioplasty for the airway improvement.

The modified surgical procedure (extensive osteoplasty of the entire lower mandibular border) is presented (photos, graphic illustrations)

Methods

In the years 2008-2012 the authors performed 45 genioplasties as solitary procedures with no other surgical, nor orthodontic treatment. 22 osteotomies involved the entire lower border of the mandible, 23 osteotomies were limited to the interforaminal area. All were performed with the piezo equipment. Out of 45 operated patients 33 were assessed for the OSAS signs and symptoms, pre and postoperatively.

The assessment of the surgical treatment of OSAS was performed by special self assessment questionaire (subjective) and AHI index.

The pre and post operative results were also assessed by standard lateral cephalograms where the retroglossal and retropalatal distance were measured.

Results

In all operated patients esthetic and functional improvement was achieved. The lower border osteotomy allowed for major (up to 15mm) chin advancement comparing to the 8 mm advancement in standard genioplasty. The questionnaire assessment, AHI and lateral cephalograms confirmed the superiority of the new method. Bone healing, nerve function recovery in all patients were uneventful. Marked improvement the lateral and frontal facial contour was achieved.

Conclusions

Osteotomy of the lower mandibular border performed by piezoelectric saw gives new possibilities in the treatment of OSAS and facial esthetics. The new method does not have the full advantages of the bimaxillary advancement, although is simple, easy to apply and doesn't need any orthodontic preparation. It can be used as a complementary method with other surgical ways of treatment.

OUTCOMES OF MAJOR AIRWAY RECONSTRUCTIVE SURGERY IN A CONTEMPORARY AUSTRALIAN OTOLARYNGOLOGY PRACTICE... BEYOND THE "MODIFIED UPPP"

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Introduction

After initial clinical and physiological assessment, some patients who fail device use (CPAP or MAS) for compliance issues, are not considered suitable for a modified version of uvulopalatoalpharyngoplasty and radiofrequency tongue reduction, and may require more extensive surgery. This presentation focuses on outcomes from those surgeries in a contemporary Australian practice

Objectives

To demonstrate efficacy of surgeries that are more extensive than modified UPPP and radiofrequency alone in the context of failed or rejected device use

Methods

The first twenty patients deemed unsuitable for limited surgery having failed or rejected device-use were assessed for more comprehensive surgery with prospective documentation of pre- and post-operative apnea-hypopnea index (AHI) , Epworth sleepiness score (ESS), Severity of snoring scale (SSS), clinical assessment and body mass index (BMI).

Results

Mean AHI pre-op fell from 35.2 (21.6-60) to 18.0 (4-37), post-op. mean pre-op ESS fell from 11.1 (3-19) to 5.3 (3-8) and snoring severity scale (SSS) fell from 7.4 (5-9) to 1.2 (0-3).

Conclusions

Significant improvement in physiological and quality of life parameters can be achieved in patients who have failed device use and then undergo soft-tissue surgery that is more extensive than modified UPPP and RF tongue ablation.

DOES A LARGE VENTILATORY RESPONSE TO AROUSAL PREDISPOSE TO UPPER AIRWAY COLLAPSE ON THE RETURN TO SLEEP?

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Introduction

Arousals from sleep commonly occur at the end of respiratory events in obstructive sleep apnea (OSA). Arousals could perpetuate cyclical breathing via hyperventilation, hypocapnia and dilator muscle hypotonia leading to airway collapse on the return to sleep. However, several studies have not shown reduced dilator muscle activity following the return to sleep after induced arousal. The magnitude of hyperventilation at arousal varies between individuals and it is possible the proposed sequence of events only occur in individuals with large responses.

Objectives

1) To assess the variability of the magnitude of the ventilatory response to arousal.

2) To compare dilator muscle activity changes following arousal between individuals with large and small ventilatory responses to arousal.

Methods

38 healthy individuals have been recruited. Subjects were instrumented with: EEG, EOG and chin EMG, a nasal mask and pneumotachograph, an epiglottic pressure catheter and 2 fine wire intramuscular genioglossus electrodes. CO2 was sampled from the mask and the end tidal value (PETCO2) determined. Once more than 2 minutes of stable supine N2-N4 sleep was achieved, auditory tones (40-100dB, 0.5s, 1000Hz) were played to induce brief 3-15s arousals.

Results

Adequate data were obtained in 21 subjects to date. The peak ventilatory response to arousal ranged from 7% to 58% above the pre-arousal level of ventilation (median 32%). Physiologic data were compared between 4 subjects with large ventilatory response to arousal (>50% increase in ventilation) and 5 subjects with small ventilatory response to arousal (<25% increase in ventilation). The mean duration of arousal did not differ between large and small ventilatory response to arousal groups (6.3±0.9 and 7.4±0.9 sec respectively). By design, post arousal ventilation was significantly different between groups (9.4±0.8 vs 6.6±0.3L/min), but no other variables differed significantly. However, PETCO2 and peak inspiratory genioglossus muscle activity tended to show a greater reduction on the 2nd and 3rd breaths following arousal in the large ventilatory response to arousal group (Breath 2: -1.1±0.3 vs -0.1±0.5mmHg and 111±7 vs 131±11% baseline activity respectively), although genioglossus activity was not reduced below baseline following the return to sleep in either group.

Conclusions

More data are required before firm conclusions can be made. However, if the results persist in a larger population they would suggest that reduced activity of the genioglossus muscle does not occur on the return to sleep following arousal, even in individuals with a large ventilatory response to arousal.

ENT SURGERY IN PATIENTS WITH SLEEP APNEA SYNDROME - THE ICELANDIC SLEEP APNEA COHORT (ISAC)

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Introduction

The place of sugical correction of upper airway narrowing as a treatment option for obstructive sleep apnea syndrome (OSAS) is not clear. There is no general agreement on when a surgery should be tried, independent of type of surgery. Regardless of this many patients report positive results and upper airway operations are frequently performed.

Objectives

The objective of this presentation is to demonstrate the frequency of surgical intervention in a specific cohort of OSAS patients.

Methods

All CPAP users in Iceland are taken care of by the Landspitali. Patients diagnosed with moderate to severe obstructive sleep apnea (OSA) from 2005 - 2010 were invited to participate. Altogether 822 OSA patients participated (665 males, 157 females). Two years later they were invited for a follow-up evaluation. The two years follow up included a full ENT-assessment and specific questions regarding upper airway symptoms and surgery.

Results

Altogether 741 (90%) OSA patients returned for the 2 year follow-up. Of those, n=475 (64%) were using CPAP and n=266 were non-users. 407 (55%) out of 741 patients had undergone a total of 566 operation in the upper airways. Tonsillectomies where the most frequent with 226 cases, mostly done during childhood and teenage. 171 cases of septoplasty, 82 of turbinoplasty and 55 of uvulopalatoplasty were reported, approximatly one third of them after the start of CPAP treatment.

Conclusions

In a specific cohort of OSAS patients in Iceland every second patient had undergone some sort of surgery of the upper airway. Surgical intervention is frequently performed in patients seeking help for symptoms of obstruction of the upper airways.

COBLATION UVULOPALATOPHARYNGOPLASTY IMPROVES SLEEP APNEA OUTCOMES IN CPAP FAILURES

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Background

In recent years there has been a demand from the scientific community for randomized controlled trials on the effect of uvulopalatopharyngoplasty operations (UPPP). As a respond to that plea two comparable studies were started, one in Stockholm using cold steel technique and this one in Reykjavik using coblation technique. The study in Stockholm has recently been completed. We wish to report from Reykjavik from this ongoing study as the results are in tune with those from the sister study in Stockholm.

Hypothesis

In patients with sleep apnea and high or medium risk oropharyngeal obstruction (Friedman Stage I or II), UPPP improves the apnea-hypopnea index on polysomnography (PSG) and daytime sleep propensity on the Epworth Sleepiness Scale (ESS) at 6 months, compared to patients who delayed UPPP.

Study design

This is a two armed randomized controlled trial designed to evaluate the efficacy and predictors of UPPP outcome for CPAP failure patients. Patients with high and moderate likelihood of symptomatic and PSG improvement with UPPP, based on oropharyngeal anatomy (Friedman I & II), were randomized either to UPPP early or to UPPP delayed by six months. To compare UPPP patients to untreated patients, primary outcomes were assessed at 6 months, immediately prior to delayed UPPP (control group) and 6 months after UPPP (treated group). Patients will be followed for an additional 24 months after surgery to assess if treatment effects persist.

Study group

Inclusions criteria: CPAP failure patients. Apnes-hypopnea index (AHI) ≥ 15. ESS ≥ 7. BMI ≤ 35 kg/m2.

Exclusions criteria: Friedmans stage 3 and 4. American Society of Anesthesiologists Class >3. Grave mental, nerve, heart, or lung disease. Nasal occlusion.

Study parameters

PSG, ENT-status, ESS, SF-12, UPPP-operation questionnaire, anthropometry, blood tests.

Operation

Standard UPPP +/- tonsillectomy, using coblation technique (ArthroCare Corporation).

Primary outcome

Changes in PSG and ESS.

Results

This is an ongoing study and so far 15 patients have fulfilled the criteria for evaluation of results. Eight of these were randomized to delayed operation.

No statistically significant change was seen in AHI nor ESS after 6 months of untreated observation of the 8 patients randomized for delayed operation.

After UPPP operation there was a statistically significant decrease in mean AHI by 44% from 32 +/-4.6 to 18 +/- 3.8 (n=15, p=0.0001). Mean ESS decreased in the same manner by 42%, from 12 +/-1.1 to 7.2+/-0.8 (p=0.0001).

The reduction in AHI and ESS 6 months after operation was statistically significant greater than the change in AHI and ESS after 6 months of observation (each p=0.0001).

Conclusion

UPPP reduces objective and subjective parameters of obstructive sleep apnea syndrome.

OPTIMIZATION OF OSAS TREATMENT IN PATIENTS WITH PHARYNGEAL LEVEL OF OBSTRUCTION

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Introduction

Obstructive Sleep Apnea Syndrome (OSAS) – is a life-threatening breath disturbance, defined as asphyxia periods during sleep. It leads to excessive daytime sleepiness, hemodynamic disorders and unstable heart function. The presence of abnormal size and dislocation of hyoid bone is considered to be the factor, contributing to development of snoring and OSAS course.

Objectives

To evaluate the effectiveness of hyoid suspension for OSAS treatment in patients with pharyngeal level of obstruction.

Methods

Prospective study included 12 adult patients with OSAS. Preliminarily all the patients underwent cardio-respiratory monitoring and drug-induced sleep endoscopy for detecting falling back of tongue and epiglottis. For the exposure of hyoid bone location, lateral cephalometry was made. 3 months after the operation eftsoon cardio-respiratory monitoring and drug-induced sleep endoscopy were made. The following examination included the estimation of life quality (LQ, SF-36), intensity of snoring according to visual analogue scale (VAS) and also daytime sleepiness, evaluated by Epworth Sleep Scale (ESS). The study also included rhinomanometry and spirometry. The procedure of hyoid suspension was accomplished according to AIRvanceTM Hyoid Suspension procedure. The effectiveness of treatment was evaluated on the base of statistically calculated significant decrease of apnea/hypopnea index (AHI) after the procedure. Objective success of treatment implied AHI decrease >50%.

Results

Improvement in the treatment group turned to be significant; this conclusion is based on the results of AHI evaluation ($P < 0,0001$), LQ, SF-36 ($P < 0,0001$), VAS of snoring intensity ($P < 0,0001$) and ESS ($P = 0,0002$). Desaturation duration and the number of desaturation episodes decreased twice and the oxygen saturation increased till 95%.

Conclusion

This study showed that the procedure of hyoid suspension in patients with OSAS leads to significant increase of AHI and LQ, reduces desaturation duration and the number of desaturation episodes and increases the oxygen saturation.

THE USAGE OF PALATAL IMPLANTS FOR OSAS TREATMENT IN PATIENTS AFTER LASER-ASSISTED UVULECTOMY

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Introduction

In case of upper airways' obstruction on the level of soft palate due to its flabbiness, the effectiveness of different uvulotomy methods turns to be insufficient and obstructive episodes remain.

Objective

To evaluate the effectiveness of palatal implants for OSAS treatment in patients after laser-assisted uvulotomy.

Methods

Prospective study included 22 non-obese adults, who still had OSAS findings in spite of previously performed laser-assisted uvulectomy. Preliminarily all the patients underwent cardio-respiratory monitoring and drug-induced sleep endoscopy for detecting of obstruction level. The following examination included the estimation of life quality (LQ, SF-36), intensity of snoring according to visual analogue scale (VAS) and also daytime sleepiness, evaluated by Epworth Sleep Scale (ESS). The study also included rhinomanometry and spirometry. The surgical procedure of palatal implants insertion corresponded to the published method (Restore Medical Inc, Saint-Paul, Minnesota). 3 months after the operation eftsoon cardio-respiratory monitoring and drug-induced sleep endoscopy were made. The effectiveness of treatment was also evaluated on the base of statistically calculated significant decrease of apnea/hypopnea index (AHI). Objective success of treatment implied AHI decrease >50%.

Results

Improvement in the treatment group turned to be significant; this conclusion is based on the results of AHI evaluation ($P < 0,0001$), LQ, SF-36 ($P < 0,0001$), VAS of snoring intensity ($P < 0,0001$) and ESS ($P = 0,0002$).

Conclusion

This study showed that uvulectomy in patients with OSAS and ronchopathy contributes to decrease the intensity of snoring, but doesn't influence significantly on AHI and LQ.

Structural support of palatal implants provokes the compiling of fibrous tissue and lets achieve the induration of soft palate and decrease its vibrating. As a result, the hardening of soft palate leads to descenting of sleep apnea episodes and OSAS course improvement.

ANALYSIS OF THE CORRELATION BETWEEN SLEEP HYGIENE AND CLINICAL SYMPTOMS IN OBSTRUCTIVE SLEEP APNEA PATIENTS

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Introduction

Obstructive sleep apnea (OSA) is a repetitive apnea or hypopnea due to the cyclic increase of the upper airway resistance during sleep. Recurrent upper airway obstruction causes drop of blood O2 saturation and frequent arousal from sleep which is able to diminish the quantity and quality of sleep and result in a derangement of normal daytime activity by inducing insomnia and excessive daytime sleepiness. Sleep hygiene also may be affect the sleep and daytime activity.

Objectives

This study tried to analyze the relationship between the various subjects relating to sleep hygiene and clinical symptoms in OSA patients.

Methods

One hundred and ninety seven patients from 2007 to 2010 diagnosed as an OSA by polysomnography were included. The survey was performed in daytime and nighttime symptoms, the Epworth Sleepiness Scale (ESS), and sleep hygiene. The daytime and nighttime symptoms were graded by the 10 cm visual analogue scale (VAS), and sleep hygiene was checked in 9 categories by the 3 point scale. The relationship among categories was analyzed by using the Pearson correlation.

Results

Among the categories of sleep hygiene, inappropriate temperature and humidity, drinking before sleep, and emotional excitement or arousal were strongly related with daytime and nighttime symptoms, and ESS score.

Conclusion

It may be helpful to improve the symptoms in OSA patients if the sleep hygiene is educated and can be controlled in patients with OSA.

IMPACT OF CPAP TREATMENT ON HbA1C IN PATIENTS WITH SEVERE OBSTRUCTIVE SLEEP APNEA AND TYPE 2 DIABETES MELLITUS

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Introduction

There is increasing prevalence of obstructive sleep apnea (OSA) in patients with type 2 diabetes mellitus. The causal role of obstructive sleep apnea in this association has not been well delineated.

Objectives

To investigate the effect of CPAP on HbA1C and cardiometabolic profile in diabetic patients with OSA.

Methods

In this randomized controlled study, patients were recruited from diabetic clinic in a tertiary university teaching hospital for in-laboratory polysomnography. Those patients with an apnea hypopnea index (AHI) ≥ 15 were randomly assigned to either CPAP or control group for 3 months of treatment. Epworth sleepiness scale, anthropometric and blood pressure measurements, and urinary microalbumin were collected. Fasting blood was taken for insulin, glucose, lipid and glycated haemoglobin levels. Endothelial function was assessed by EndoPAT.

Results

64 diabetic patients were recruited, 32 were assigned to each group (CPAP and control), with a mean (±SD) age of 55±9 years, BMI of 30.9±6.5 kg/m2, HbA1C of 8.1±1.2% and AHI of 47.3±23.6. There were no differences of clinical parameters between two groups at baseline. After 3 months of CPAP treatment, there were significant decreases in systolic blood pressure (144 to 134 mmHg; 95% CI, 4.4 to 16.8; p=0.001), diastolic blood pressure (83 to 77 mmHg; 95%CI, 1.8 to 10.5;p=0.007); HbA1C (8.0 to 7.7%, 95%CI, 0.01 to 0.6;p=0.041); and serum triglycerides (1.9 to 1.5 mmol/L;95%CI, 0.22 to 0.58;p<0.001) in the CPAP group while no changes were seen in the control group. When we compared CPAP group with the controls, there was significant reduction in systolic blood pressure (9.1 mmHg; 95%CI, 0.3 to 17.9; p=0.044), HbA1C (0.5%;95%CI, 0.1 to 0.8;p=0.023), and serum triglycerides (0.3 mmol/L;95%CI, 0.02 to 0.5;p=0.035).

Conclusions

3 months of CPAP treatment improves glycemic control and the metabolic profile in patients with severe OSA and type 2 diabetes mellitus.

GENDER DIFFERENCES IN THE EFFECT OF COMORBID INSOMNIA ON DEPRESSION, ANXIETY, FATIGUE, AND SLEEPINESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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Purpose

There are gender differences in the presentation obstructive sleep apnea (OSA). However, the influence of gender on the presentation of comorbid insomnia and OSA is not known. This study investigated gender differences in comorbid insomnia and OSA.

Methods

Data were collected from adult patients who visited sleep laboratories for evaluation of suspected OSA. Patients were asked to report insomnia symptoms and completed a battery of questionnaires including Beck Depression Inventory, State-Trait Anxiety Inventory, Multidimensional Fatigue Inventory, Epworth Sleepiness Scale, and Short Form-36 Health Survey. The apnea-hypopnea index (AHI) and the respiratory distress index (RDI) were quantified as measures of OSA severity.

Results

750 patients (645 men and 105 women) that completed the study, 367 (48.9%) reported at least one insomnia symptom. A higher proportion of women (61.9%) than men (46.8%) reported insomnia symptoms. Women had milder OSA than men. Women reported higher depression, state anxiety, fatigue and daytime sleepiness, and lower quality of life than men ($p<0.01$). In men, the presentation of OSA differed according to the specific insomnia symptom reported. The AHI and RDI were lower in men with difficulty initiating sleep or early awakening, and higher in men with difficulty maintaining sleep, compared to men without insomnia. Men with comorbid insomnia symptoms had higher depression, anxiety, and fatigue and lower quality of life scores than men without comorbid insomnia. These differences were not observed in women. Men with all three insomnia symptoms had higher daytime sleepiness than men with no insomnia symptoms.

Conclusions

Women with OSA had a predominance of insomnia, higher levels of depression, anxiety, and fatigue, and poorer quality of life than men with OSA, even though they had milder OSA. However, additional impact of comorbid insomnia in OSA was evident only in men.

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MODIFIED UVULOPALATOPHARYNGOPLASTY AND COBLATION CHANNELING OF THE TONGUE FOR OBSTRUCTIVE SLEEP APNEA: A MULTI-CENTRE AUSTRALIAN TRIAL

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Introduction

Surgery remains a viable treatment alternative for those who have failed device use in Obstructive Sleep Apnea. This paper establishes the positive physiological effect achieved with a reproducible operation.

Objectives

To investigate the surgical outcomes and efficacy of modified uvulopalatopharyngoplasty (mod UPPP) and Coblation channelling of the tongue (CCT) as a treatment for obstructive sleep apnea (OSA).

Methods

Adult patients with simple snoring or obstructive sleep apnoea were treated with combined modified UPPP (+/- bilateral tonsillectomy) and CCT (N=48). Full polysomnography was performed pre-operatively and three months post-operatively. Post-operative clinical assessment, sleep questionnaires and patient demographics including body mass index were compared to pre-operative data. All polysomnograms were re-scored to AASM recommended criteria by two sleep professionals.

Results

The pre-operative AHI (median and interquartile range) of 23.1 (10.4 to 36.6) was lowered to a post-operative AHI of 5.6 (1.9 to 10.4) ($P<0.05$). Epworth Sleepiness Score fell from 10.5 (5.5 to 13.5) to 5.0 (3.09 to 9.5) ($P<0.05$). Morbidity of the surgery was low with no long term complications recorded.

Conclusions

Modified UPPP combined with CCT is a highly efficacious intervention for OSA with minimal morbidity. It should be considered for individuals who fail or are intolerant of CPAP or other medical devices.

VALUATION OF ORTHOAPNEA DEVICE EFFECTIVENESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA SYNDROME

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Introduction

The mandibular advancement device (MAD) is employed in the treatment of obstructive sleep apnoea syndrome (OSAS) as an alternative in patients with mild or moderate OSAS or even in severe patients who do not tolerate the CPAP or refuse surgery.

Objectives

Evaluate the effectiveness of the MAD designed by Orthoapnea in patients with OSAS. Determine whether there is an improvement or not in the airway area patency and volume.
Determine if the number of respiratory events and desaturations decreases.

Methods

Prospective study in mild or moderate OSAS diagnosed patients by respiratory polygraphy at Virgen de la Victoria Hospital in Málaga. Those with serious comorbidity, severe obesity, anatomic problems that make the MAD placing impossible, high gag reflex, or pregnant women were excluded. A basal polygraphy was carried out and repeated after four weeks of treatment with the MAD. During the treatment period, two 3D i-CAT CT scans were performed with and without MAD to measure airway area and volume, defined by Dolphin 3D imaging airway analysis tool. The following variables were registered: sex, age, total apnoea-hypopnoea index (AHI) – in supine and non supine position, – total amount of apnoeas, amount of obstructive apnoeas, amount of hypopnoeas, desaturation per hour index, and percentage of time during which the saturation was under 90% (CT90).. The treatment was considered effective when the reached AHI was lower than 5 or significantly reduced. The results were analyzed by Student's T-test for paired data, nonparametric Wilcoxon test and McNemar test.

Results

43 patients were included in the research: 32 men (74.4%) and 11 women (25.6%); average age of 44.7± 19.2; body mass index average of 27.1± 5.6 kg/m2. The airway area patency and volume increased positively after using the device (area from 256 to 308 mm2; volume from 4533 to 6356 mm3). When comparing the respiratory parameters before and after using the MAD, statistically significant decreases ($p<0.05$) were obtained in the following variables: average AHI (from 16.2 to 6), both in supine and non supine position; average of total apnoeas (from 69.2 to 9.8); average of obstructive apnoeas (from 34 to 8.7); average of hypopnoeas (from 70.1 to 24.8); desaturation per hour index average (from 13.7 to 5.5); average CT90 (from 1.6 to 0.6).

Conclusions

The use of Orthoapnea MAD proves to be an efficient therapeutic alternative, increasing airway area patency and volume, thus reducing the AHI on patients with mild and moderate OSAS, and improving some of its pathophysiologic consequences, such as nocturnal desaturation.

"ASSESSING AIRFLOW PATTERNS AND PRESSURE IN THE PHARYNGEAL AIRWAY AS AN INDICATOR OF OBSTRUCTIVE SLEEP APNEA SEVERITY"

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Introduction

Sleep-disordered breathing effects on patient´s quality of life are well known. In general, the functional impact of the obstruction is difficult to quantify. When obstructions overlap to a preexisting anatomic constriction, it is even more challenging to assess the most significant level of obstruction. This may explain why obstructive symptoms continue to appear in an undesirable number of treated patients.

Objectives

Today's diagnosis tools for obstructive airway disorders are based on Polysomnography and Medical Imaging data and cannot offer details about the effect of the anatomical features on airflow or on airway resistance for assessing obstruction's severity. It is hypothesized here that the pharyngeal airflow, often neglected, it is largely altered in obstructed airways and its quantitative assessment using computational modeling can contribute to an accurate, non-intrusive, and inexpensive diagnosis of sleep-disordered breathing condition.

Methods

Computed Tomography imaging for extracting patient-specific upper respiratory tract anatomy and Computational Fluid Dynamics1 modeling for computing the airflow through the pharyngeal airway are employed. Thus, not only the specific anatomic measurements are acquired (i.e. pharyngeal airway dimensions, cross-sectional area, and volume) but also pertinent data to the airflow are computed (e.g. airway resistance, flow patterns, velocity, pressure, turbulence production, or wall shear-stresses). The data obtained in normal healthy pharyngeal respiratory tracts (Controls) are averaged and used to generate a "Baseline" against which the results obtained in sleep-disordered breathing patients at pre and post-treatment will be compared and contrasted.

Results

The described methodology is demonstrated using four normal healthy controls and four patients with sleep-disordered breathing who underwent surgery or used positive airway pressure devices. The airway resistance is often a preferred variable when analyzing the severity of an airway obstruction. Thus, the "Baseline" (Controls), the pre-treatment and post-treatment conditions are assessed using mean pharyngeal airway resistance data calculated for each situation in part at peak inspiratory and expiratory flow rates. Very large differences (up to an order of magnitude) between the pre-treatment and the post-treatment data were found. All the airway resistances calculated at post-treatment were found to be bellow or in the range of the averaged airway resistance estimated for the healthy subjects (Controls).

Conclusions

The present study represents an important step in building a tool for quantifying Obstructive Sleep Apnea at pre-treatment and for assessing treatment outcome. Such a computational model shall enable to determine and understand the patho-physiology of the sleep disorder and the risks for airway collapse and flow induced obstruction at pre- and post-treatment conditions. The simulation of the pharyngeal airflow will allow the surgeon to add quantitative data into his/her decision making, which is often based on semi-quantitative or qualitative clinical findings.

[1] Computational Fluid Dynamics is able to predict fluid flow characteristics by solving the physical laws of fluid mechanics (Navier-Stokes equations) using numerical methods and algorithms embodied in the form of a computer code.

PHARYNGEAL FLAP CONSTRUCTION SURGERY WITH TONSILLECTOMY IN VELOPHARYNGEAL INCOMPETENT CHILD ACCOMPANYING OSAS - A CASE REPORT

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Introduction

Palatine tonsillar hypertrophy is one of major cause of obstructive sleep apnea in children while velopharyngeal incompetence is one of important causes of hypernasality and articulation disorder. We treated surgically a five-year-old boy suffering from severe velopharyngeal incompetence accompanying obstructive sleep apnea because of palatine tonsillar hypertrophy.

Case

A five-year-old boy having persistent hypernasality and articulation disorder was sent to our department from dental clinic in our university hospital. He received lip and cleft palate closure operation on his one year and nine months old. Speech therapy for two years after the closure operation has been ineffective because of his severe velopharyngeal incompetence. Surgical treatment with pharyngeal flap construction was recommended for his hypernasality. However he was suffering from obstructive sleep apnea and his polysomnographic results showed obstructive sleep apnea due to bilateral palatine tonsillar hypertrophy. We faithfully explained indication and hazard of these surgical treatments to his parents and they well understand our explanation and consented with us. After surgical treatment, snoring and sleep apnea were remarkably decreased and hypernasality has been improved gradually. Finally there were no sleep apnea and hypernasality at all.

Conclusion

Firstly, informed consent to their guardians of such complicated cases is the most faithful for choosing surgical treatment. Secondly, surgical procedure in these conditions must be skilful. Thirdly, intensive care after operation must be important.

DOES THE MANDIBULAR ADVANCING DEVICE (MAD) WORK INDEPENDENT OF OBSTRUCTION LEVEL?

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Keywords: obstructive sleep apnea, pressure measurements, mandibular advancing device

Introduction

Obstructive sleep apnea/hypopnea syndrome (OSAHS) is recognized by repeated total or partial obstruction in different locations in the upper airways. These sleep related obstructions are defined as apneas, hypopneas and events with increased respiratory effort. A mandibular- advancing device (MAD) is a common treatment for OSAHS. This treatment device keeps the mandible in an anterior position, prevents obstruction to occur and eases the passage of air during sleep.

Lack of compliance and effect is often a problem for treatment with MAD; the challenge is to determine which groups of patients are most likely to benefit from MAD and how these patients can be identified. The effect of the MAD can be different in various levels of the upper airways. Therefore further knowledge of how the MAD works is required.

Objectives

The primary objective of this study was to detect changes in the location of the sleep related obstructions during treatment with the mandibular- advancing device Somnoguard.

A secondary aim was to detect the effect of the device on apnea/hypopnea index (AHI), intra- thoracal inspiratory pressure and the patient´ general level of daytime sleepiness measured with Epworth Sleepiness Scale (ESS).

Methods

Twenty-nine patients of a total of thirty-three completed the study. These included both women and men. A sleep study with pressure measurements to determine the levels of obstructions was performed before the patients started using Somnoguard. After 4 weeks of accustomization with the device, the patients had another sleep study performed with Somnoguard inserted.

Results

The apnea/hypopnea index (AHI) did not change significantly. Other parameters showed significant change and their changes related to their level of occurrence were analyzed further. More than 50 per cent of the patients in this study reported less snoring and subjectively better quality of sleep. However, several patients experienced temporary teeth and jaw discomfort, and complained that the device sometimes fell out of the mouth during sleep.

Further detailed results will be presented.

Conclusion

This study provides knowledge of which patients are suitable for treatment with a mandibular-advancing device. This can have consequences for the clinical practice and particularly the choice of sleep study.

PREDICTIVE VALUE OF DRUG INDUCED SLEEP ENDOSCOPY COMPARED TO SNORING-SOUND TEST AND MÜLLER MANEUVER IN ADULT OSAS PATIENTS

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Objective

To improve the therapeutic effect of uvulopalatopharyngoplasty (UPPP) for the adult OSAS patients, it is necessary to define the site of obstruction. Previously it has been reported that drug induced sleep endoscopic examination (DISE) to localize the site of pharyngeal airway collapse for adult OSAS patients. From our experience it is useful to know the site of obstruction but it is not convenient to perform for all of adult OSAS patients coming to the out-patient clinic.

On the other hand, it has been reported that müller maneuver is a useful easy method to detect the site of obstruction in adult OSAS patients. It can be done in the outpatient clinic without need for sedative drugs. Patient try to inhale much and negative pressure will occur during endoscopic examination. The disadvantages of such maneuver are ; it is neither done through the night nor during patient is asleep and it is doubted that it reflect directly the airway collapse in OSAS patients.

Another method for diagnosis is the snoring-sound test which is a simple examination to detect of airway collapse. Patients imitate they are snoring and the ENT doctor can see the site of collapse and the way to collapse using fiberscope.

The aims of this study are to know the differences in the results of these examinations and to know the benefits and disadvantages of these three examinations.

Methods

We chose 30 adult OSAS patients they came to our ENT clinic doubted having OSAS in Fujita-Health 2nd University hospital. Polysomnography (PSG) was done in the first night to check whether they have OSAS or not. At second day during the daytime snoring-test, müller maneuver and DISE were done consequently for all OSAS patients.

We divided the type of obstruction into four types; anterior-posterior pharyngeal type, tonsil type, circumferential pharyngeal type and lingual tonsil type. We compared between the three examinations with regard to the obstruction site.

Snoring-sound test has been performed by asking patient to imitate to snore under endoscopic observation. Müller maneuver has been performed by asking the patient to inhale with nose and mouth is closed under endoscopic observation. Both examinations have been performed while patients are awake. DISE has performed during patient is sleeping in bed using diazepam. We tried these three examinations in the same patient and compared the results.

Results

We found that it was more easy to observe the movements of uvula and soft palate in DISE than other two methods. Furthermore, as the snoring-sound test and müller maneuver have been performed in sitting position during patients are awake they were less effective to detect collapse site than DISE.

After comparison of these three methods we could identify that DISE is much useful to detect collapse site. However we should consider that DISE is not done throughout the whole night.

Conclusion

Endoscopic pharyngeal assessment of OSAS patients has clinical value for the improvement of UPPP outcome. DISE has better predictive value in detection collapse site compared to other two methods.

ENDOTHELIAL FUNCTION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: ASSOCIATIONS WITH NIGHTTIME OXYGENATION AND BLOOD METABOLIC PARAMETERS

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Introduction

Impaired endothelial function is observed in patients with obstructive sleep apnea (OSA). The mechanisms of the endothelial injury are still not clear, but potential etiologies include hypoxemia and systemic inflammation. OSA is also associated with obesity, hypertension and metabolic dysregulation that may contribute to inflammatory changes and adverse effects on endothelium. Repetitive episodes of cessation of breathing during sleep in OSA are followed by hypoxia/re-oxygenation that resemble ischemia/reperfusion injury and may be the main domain in pathogenesis of endothelial dysfunction in OSA.

Objectives

The objective of the study was to evaluate differences of night time oxygenation parameters and metabolic markers in OSA patients with normal and impaired endothelial function.

Methods

Men complaining of typical OSA symptoms and having no actively treated comorbidities were included. All of them did not smoke for at least two years and had normal lung function evaluated by standard spirometry. OSA was confirmed by whole-night polysomnography (PSG), when apnea/hypopnea index (AHI) was >5/h. Mean oxygen saturation during sleep (MeanSpO2), oxygen desaturation index (ODI), percent of total sleep time spent with oxygen saturation less 90 % (SpO2<90%/TST) were evaluated. Body mass index (BMI) was calculated. Blood samples were taken and endothelial function was evaluated in a fasting state during the morning after PSG. The assessment of brachial artery flow-mediated vasodilation was performed by an experienced cardiologist, who was blinded to diagnosis. Endothelial dysfunction was considered when reduced vasodilation less 6 percent was detected in brachial artery diameter after a 5-minute arterial occlusion with blood pressure cuff. Blood high sensitivity C reactive protein (hs-CRP), glucose, fibrinogen concentrations were measured, lipid status (total cholesterol, high density lipids, low density lipids, triglyceride) was evaluated. All subjects were divided into 2 groups based on endothelial function. Data is presented as mean ±SEM. Differences were evaluated using Mann-Whitney U test.

Results

31 men aged 40±4.4 years with mean BMI 31.7±0.7 kg/m2 were included in the study. Endothelial dysfunction was detected in 16 subjects. There was no difference between age, daytime oxygen saturation and BMI in the groups with normal and impaired endothelial function. AHI, MeanSpO2, ODI and SpO2<90%/TST differed in the group with normal and impaired endothelial function (respectively: 32.8±7.9 and 57.2±26.6 events/h, 94.4±0.3 and 90.8±1.7 %, 31.8±7.8 and 63.3±7.7 events/h, 3.2±1.6 and 24.2±7.0 %, $p<0.05$). There was no difference in hs-CRP, total cholesterol, high density lipids, low density lipids, triglyceride and glucose levels. Fibrinogen concentrations were higher in the group with endothelial dysfunction than in the other group (3.1±0.1 and 2.8±0.2 g/l, $p<0.05$).

Conclusions

Endothelial dysfunction in OSA patients was associated with more severe OSA, worse nighttime oxygenation parameters and higher blood fibrinogen concentrations. Neither BMI, nor hs-CRP, glucose or lipid concentrations differed in the two study groups. Impaired oxygenation during sleep appears to be an important pathway leading to impaired endothelial function in OSA.

OBSTRUCTIVE SLEEP APNEA IN TREACHER-COLLINS SYNDROME: PREVALENCE, SEVERITY, CAUSE AND SCREENING

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Objective

Primary aim of this study is to evaluate the prevalence, severity and anatomical cause of obstructive sleep apnea (OSA) in patients with Treacher-Collins syndrome. Secondary aim is to evaluate the accuracy of two established OSA questionnaires in children and adults.

Methods

We performed a cohort study in 35 patients (13 children). An ambulatory polysomnography was performed to determine the prevalence and severity of OSA. All upper-airway-related surgical interventions were evaluated retrospectively. In 11 patients, sleep endoscopy, flexible and rigid endoscopy were applied to determine the level of anatomical obstruction of the upper airway. The Brouillette score was evaluated in all children and the Epworth Sleepiness scale in all adults cross-sectionally.

Results

The overall prevalence of OSA in Treacher-Collins patients was 46% (54% in children, 41% in adults) despite 38 upper-airway-related surgical interventions in 17 patients (5 children). Examination of the upper-airway revealed various anatomical levels of obstruction, from the nasal septum to the trachea. However, most significant obstruction was found at the level of the oro/hypopharynx. The total Brouillette score showed a sensitivity of 50%, specificity of 71%, and positive and negative predictive values of 60% and 63%. The Epworth Sleepiness Scale showed a sensitivity of 0%, specificity of 92%, and positive and negative predictive values of 0% and 57%.

Conclusions

OSA in Treacher-Collins patients is an important problem. Endoscopy of the upper airways was helpful in determining the level of obstruction. Because OSA in Treacher-Collins has a multilevel origin, surgical treatment at one level will not resolve OSA in most patients. Screening for OSA based solely on the Brouillette score and Epworth Sleepiness scale is not reliable, probably due to habituation. In conclusion, this study shows that screening with a polysomnography and an individual treatment plan based on endoscopy results is necessary for patients with Treacher-Collins.

PECULIAR SLEEP POSITION IN DOWN SYNDROME PATIENTS AS A PROTECTIVE MECHANISM AGAINST NOCTURNAL OXYGEN DESATURATION

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Key words: sleep, position, Down syndrome

Introduction

Down syndrome (DS) is one of the most frequent chromosome abnormalities and the overall prevalence was 5.82 DS births per 10,000 live births in Japan. Although access to prenatal diagnosis was increased, the trends in its prevalence showed tendency to increase probably because of the advanced maternal age in pregnancy. Patients with DS are prone to develop obstructive sleep apnea (OSA) for a combination of reasons, including the typical flattened midface and upper airway dysmorphology, as well as low muscle tone and enlarged tonsils or tongue. In previous investigation about sleeping habits of individuals affected by DS, strange postures and frequent symptoms were reported. The most adopted sleep position is a folding position, which is sitting cross-legged and flopped forward with his/her head resting on a bed. In the previous study, this unique sleep position was unclear, yet was hypothesized for OSA protection. Therefore, the contribution of this position for OSA protection needs to be ascertained.

Objectives

The aims of the current study were to determine the relationship of sleep position in DS patients and nocturnal oxygen desaturation and whether this sleep position is affected by patients' age.

Methods

Thirteen consecutive patients with DS (male: 3, female: 10, age: 5-34 years, 17.6±9.5), who were the member of the DS Association of Fukuoka, Japan, were recruited for this study from May 2011 until March 2012. Overnight pulse oximetry of these patients, set up by their parents, were recorded for two to three consecutive nights and analyzed. The DS patients' parents also filled in the questionnaire about sleeping posture and sleep time, as well as Epworth Sleepiness Scale (ESS). Continuous variables were compared with Student's t-test for independent samples (Mann Whitney U when appropriate).

Results

Patients were split by sleep positions into two groups, usual and unusual position groups (n = 8 vs. 5). Patients who slept in unusual positions (leaning forward, prone, and so on) were tend to be younger than the patients who slept in usual positions (supine and lateral decubitus position), (21.4+9.5 vs. 11.6+6.0, $P < 0.1$). Patients with unusual sleep positions had much better value of 3% oxygen desaturation index (ODI) than those with usual sleep positions (4.5+1.2 vs. 18.0+12.5, $P < 0.01$). There were no significant differences in body weights, body heights, body mass indexes (BMI), ESS scores, total sleep time, and lowest saturation between two groups of DS patients.

Conclusions

Peculiar sleep positions in DS patients should improve the nocturnal oxygen desaturation index. The need of taking these postures was supposedly compensation against OSA. Not all DS patients had these positions. Strange sleep positions tended to exist in younger patients, although it was not significantly related in statistical analysis. This might be due to small sample size. Accordingly, these positions can be considered related to alleviation of OSA due to maturity of DS patients.

UVULOPALATAL FLAP WITH AND WITHOUT LATERAL PHARYNGOPLASTY: A CLINICAL PROSPECTIVE RANDOMIZED STUDY IN ASIAN ADULTS

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Introduction

As shown in previous studies, the lateral pharyngeal wall seems to play a key role in the obstructive sleep apnea syndrome (OSAS). These regions become thickened and collapsible during respiration in patients with OSAS, leading to the narrowing pharynx. There is no clinical prospective randomized study in the surgery for widening the lateral pharyngeal wall space till now. For this reason, we developed a surgical technique designed to splint the mucosa and submucosa of lateral pharyngeal wall without muscular layer resection. This is a prospective randomized study in an academic tertiary center in Taiwan.

Objective

To assess the effectiveness of uvulopalatal flap (UPF) with and without lateral pharyngoplasty (LP) procedures in the treatment of adult obstructive sleep apnea syndrome (OSAS).

Methods

Patients were randomly assigned into 2 groups: in one group, we did the UPF with palatine tonsillectomy only (29 cases) and we called it UPF group. In the other group, we performed the UPF with palatine tonsillectomy, plus LP (25 cases) and we called it LPF group. The LPF group was done by the rotation of lateral pharyngeal submucosa flap. Unlike the traditional lateral pharyngoplasty which involve the superior pharyngeal constrictor muclses (SPC), we only splitted mucosa and submucosa layer to avoid fibrosis and muscular constriction after the operation.

Results

We compared post-operative outcome through the evaluation of OSAS-related symptoms and the analysis of overnight polysomnography (PSG). Both groups achieved a statistically significant reduction in apnea-hypopnea index after surgeries, but only the moderate OSAS patients (15□AHI<30) in the LPF group achieved the better reduction of apnea-hypopnea index (AHI) than the UPF group with significance (p=0.020). As for the nadir SpO2, in severe OSAS, both UPF and LPF groups had significant improvement after surgery. There was no significant difference in mean SpO2, body mass index (BMI), snoring index, Epworth Sleepiness Scale (ESS), and periodic limb movement index (PLMD) between the two groups before and after surgery. LPF group in the moderate OSAS patient had better reduction of the AHI than the UPF group, but in the severe OSAS patient, there was no significant difference. We propose the hypothesis that the thickness of the tongue base might play an important role in the severe OSAS group. Therefore, to perform the LPF only without reducing the thickness of the tongue base didn’t show the significant benefit for patients.

Conclusions

LPF group showed better AHI outcome than UPF group in the moderate OSAS. Except the bias of the thickness of the tongue base, the LPF might be a good choice in the OSAS patient, especially in the moderate and severe groups.

SURGERY AS FIRST-LINE TREATMENT FOR OBSTRUCTIVE SLEEP APNEA

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Objectives

To determine if an appropriately screened patient population with obstructive sleep apnea (OSA) may benefit from surgical intervention as a primary therapeutic modality in lieu of CPAP.

Study Design

Prospective non-blinded cohort study

Methods

Fourty-eight patients were identified that met inclusion criteria between May 2007 and May 2010. All patients had optimal anatomy for surgical intervention. Surgical interventions included tonsillectomy plus palatoplasty and septoplasty/turbinoplasty. All patients had at minimum moderate sleep apnea (AHI>15) on overnight polysomnogram, and had previously failed a trial of CPAP. The success of surgical intervention is measured by evaluating the change in the preoperative and postoperative Apnea-Hypopnea Index (AHI), Epworth Sleepiness Scale (ESS), and modified Sleep Apnea Quality of Life Index (SAQLI-E).

Results

Patients demonstrated a statistically significant improvement in their AHI, ESS, and SAQLI-E scores following surgical intervention ($p<0.001$). Pre-operative ESS was 13.7 ± 2.9, which declined to 6.13 ± 2.45 with surgical intervention. The AHI value decreased from 41.0 ± 27.8 pre-operatively to 17.9 ± 10.1 postoperatively, a mean of 23.2. Lastly, pre-operative SAQLI-E scores were 21.7 ± 5.8. With surgery, the mean reduction was by 11.5, with post-operative scores being 10.2 ± 3.2.

Conclusions

Surgical intervention for OSA significantly improves quality of life as measured by the SAQLI-E score, sleepiness as measured by the ESS score, and OSA severity as measured by the AHI. In a carefully selected patient population, the evidence suggests that surgical intervention can be considered as primary therapeutic modality in lieu of CPAP.

DIAGNOSTIC ACCURACY OF THE STOP, STOP-BANG AND SIMPLIFIED STOP-BANG FOR DETECTION OF OBSTRUCTIVE SLEEP APNEA IN CLINICS

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Key words: STOP-BANG, simplified STOP-BANG, screening test, confirmatory test, obstructive sleep apnea

Introduction

It's estimated that 82% of men and 93% of women with moderate to severe OSA are not diagnosed. Identifying OSA patients in early stages and treating them play an important role in the reducing of its enormous complication.

Objectives

The main purpose of this study was to assess the predictive parameters of the STOP, STOP-BANG and simplified STOP-BANG Questionnaires in screening of obstructive sleep apnea (OSA). Also we analyzed the predictive parameters of the STOP-BANG and simplified STOP-BANG in higher cutoffs as a confirmatory test for OSA in clinics.

Methods

Six hundred and three patients who admitted to the sleep clinics and underwent polysomnography (PSG) filled in the STOP-BANG Questionnaire. Height, weight and neck circumference were measured by technicians for calculating STOP-BANG and simplified STOP-BANG score. The apnea hypopnea index (AHI) on the PSG was used as gold standard for diagnosis of OSA.

Results

Based on the results obtained from PSG, 165 patients (27.4%) had AHI<5, whereas the remaining 438 patients had mild (n = 123, 20.4%), moderate (n = 114, 18.9%) and severe (n = 201, 33.3%) OSA. With cutoff 2 for the STOP and 3 for the STOP-BANG and simplified STOP-BANG, the sensitivity of them for screening of OSA in the AHI threshold of 15 were respectively 91.1, 97.1 and 99.2. With cutoff of 6 for the STOP-BANG and simplified STOP-BANG, the specificity of them for confirming the OSA in the AHI threshold of 5 were respectively 97.8 and 95.7, and in the AHI threshold of 15 were respectively 93 and 88.6.

Conclusions

We found the STOP, STOP-BANG and simplified STOP-BANG as reliable and concise tools for OSA screening. This study suggest that the STOP-BANG and simplified STOP-BANG could be used for both the screening and confirming the OSA in clinics.

IMPACT OF OSA ON INFLAMATORY MARKERS, ADIPOKINES AND ENDOTELIAL DYSFUNCTION IN MORBIDLY OBESE PATIENTS WITH METABOLIC SYNDROME: A MATCHED STUDY

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Introduction and Objectives

In a previous cross-sectional study of morbidly obese patients, obstructive sleep apnea (OSA) was associated with Metabolic Syndrome (MetS) and with a worse metabolic profile independent of age, gender, body mass index (BMI) and smoking. Obesity, and in particular central obesity, is the most important risk factor for OSA and also for insulin resistance, hypertension and cardiovascular disease. To explore the relative importance of OSA and MetS on shared physiological pathways, we explored how the presence of OSA in morbid obese patients with MetS affects to adipokines release, proinflamatory markers, endothelial dysfunction and atherosclerosis surrogate markers.

Methods

In a Case controlled study we included 39 patients with MetS defined by the NCEP-ATP III modified criteria from an obesity surgery program in three University Hospitals. Patients with and without OSA were matched for age, gender and central obesity. To explore the effect morbid obesity by itself we also included as reference a third group of 13 patients without MetS nor OSA and compared with the other groups. Anthropometrical, blood pressure (BP), and fasting blood measurements were obtained the morning after an overnight polysomnography. VEGF, soluble CD40 ligand (sCD40L), TNF-α, IL-6, leptin, adiponectin and chemerin were determined in serum by ELISA. OSA was defined as apnea/hypopnea index (AHI) ≥ 15.

Results

Cases and control subjects did not differ in terms of age, BMI, gender and waist circumference (43±10 years, 46±5 kg/m2, 128±10 cm, 71% females). PostHoc Analysis showed a significant difference in statin use between Non OSA-Non MetS and OSA-MetS patients (0%, and 27%, $p<0.05$). The cases had severe OSA with a median and interquartile range of 47(32-66)

events/h and, lower time spent under 90% of oxihaemoglobin saturation 7(5-31)% (see table for MetS components distribution among groups). All groups presented similar serum cytokines (IL-6, TNF-α), adipokines (leptin, adiponectin and chemerin), VEGF and sCD40L levels. A positive correlation was found between IL-6 and oxyhaemoglobin desaturation index of 4% (ODI 4%) r 0,284 p 0.044.

Conclusions

In a morbidly obese population with established MetS the presence of OSA did not determine any differences in adipokines release, pronflamatory markers, endothelial dysfunction and atherosclerosis surrogate markers when adjusted by central obesity. The morbid obese patient without established MetS nor OSA already has a similar biomarker profile.

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SATISFACTION WITH A SINGLE EDUCATION SESSION FOR CPAP USAGE

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Introduction

In sleep medicine trials of CPAP adherence education among Obstructive Sleep Apnea (OSA) patients have proven to be effective when compared to usual care. Although there are many studies concerning the efficacy of the message and the behavioral change, as far as we know, none obtained the satisfaction feedback of included patients.

Objective

Develop a specific satisfaction questionnaire and evaluate OSA patients' satisfaction towards a single education session (ES) concerning CPAP usage.

Material and Methods

During 6 months, 247 consecutive patients with newly diagnosed OSA and CPAP prescription were enrolled to a single education session. Mean age was 56.3 and 71% were male. A specific satisfaction 10 items (5 likert score) questionnaire was delivered to all patients at the end of the session and a total of 93.5% were properly fulfilled.

Results

Satisfaction questionnaire presents a high internal consistency as reflected by the Cronbach´s alpha coefficient of .93. High levels of total satisfaction were obtained (M= 4.19,SD=.63). The higher scores were obtained by the ordered items asked in the questionnaire: ES answered my needs (M=4.44, SD=.59); ES motivated me to CPAP usage (M=4.42, SD=.76); ES according to my expectations (M=4.32, SD=.67); ES gave me understandable explanations (4.29, SD=.82); ES answered my doubts (M=4.19, SD=.83); Amount of Information About Disease/ Treatment and ES used logistics (M=4.10, SD= .86 and .84, respectively); and Amount of Information About Treatment (M=4.00, SD=.97). Time duration of the session had the lowest result (M=3.94, SD=.85), followed by the encouraging debate among participants (M=3.97, SD=84).

Conclusion

In general, patients were very satisfied with the education session concerning CPAP usage, revealing less satisfaction with its time duration and referring a lack of debate encouragement during the session. Future session improvements will reflect these results.

ERECTILE DYSFUNCTION IN OBSTRUCTIVE SLEEP APNEA PATIENTS

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Keywords: Obstructive Sleep Apnea, Erectile Dysfunction, Aging, Diabetes mellitus, Hypertension

Introduction

OSAS (Obstructive Sleep apnea syndrome) is defined by recurrent episodes of upper airway obstruction during sleep, causing multiple clinical consequences. Literature review suggests that OSAS induces a spectrum of abnormalities in neural, hormonal and vascular regulation that contribute to the development of Erectile Dysfunction (ED).

The aims of this study were to estimate the prevalence of ED in OSAS patients and evaluate its determinants.

Methods

62 male consecutive patients from Hospital S. João Sleep Clinic with newly diagnosed OSAS were included in the study and answered the IIEF-5 (international index erectile function 5 item version) questionnaire.

Results

The prevalence of ED in OSAS patients was 64,4%. Age and Diabetes constituted themselves as independent risk factors for more severe degrees of ED: OR=1,226 (95%CI:1,062 – 1,415) and OR=31,205 (95%CI:1,222 – 796,557), respectively. Compared with nonsmokers, ex-smokers group revealed a positive association with ED: OR=4,32 (95%CI:1,09 – 17,11). Hypertension and ACEI (angiotensin converting enzyme inhibitors) or ARB (angiotensin II receptor blockers) therapy were also correlated to ED symptoms: OR=3,25 (95%CI:1,09-9,65) and 7,39 (95%CI:1,52-35,99), respectively.

No association was found relating BMI (p=0,254), alcoholic habits (p=0,357), acute myocardial infarction (p=0,315), dyslipidemia (p=0,239),metabolic syndrome (p=0,215) and ED.

OSAS severity was not associated with ED in our sample.

Conclusions

The prevalence of ED in OSAS patients is high. ED determinants in our sample were age and diabetes. Past smoking habits, hypertension and ACEI/ARB therapy also revealed a statistically significant association with ED.

RATE AND CLINICAL FEATURES OF OBSTRUCTIVE SLEEP APNEA IN THAI HYPERTENSIVE PATIENTS

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Keywords: obstructive sleep apnea; hypertension; Thai; clinical features

Introduction

Obstructive sleep apnea (OSA) is a novel medical disease. The prevalence of OSA is 20% in general population and 40% in hypertensive patients. OSA is always underdiagnosed in clinical practice but it is associated with major cardiovascular diseases if left untreated. However, there is limited data on evidence of OSA and its clinical features in Thai hypertensive patients.

Objective

To study rate and clinical features of OSA in Thai hypertensive patients

Methods

We retrospectively reviewed medical records of patients treated at hypertension/sleep clinic at Srinagarind hospital, Khon Kaen University between 2010 and 2011. The inclusion criteria were hypertensive patients who had at least one symptom of OSA and had been tested for sleep study. Rate and clinical features of OSA were studied.

Results

During the study period, 49 patients met the criteria. Of those, 42 patients (85.71%) had apnea-hypopnea index more than 5/hour. The common symptoms of OSA were snoring (100%), daytime sleepiness (28.57%), unexplained nocturia (28.57%), and gastroesophageal reflux disease (28.57%). The median age of all patients was 61 years (range 34-78) and 35 patients (83.33%) had age range of 40-70 years. The numbers of patients with age less than 60 years and more than 60 years were 20 and 22 cases, respectively. Hypertensive patients with OSA who were older than 60 years had significantly lower BMI compared to those who were younger than 60 years (27.46 vs 30.44, p 0.031). Most patients (88.10%) had well-controlled blood pressure level.

Conclusions

OSA is very common in Thai hypertensive patients who have at least one symptom of OSA with age range of 40-70 years. Thai physicians should be aware of OSA in hypertensive patients to reduce cardiovascular complications of OSA even the blood pressure is undercontrolled. Elderly hypertensive patients with OSA had lower body mass index than younger ones.

NATION-WIDE SURVEILLANCE ABOUT THE RELATIONSHIP BETWEEN SLEEPING POSTURE AND SYMPTOMS OF SLEEP DISORDERED BREATHING AMONG THE PATIENTS WITH DOWN SYNDROME

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Introduction

Sleep disordered breathing (SDB) is one of the important risk factors for cardiovascular diseases. Patients with Down syndrome (DS) tend to develop SDB for several reasons, including specific flattened midface, narrow upper airway by enlarged tongue, adenoid, and/or tonsils as well as obesity. Actually, it has been reported that DS-patients have high rates of SDB compared with the general population. On the other hand, DS-patients have particular sleeping postures, which might be related to their severe SDB from very early life stage. It is known that the children with severe SDB but absence of DS have also the similar sleeping postures and get into sleeping in normal postures after treatments of SDB. However, there are no precise studies on the relationship between the particular sleeping postures and SDB in DS-patients in a wide range of age.

Objectives

We investigated the relationship between symptoms of SDB and sleeping postures from the analysis of questioners sent to caregivers of DS-patients.

Methods

We randomly distributed questionnaires to the caregivers of the DS-patients all over Japan through Japanese DS association around early March 2012. The questionnaires included the demographic description, sleeping postures, Epworth sleepiness scale (ESS), and frequency of snoring, arousal and apneic episodes.

Results

We received 195 replies from the caregivers (patients; men 113, women 80, unknown, 2). The patients' ages ranged from 5 months to 63 years (average: 14.6±10.0 y.o). Body mass index (BMI) was 20.5±11.8 and significantly increased with age ($P<0.001$). The mean ESS was 5.7±4.5. Unusual sleep postures other than supine or decubitus position (sitting, with leg fold, prone and leaning forward) were observed in 75% of the DS-patients, showing a significant decrease with age ($P<0.01$). On the other hand, there was no significant interaction between the existence of unusual sleeping postures and objective signs suggesting SDB. Rates of the snoring, waking up, and apneic episodes in the DS-patients were 73%, 52% and 26%, respectively. There was no significant interaction between the age and severity of the snoring, arousal or apnea.

Conclusions

We found the high prevalence of SDB compared with the general population in the same age. The rate of abnormal sleeping postures decreased by aging. We obtained the data in other study that the peculiar sleep postures improved the nocturnal oxygen desaturation index. If we assume that the unusual sleeping postures are self-defending unconscious behaviors to protect themselves from severe hypoxia, our findings from the questionnaires suggest that the infant DS-patients are more suffering from severe hypoxia during sleep than the older DS-patients due to their immature facial configuration. As the airway structures are improved by continued growth, the abnormal sleeping postures decrease. This may explain why aging did not affect the rate of snoring, arousal or apnea. Considering changes in SDB along with their development might be crucial in treating DS patients.

PREDICTIVE UTILITY OF A RISK ASSESSMENT FOR NONADHERENCE TO CPAP: NAP INDEX

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Introduction

Nonadherence to CPAP is a critical problem that results in poor health, functional, and morbidity outcomes. Non-use and low hourly usage patterns emerge in the first week of treatment and are predictive of long-term CPAP adherence. It is therefore important to prospectively identify risk for nonadherence prior to initiation of home therapy.

Objectives

The study objectives are (1) test a risk screening questionnaire for nonadherence to CPAP among adults with newly-diagnosed OSA; (2) reduce the screening questionnaire items to a minimum set that effectively identifies 1-month CPAP nonadherence; and (3) examine the diagnostic utility of the screening index.

Methods

A prospective longitudinal study was conducted at two U.S. sites, a large tertiary academic medical center sleep center and a community-based clinical sleep center. Adults with newly diagnosed OSA (AHI≥10 events/hr) during full night, in-laboratory polysomnogram (PSG) were consecutively recruited. After consent and baseline demographic measures, participants underwent in-laboratory CPAP titration PSG and completed the 200-item risk screening questionnaire in morning immediately after PSG. The questionnaire included previously validated instruments employed in studies of OSA and CPAP adherence and investigator-developed items. Objective CPAP adherence was collected at one month. Bivariate associations of instrument sub-scales, patient and disease characteristics and three levels of CPAP use (4 hours [clinical benchmark], 2 hours, and 0hr) identified significant variables for logistic regression ($p<0.20$) reduced by backward selection. Logit regression models and estimated models with receiver operating characteristic curves (ROC) were produced for each CPAP adherence level.

Results

One hundred and three subjects were enrolled; 97 with complete data for analysis. The sample included predominantly white (87%) males (55%) with obesity (BMI 38.3; SD 9.3) and severe OSA (AHI 36.7; SD 19.7). One month CPAP use was 4.25hrs/night (SD 2.35). No significant site differences were identified. For 0hrs CPAP adherence level, 10-questionnaire items reliably identified nonadherers, defined at 0hr level of CPAP use (Wald X2[2] = 11.26; p=0.0036; HL Goodness of Fit X2[8]=3.84, p=0.87) with ROC AUC 0.82 (SE=0.06). For 2hrs CPAP adherence level, 21 questionnaire items reliably identified nonadherers defined at 2hr level of CPAP use (Wald X2[6] =18.21, p=0.0057; HL Goodness of Fit X2[8]=3.95, p=0.86) with ROC AUC 0.89 (SE=0.04). For 4hrs CPAP adherence level, 16 questionnaire items reliably identified nonadherers defined at 4hr level of CPAP use (Wald X2[8]=36.71, p=0.0000; HL Goodness of Fit X2[8] =6.98, p=0.54) with ROC AUC 0.82 (SE=0.04).

Conclusions

A risk screening questionnaire employed immediately after titration PSG (i.e., first exposure to CPAP) reliably identifies CPAP nonadherers. Prospective screening for CPAP nonadherence permits the delivery of targeted interventions to promote adherence prior to the establishment of use patterns that are not conducive to long-term CPAP treatment and/or referral to alternative OSA treatment. Similarly in CPAP trials, enrollment of subjects with high likelihood of adherence to treatment permits efficacy evaluation.

TRANSORAL ROBOTIC SURGERY (TORS) FOR OBSTRUCTIVE SLEEP APNEA - INITIAL EXPERIENCE IN AN ACADEMIC MEDICAL SLEEP CENTRE IN SINGAPORE

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Introduction

Transoral robotic surgery (TORS) using the da Vinci surgical system was introduced as an innovative surgical technique to treat tongue base and hypopharyngeal type obstruction in obstructive sleep apnea. We describe our initial experience in using this surgical system to treat obstructive sleep apnea

Objectives

The objective of this review is to investigate the safety and peri-operative issues in our initial experience with TORS for obstructive sleep apnea and document its efficacy.

Methodology / Subjects

This is a retrospective review of prospectively collected data. Six subjects with moderate to severe obstructive sleep apnea on overnight polysomnogram who underwent surgical treatment with the da Vinci robotic system were reviewed. Patients reject continuous positive airway pressure(CPAP) for treatment. Data collected include demographic data, pre-operative and postoperative overnight polysomnogram parameters, functional outcome sleep questionnaire and SF-36 and, preoperative Precedex-induced sleep endoscopic determination of tongue base and supraglottic obstruction, set-up time, operative time, operative procedures, intensive-care stay, complications, length of hospital stay, pain score, oral intake and safety profile.

Results

Six subjects with moderate to severe obstructive sleep apnea (mean RDI 82.6 /Hr and LSAT 77%) who underwent palatal surgery and TORS in Singapore General Hospital from October 2011 to April 2012 were included in the review. The subjects were all male, mean age 40.1 years (35-44) and mean BMI 27.5. Two subjects had TORS for tongue base reduction alone after failing nasal and palate surgery. Three subjects had palate surgery, lingual tonsillectomy and tongue base reduction. One subject had palatal surgery, lingual tonsillectomy/tongue base reduction and epiglottidectomy. First 2 subjects were intubated overnight and managed in the intensive care. The rest of the 4 subjects were extubated in the operating room and monitored in the high dependency ward. None of the patient requires tracheostomy. Oral feeding of fluids and soft diet were initiated the very next day after the operation. The set up time for the robotic system ranges from 20 to 30 minutes. The operative time for TORS-assisted lingual tonsillectomy/tongue base reduction/supraglottoplasty takes 50 minutes to 90 minutes. The average length of stay in the hospital was 3-4 days. No major complications were observed. Pre-discharge endoscopic examination of the airway was performed for all subjects before allowing patient to go home. Subjects reported favorable snoring, FOSQ, SF36 and EDS scores, three months after the surgical treatment.

Conclusion

In our institution, our initial experience with TORS shows that it is a safe technique with minimal morbidity and complication rates. Long term results needs to be further establish.

SAFETY OF SINGLE STAGE MULTI LEVEL PROCEDURES FOR MILD TO MODERATE OSA - INDIAN PERSPECTIVE

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Introduction

Single stage multilevel procedures in the management of OSA has for always been associated with high morbidity and necessity for admission in high dependency units. We present a series of cases post operatively managed in the post operatory recovery and not in the surgical ICU.

Objective

To assess the safety of single stage multi level procedures for mild and moderate osa

Methods

A total of 70 patients from 2009 to 2012 operated at our department for mild/moderate OSA studied retrospectively in whom, multilevel procedures such as septoturbinoplastes; uvulopalatoplasty (classical; modified), base tongue procedures (wedge resection; RF application) were done at a single sitting, all monitored at the post op recovery.

Results

The over all complications were as follows: haemorrhage-10 patients (7%) (nasal and oropharyngeal); 4 patients desaturated requiring CPAP (2,8%), 3 patients had tongue oedema (2,1%). There are other complications reported in the literature in immediate post operative period such as pulmonary oedema etc but we have been lucky to have not seen any of these complications.

Conclusions

Based on our data single stage multilevel surgery for OSA need not be treated as a complicated and complex surgery requiring high dependency ICU care routinely. They can be managed effectively in the post op recovery with good monitoring facilities and if in need can be shifted to an ICU, saving money for the patients.

THE BISPECTRAL INDEX (BIS) AS AN INSTRUMENTAL METHOD FOR THE MEASUREMENT OF THE EXCESSIVE DAYTIME SLEEPINESS (EDS). PILOT STUDY

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Introduction

The Bispectral Index (BIS Index) provides a measurement of the hypnotic effect of anesthesia and offers the anesthesia professionals an accurate method for continuous monitoring of consciousness throughout sedation as well as of the depth of anesthesia. The BIS Index has passed the necessary validation of principles, clinical trials and experience with over 6 million patients; it has been proven to be a reliable instrumental measurement of the brain activity. The BIS Index is a number between 100 and 0, scaled to correlate with the patient's awareness and sedation levels. BIS values near 100 represent an "awake" clinical state while 0 indicates the isoelectric EEG. Our interest was focused on BIS levels of 100 – 70, which is supposed to be a sedation level. At a BIS Index value of less than 60, the probability of the patient being conscious is extremely low. BIS Index values decrease during natural sleep as well as during the administration of an anesthetic agent.

Objectives

The aim of the study was to find possible correlations among the BIS Index, AHI and Epworth Sleepiness Scale (ESS) values. We hypothesize that the BIS Index could be an instrumental and objective method for measurement of EDS and can indicate sleepiness when patients deny it, regardless of objectively found high AHI values.

Methods

Thirty four patients with an established diagnosis of OSA and with an AHI value of > 10 were checked for the BIS index. The measurements were performed by a standardized technique and were carried out in a dark silent room for 15 minutes. The mean BIS values were recorded every minute by a single observer. A control group of 42 medical students without any signs and symptoms of OSA was formed. The BIS Index was compared with the ESS and AHI values in both groups and between groups. The data was analyzed with a linear regression. The intergroup comparison of BIS values was performed using two-sample t test.

Results

There was a statistically significant difference in the mean BIS Index measurement between OSA and control groups ($p<0.01$). On average BIS Index was higher in the control group than in the OSA group. The significant difference in BIS Index between groups were observed from the 5th minute ($p<0.01$). There was a statistically significant negative relationship between ESS and BIS Index ($p<0.05$).

Conclusions

In our study we found clear differences between BIS values in OSA subjects and controls, as well as a negative correlation between BIS and ESS. Patients with low ESS scores had high BIS index values and were alert and vice versa. No statistically significant relationship between BIS index and AHI was found. However to understand if the BIS index could be used as a reliable measurement of ESS and predictor of OSA, further studies are required.

OXYHOLTER - GOOD SCREENING TOOL IN HIGH RISK OSA PATIENTS

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Introduction

Obstructive sleep apnea is a common problem in about 2-4% of all population. The Golden standard in diagnosing OSA is polisomnography. The method is very expensive and rarely available. The aim of this study was to assess the predictive role of an oxyholter in high risk OSA patients.

Methods

We had 56 participating patients who exhibited high risk of OSA (history of heavy snoring, overweight – BMI ≥28, neck circumference >44cm), mean age 54,26 years, 88,6% men. Concurrently all patients were also monitored using the scale of sleepiness Epworth (>15 points).We performed an oxyholter registration. Mean AHI was 20,32, (SD 13,79, mediana 17,65). OSA defined as AHI > 5 was diagnosed in 92,85% of patients AHI > 15 was diagnosed in 30 cases 53,57%. We decided to perform a polygraphy in this group to compare the oxyholter results using the recommended method for OSA diagnosis. The mean AHI using polygraphy was 25,44, estimated AHI > 15 was 57,14%. Downfalls in saturation seems to correlated with bradyarrhythmias throughout the night hours and tachyarrhythmias during the early morning hours but there was no statistical significance.

Results

AHI obtained using the oxyholter correlated with AHI obtained using polygraphy (R=0,9225 P<0,0001) . The oxyholter seems to be a good affordable screening tool of OSA for patients in the high risk group.

Conclusion

We concluded that the oxyholter is an effective and not expensive screening tool in high risk OSAb patients.

MODIFICATION OF AIRWAYS ANATOMY AFTER ORTHOGNATHIC SURGERY: VOLUMETRIC , AREAL AND LINEAR STUDY WITH CONE BEAM CT

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Introduction

According to recent studies the surgical treatment of OSAS with maxillo-mandibular advancement, is indicated for patients with a moderate to severe OSAS, with no benefits from ventilation therapy, regardless of the presence of dento-skeletal malocclusion. The documented high efficacy of the treatment, around 95%, and the long-term stability of the results obtained are not, however, exactly related with the extent of the displacement of bones implemented.

Objectives

Identify the qualitative and quantitative correlation between the surgical movements carried out and the changes in the airways after jaws surgery. This will improve pre-operative planning and increase the chances of successful surgery in patients with OSAS .

Methods

34 patients requiring jaw surgery (LeFort I + Mandibular Sagittal Split Osteotomy) for correction of dentoskeletal deformities have been enrolled in this study. Each patient underwent a CBCT scan of the entire maxillo-facial complex (Field of Investigation 17 cm) before and after surgery. Upper airways were reconstructed tridimensionally combining CBCT data with a specifically designed software; for each patient volume and areas of the upper airway tract were calculated using landmarks not subject to change before and after surgery . Then these data were statistically linked to the surgical movement of the repositioned bone segments derived from the cephalometric treatment planning.

Results

Analysis of surgical movements showed an average advancement of 5,8 mm for the mandible, of 6,8 mm for the upper jaw and an average counterclockwise rotation of the occlusal plane of 5,8 degrees .

Upper airways volume increased in 97.1% of the patients with an average volume enlargement of 46%. Changes in airways were different according the level: 10.6% at the C2 level, 45% at the C3 level, the antero-posterior and side-to-side diameters showed an increase both at C2 level (AP 41%, LL 10%) and at the C3 level (AP 22%, LL 4%).

The statistical analysis of airways changes together with surgical movements showed a positive correlation between anteriorposterior movement of the mandible and volume changes and between counterclockwise rotation of the occlusal plane and volume.In both cases a linear relationship was found.

The correlation between the upper jaw and the volume was also positive, but not statistically significant given its plateau for feed values (greater than 5 mm).

Conclusions

The orthognathic surgery modifies the airways significantly. What mostly affects the volume of the airway is the mandibular movement, followed by the counterclockwise rotation of the occlusal plane. The effect of the upper jaw advancement is less defined. The bimaxillary surgery is to prefer over the solely mandibular surgery because it leads to a greater degree of movement (especially in mandibular advancement) and allows to rotate the bone segments counter-clockwise of the bimaxillary complex.

MAXILLO-MANDIBULAR DISTRACTION OSTEOGENESIS USING INTERNAL DISTRACTORS IN CHILDREN WITH SEVERE RETROGNATHIA AND OBSTRUCTIVE SLEEP APNEA

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Introduction

Children born with severe retrognathia are frequently affected by obstructive sleep apnea (OSA) due to the small anatomical airway dimensions. The respiratory distress in these children could potentially be fatal and many require tracheostomy as either for resuscitation or prophylactically in providing sufficient oxygen saturation. Distraction osteogenesis is a clinical tissue engineering method of bone regeneration by dividing a bone segment gradually using a mechanical distractor device. This has been shown to be effective in advancing retrognathic jaws of either the mandible or maxilla. In most cases, external extractors were used, which commonly resulted in unsightly facial traction scars. Few cases of have been reported using internal distractors for OSA patients.

Objective

The aim of this presentation is present our experience in applying internal distractors to resolve the OSA of four children presented with severe retrognathia.

Method

Four patients born with severe retrognathia associated with various craniofacial syndromes (One Nager Acrofacial Dysotosis, one Marcus Gunn phenomenon, two Treacher Collins Syndromes) were diagnosed to have severe OSA related to their craniofacial deformities. Three patients presented with severe mandibular retrognathia and one with maxillary retrognathia. Two of the patients had permanent tracheotomy due to upper airway obstruction by the retro-positioned tongue. Bilateral internal craniofacial distractors were applied to advance the jaws forward in order to enlarge the upper airway dimensions for relief of the OSA. Surgical planning was performed with 3-dimensional computer software (Surgicase, Materialise, Belgium) in determining the extent of jaw advancement for airway correction. Jaw advancement was also simulated by the use of stereomodels for pre-adapting the fixation mesh of the internal distractors; determine the vector of distraction and preparation of the vector guidance splint. A pair of craniofacial distractors fixed with titanium mini-screws were applied after either a Le Fort I osteotomy for the maxillary case or bilateral posterior body osteotomies for the three mandibular retrognathic cases. After a latency of 5 days for mandible or 3 days for maxilla, the distractors was activated at 1 mm per day in 2 rhythms until the pre-determined skeletal relationship with dental occlusion overcorrection were achieved.

Results

All four children achieved extensive jaw lengthening ranging from 15 to 40mm by distraction with internal distractors. The upper airway was significantly enlarged and the tongue was re-positioned forward correspond with the advanced mandible. The OSA was resolved in all four children. In the two children with pre-existing tracheotomy, successful de-cannulating was achieved and they were able to be discharged home for the first time in their lives.

Conclusion

Distraction osteogenesis can be safely performed in children and the use of internal distractors can provide good stability of the jaw segments resulting in uneventful bony regeneration. Surgical planning with a combination of computer software and stereomodel are recommended for determination of the distraction vector and prebending of fixation plate in facilitating predictable results. Maxillo-mandibular advancement by distraction osteogenesis can achieve a high level of success in relieving the OSA in four syndromic children.

AMBIENT TEMPERATURE AND OBSTRUCTIVE SLEEP APNEA – EFFECTS ON SLEEP, SLEEP APNEA AND MORNING ALERTNESS

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Introduction

The ambient indoor temperature in Sweden is usually 20ºC (68ºF). Individual patients investigated at our department have told us that they sleep better in a colder environment and that they snore less in cold versus warm rooms.

Objectives

We aimed to investigate the effect of ambient temperature on sleep, sleep apnea and morning alertness in patients with obstructive sleep apnea.

Methods

We performed an in-hospital randomized controlled trial in forty patients with obstructive sleep apnea naïve to treatment, with an apnea-hypopnea index of 10-30. Patients were investigated during three different nights in room temperatures of 16ºC (60ºF), 20ºC (68ºF) and 24ºC (75ºF) using overnight polysomnography and Karolinska Sleepiness Scale.

Results

The obstructive apnea-hypopnea index was 30 ± 17 at 16ºC room temperature, 28 ± 17 at 20ºC and 24 ±18 at 24ºC. The obstructive apnea-hypopnea index was higher at 16ºC room temperature vs. 24ºC ($p=0.001$) and at 20ºC room temperature vs. 24ºC ($p=0.033$). Total sleep time was a mean of 30 minutes longer ($p=0.009$), mean sleep efficiency was higher (77 ± 11% vs. 71 ± 13% respectively, $p=0.012$) and the patients were significantly more alert according to the Karolinska Sleepiness Scale ($p<0.028$) in the morning at 16ºC room temperature vs. 24ºC. The amount of sleep in different sleep stages was not affected by room temperature.

Conclusions

Untreated patients with obstructive sleep apnea sleep longer, have better sleep efficiency and are more alert in the morning after a night's sleep at 16ºC (61ºF) room temperature vs. 24ºC (76ºF), but obstructive sleep apnea is more severe at 16ºC and 20ºC compared with 24ºC.

DIAGNOSIS AND TREATMENT OF INFANTS WITH SUSPECTED ROBIN SEQUENCE, A REVIEW OF 89 CASES

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Introduction

Robin Sequence (RS) is a rare, congenital disorder arising in about 1:8500 births. Traditionally the triad of micrognathia, glossoptosis, and upper airway obstruction characterizes RS, but this triad is not consistently used among health workers and in literature. A wide range of treatment methods have been described for RS ranging from conservative prone positioning to invasive mandibular distraction. However, treatment remains controversial due to the unclear diagnosis, the highly heterogeneous phenotype and a lack of large studies with clear indications for treatment.

Objectives

To determine how many infants diagnosed with RS meet the criteria of the traditional triad and to differentiate between an isolated and non-isolated RS, 2) To describe the airway management of those with the traditional triad.

Methods

Retrospective case study of 89 infants reported in our hospital system with RS between 2000 and 2010. All available data from the patient record form were noted.

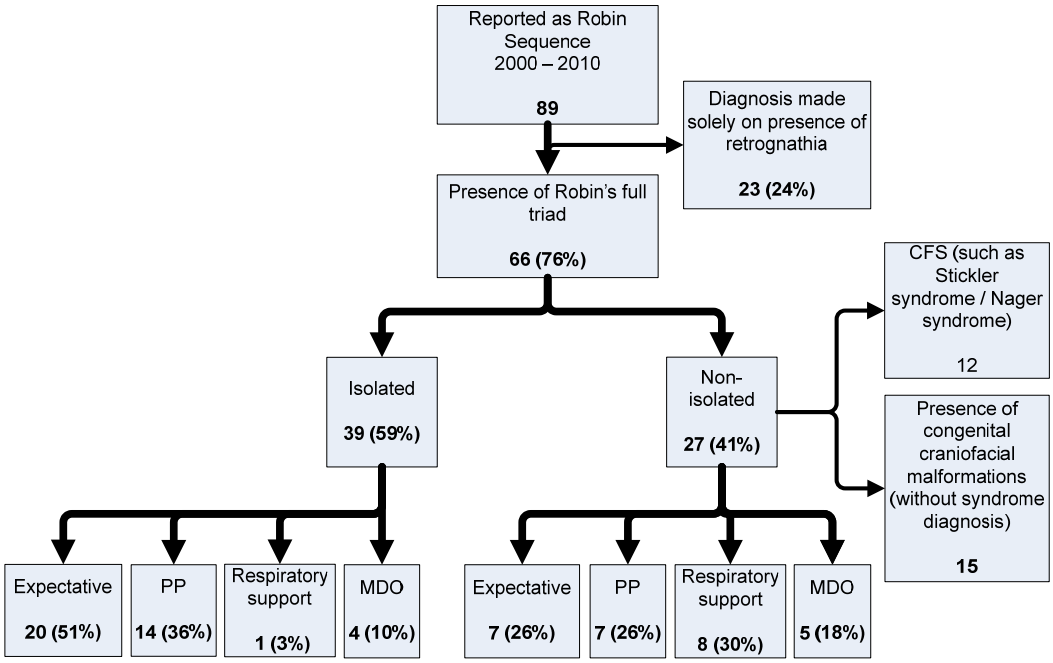
Results

In 66 of the 89 (74%) infants a correct diagnosis according the traditional triad was made (see fig. 1). In the remaining 23 infants a diagnosis was made solely on the presence of micrognathia without airway obstruction. In 56 of the 66 RS infants (80%) a cleft palate was present. Twenty-seven infants were non-isolated (12 with a confirmed syndrome diagnosis). Concerning treatment there was a difference between the isolated and non-isolated group: expectative policy 51% vs. 26%, prone positioning 36% vs. 26% and respiratory support 3% vs. 30% respectively. Respiratory support included continuous positive airway pressure (CPAP), nasopharyngeal tube (NPT), oxygen supply and tracheostomy. Mandibular distraction was done in 1 isolated case and in 5 non-isolated cases. About half (47%) of all RS patients needed nutritional support, which consisted in 81% of tube feeding only.

Conclusions

In this study about three quarter of the RS diagnoses was made on basis of the classic triad proposed by Pierre Robin. Treatment modalities differed markedly between infants with isolated or non-isolated RS. Conservative treatment was sufficient in the majority of isolated RS. Respiratory support (non-surgical and surgical) was more frequently necessary in non-isolated RS.

Figure 1: Diagnosis and treatment of RS in a 10-year period in the Erasmus MC, Rotterdam



*CFS = Craniofacial Syndrome, PP = Prone positioning, MDO = Mandibular Distraction Osteogenesis

PREVALENCE AND SEVERITY OF OBSTRUCTIVE SLEEP APNEA IN INFANTS WITH ROBIN SEQUENCE

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Introduction

Infants with Robin Sequence (RS) are at risk for developing obstructive sleep apnoea (OSA) secondary to micrognathia and glossoptosis. Even though a diagnosis of OSA has important consequences for further airway management, prevalence and severity studies of OSA in the paediatric RS population are scarce.

Objective

The aim of this study is to determine prevalence and severity of OSA in infants with RS.

Methods

Retrospective study of all infants born between 2000 and 2010 with RS in which a polysomnography (PSG) was performed or an immediate tracheostomy was necessary due to upper airway obstruction. PSG consisted only of cardio-respiratory measurements. According to the standard criteria the apneu-hypopnoe index (AHI) was used to divide OSA in mild, moderate and severe.

Results

In a 10-year period 66 children were diagnosed with RS. In 27 infants (41%) a clinical PSG was done whereas in 5 infants (8%) immediate tracheostomy was necessary within 30 days after birth. Mean age at PSG was 107 days (range 5-348 days). Results from PSG were: 6 normal (22%), 3 immature breathing patterns (11%), 2 upper airway resistance syndromes (7%) and 16 OSA (59%). Concerning classification of OSA: 3 were mild, 4 moderate and 9 severe. The average AHI was 16,3 (range 1,0 – 56,0). The average oxygen desaturation index (ODI) was 15,4 (range 2,0 – 40,0).

Conclusions

PSG showed abnormalities in 78% of the recordings and OSA was seen in 59% of the infants. These results show the high prevalence of sleep disordered breathing in infants with RS and support the importance of screening of breathing disorders with PSG in infants with RS.

CPAP THERAPY IN OSA PATIENTS: THE EFFECTS ON HEALTHCARE USE AND MEDICAL COSTS RELATED TO CARDIO- AND CEREBROVASCULAR DISEASES

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Introduction

Obstructive sleep apnea (OSA) is a major risk factor for cardio- and cerebrovascular diseases, however, CPAP treatment could reduce the occurrence and healthcare costs of these complications.

Objectives

To assess the impact of CPAP therapy on healthcare use and medical costs related to cardio- and cerebrovascular diseases.

Methods

By analysing the patient database of the Hungarian Health Insurance Fund Administration in a one-year period starting from July 2007, OSA patients with newly initiated CPAP therapy were identified. Hospital admission rates, hospital treatment days, and the use and costs of relevant medications of these patients were evaluated from 3 years before to 3 years after starting the CPAP therapy.

Results

In the study period, 993 OSA patients started CPAP therapy in Hungary. In comparison to the 3-year period on CPAP therapy (post-CPAP), the numbers of pre-CPAP cardio- and cerebrovascular disease related hospital admissions and treatment days were higher by 22.4% (205 vs. 159 admissions) and 25% (2254 vs. 1698 days), respectively. Mean hospital treatment costs were 34% lower in the post-CPAP than in the pre-CPAP period (238 vs. 156 €). The reduction in post-CPAP hospital admissions, treatment days and costs was more prominent in a subgroup analysis in patients fully complying with the follow-up care (112 patients). Interestingly, the use and costs of relevant medications were nearly identical in the pre- and post-CPAP periods.

Conclusion

Our study suggests that CPAP therapy could reduce healthcare costs of OSA patients by lowering hospital admission rates, treatment days and costs related to cardio- and cerebrovascular diseases.

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MATERNAL SLEEP-DISORDERED BREATHING AND FOETAL OUTCOMES

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Introduction

Symptoms of sleep-disordered breathing, such as snoring, flow limitation and apnoeas, are thought to be more common during pregnancy. However, there is little data on the foetal outcomes of polysomnographically confirmed obstructive sleep apnoea (OSA) in pregnancy.

Objectives

To determine if OSA during pregnancy is associated with i) acute foetal compromise, as evidenced by foetal heart rate decelerations on continuous foetal cardiotocography during periods of maternal upper airway obstruction and hypoxia; and ii) chronic foetal compromise, as evidenced by a fall in foetal growth trajectory on serial third trimester ultrasound examinations, altered cord blood levels of foetal growth regulators, and birth outcomes.

Methods

Preliminary questionnaires identified women as potential OSA cases and controls. At 37 weeks' gestation, a sleep study with synchronised foetal heart rate monitoring was performed, and cord blood was collected at delivery. Foetal growth trajectory across the third trimester was determined by performing serial ultrasound examinations. Either a fall in customised centile of ≥ 30% from 32 weeks to birth or confirmed foetal growth restriction at birth (<10th customised centile) was considered significant.

Results

Forty-one women completed the study, ten of whom had confirmed OSA (AHI ≥ 5/hr).

Acute compromise: one case of an abnormal CTG occurred in a woman with OSA and a growth-restricted foetus. In most women, no foetal heart rate abnormalities were detected, despite moderate OSA associated with significant maternal oxygen desaturation.

Chronic compromise: Among women with OSA, 50% were found to have impaired foetal growth, compared with 19% of controls ($p = .07$). In addition, insulin growth factor-I (IGF-I), a key endocrine regulator of foetal growth, was significantly decreased in infants of mothers with OSA compared to BMI-matched controls ($p = .03$). A corresponding increase in the insulin like growth factor binding proteins 1 and 2 (IGF-BP1 and IGF-BP2) was also observed (IGF-BP1 – $p = .004$; IGF-BP2 – $p = .06$). In terms of birth outcomes, gestation was significantly reduced in mothers with OSA ($M = 38.5 \pm 0.9$ weeks) compared to the control group ($M = 39.4 \pm 1.3$ weeks, $p = .048$). However, infants of mothers with OSA did not differ from the controls on customised birth weight centile (44.2% ± 31.4% vs. 54.1% ± 28.7%, $p = .36$) and Apgar scores at both 1 minute (8.4 ± 0.8 vs. 8.3 ± 1.3, $p = .88$) and 5 minutes (9.1 ± 0.3 vs. 9.0 ± 0.9, $p = .81$).

Conclusions

Sleep-disordered breathing during pregnancy may be associated with acute and chronic foetal compromise, even in otherwise uncomplicated pregnancies. Further study with larger numbers is needed to confirm these results. If a link between OSA and increased foetal risk can be established, effective treatment of OSA with continuous positive airway pressure (CPAP) may be able to attenuate adverse perinatal outcomes.

THE FEASIBILITY OF USING TELEMONITORING AS A SUPPLEMENTARY SERVICE OF THE SLEEP LABORATORY

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Introduction

Telemedicine has been used for the monitoring of patients with chronic diseases such as heart failure and diabetes. Parameters being monitored varied from physiologic data such as pulse oximetry, spirometry, blood pressure, ECG, heart rate, lung impedance, physical activity to various analysates such as blood glucose, INR and exhaled nitric oxide. Since January 2010, telemonitoring has been incorporated as part of home test titration in order to help monitor patient's physiologic and ventilatory parameters during sleep.

Objective

To test the feasibility of using telemonitoring as a supplementary service in home test titration study.

Methods

Forty-one moderate-to-severe obstructive sleep apnea (OSA) patients who have undergone automatic continuous positive airway pressure (ACPAP) titrations at home are screened. Patient consent is obtained for an equipment company to set up a transmitter at patient's home. Variables such as oxygen saturation (SpO2) and ventilatory data like treatment pressure and residual apnea-hypopnea index (AHI) will be transmitted to the service provider via phone line and downloaded onto a password-protected website. A nurse coordinator is responsible for patient recruitment, liaising with service provider and doctors, screening data and contacting patients as need arises especially for AHI of > 10 events-h in CPAP treated patients. They were defined have residual sleep apnea.

Results

A retrospective review of 41 moderate-to-severe OSA patients (AHI 45.3/h) underwent ACPAP titration with telemonitoring at home in between January 2010 to December 2011. Among the 34 males and 7 females in this review, mean age was 47± 9.4 years, mean body mass index (BMI) 30.6±6.4 kg/m² and mean AHI was 45.3±25.7. Residual sleep apnea was present in five of 41 patients, overall in 12% of the study population. These five titrations were considered unacceptable and patients did not accept CPAP therapy. They were arranged back to hospital for manual titration with polysomnography (PSG). In the CPAP treated group, there were twenty-two patients accepted CPAP therapy and have started to use CPAP at home. Age, BMI and severity of OSA did not differ in between CPAP treated and untreated group.

Conclusion

Home telemedicine is an innovative way of delivering care to patient's home. It relies more on the dedication and expertise of healthcare professionals than technology and could only succeed with improved partnership between patients and healthcare professionals. Timely corrective intervention such as mask leak helped improve ventilation efficiency, enhance ventilator compliance. However residual sleep apnea appears common in patients with moderate-to-severe OSA, despite careful CPAP titration, and is associated with worse outcomes.

SLEEP IMPAIRMENT AND CHRONIC RHINOSINUSITIS

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Introduction

Chronic rhinosinusitis (CRS) is a common chronic health condition, affecting 10-15% of the European and US population in recent epidemiologic studies.

Sleep impairment is reported by patients with CRS. Various studies have been conducted regarding the effects of CRS on the patient's quality of life (QOL). There have, however, been few reports of its effects on the quality of sleep. Accordingly, we investigated the incidence of sleep problems associated with CRS and also examined which factors are involved in sleep problems.

Methods

Between April 2007 and March 2008, 685 consecutive adult patients who underwent endoscopic sinus surgery (ESS) for CRS were analyzed. All of the patients completed a QOL questionnaire that included items regarding nasal symptoms, daytime activity and sleep. In addition, data were compiled for the following patient background parameters: the peripheral eosinophil count, the tissue eosinophil count, the peripheral total IgE, the allergic rhinitis, the bronchial asthma, the total polyp score and the CT score (Lund & Mackey score). The patients were stratified into two groups on the basis of the sleep score results: ≥4 (moderate or severe symptoms, hard to tolerate) and <4 (none or mild symptoms, tolerable). Then the two groups were compared using Mann Whitney U-test in regard to the data for the above-described symptoms and background parameters. In addition, logistic regression analysis was performed using the sleep score ≥4 group as an explanatory variable, and nasal symptoms, QOL, and the above-described parameters as dependent variables. The statistics analysis about sleep impairment and daytime QOL was also done with AMOS 5.0 for Covariance structure analysis.

Results

The sleep score was ≥4 in 148 patients (21.6%). The risk factors for sleep score□4 of CRS patients by Logistic regression analysis are, "nasal obstruction", "posterior nasal discharge", "cough", "total polyp score□6", and "tissue eosinophil count□70". We think that there is a possibility that eosinophillic inflammation contribute to sleep problem and "posterior nasal discharge" and "cough" are symptoms peculiar to CRS patients who have sleep problems. In addition, we will show covariance structure analysis about sleep impairment and daytime QOL.

Conclusions

Some CRS patients experience sleep problems. Nasal symptoms (such as nasal obstruction, posterior nasal discharge, and cough) and inflammatory conditions (such as presence of polyp and eosinophilic inflammation) also have the potential to directly affect sleep problems. This study indicates that administration of therapy that takes into account the relationships of those factors to sleep problems may improve the patient's QOL. And the studies including more objective data, for example the polysomnography (PSG), the Multiple Sleep Latency Test (MSLT) / the Maintenance of Wakefulness Test (MWLT) and the actigraphy, are needed to take into consideration.

THE ASSOCIATION BETWEEN SLEEP APNEA AND YOUNG ADULT WITH HYPERTENSION: A CASE-CONTROL STUDY IN MALAYSIA

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Keywords: Sleep apnea, hypertension, young adult, airway

Introduction

Younger patients with sleep apnea have higher risks of cardiovascular mortality compared to their normal counterpart. Yet, it remains a continued struggle to find a suitable cost-effective means of screening for sleep apnea in the young population.

Objectives

To study the association between sleep apnea and hypertension in younger age group than previously studied, adding upper airway sizes at endoscopy as important compounding variables often not included in the past.

Methods

We analyzed data on polysomnography tests, body mass index (BMI), neck circumference, upper airway endoscopy sizes, habitus and health history in 120 hypertensive and 120 non-hypertensive participants in a clinic-based setting. Independent t-test, chi-square, multivariate analysis and binary logistic regression models were used for case-control comparison.

Results

The mean age of the participants was 27 years; 67.5% were men. The incidence and severity of sleep apnea were significantly higher in the hypertensive than the control subjects. Persons with hypertension had odds ratio of 2.7 times of having comorbid sleep apnea than patients without hypertension (95% confidence interval [CI] 1.2-6.1). Persons with sleep apnea (AHI ≥5) had odds ratio 2.76 (95% CI 1.57-4.86) and persons with severe sleep apnea (AHI ≥30) had odds ratio 7.94 (95% CI 4.21-15.33) of having hypertension than did persons without sleep apnea. Although adjustments for the compounding factors, particularly the BMI decreased the odds ratio to a large degree, subjects with severe sleep apnea were still 72% more likely to have hypertension than subjects without sleep apnea.

Conclusions

Sleep apnea is related to hypertension in our study population. The association was more pronounced with the increasing severity of sleep apnea. Screening for sleep apnea should be considered in young adult with hypertension.

DOES RAPID PALATAL EXPANSION DECREASE SLEEP BRUXISM IN CHILDREN? A PILOT STUDY

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Keywords: rapid palatal expansion, sleep bruxism, polysomnography, maxillary deficiency, children

Introduction

Sleep bruxism is a sleep-related movement disorder described as an involuntary masticatory movement during sleep. It is observed in 14-38% of the pediatric population and sleep quality can be affected by this parafunction in children. Respiratory events can be observed in the cascade of events preceding sleep bruxism episodes. It has been hypothesized that sleep bruxism may help re-establish muscle tone surrounding the upper airway during sleep. Moreover, a higher percentage of sleep bruxism is found in children with maxillary transverse deficiency (37%). Rapid maxillary expansion (RME) in children is an orthopedic treatment that is effective in correcting maxillary transverse deficiency and is also proven to increase upper airway capacity. Our hypothesis is based on the possible reduction of sleep bruxism by the resolution of upper airway resistance with a maxillary expansion.

Objectives

Since sleep bruxism is related to respiratory events and RME increases respiratory capacity, the objective of this study is to evaluate the possible reduction of sleep bruxism after RME treatment.

Methods

This prospective randomized controlled pilot study is currently in progress, with 15 children having completed the treatment (8-14 years old). These patients were seeking treatment for transverse maxillary deficiency (5 mm or more) at the orthodontics department of the Faculty of Dentistry, University of Montreal. None of the patients had any prior diagnosis of obstructive sleep apnea or any other sleep disorders. Sleep bruxism was diagnosed following a clinical dental evaluation, positive history, and presence of at least 2 rhythmic masticatory muscle activity (RMMA) events per hour of sleep, as recorded during the polysomnography. Based on the presence or absence of sleep bruxism, patients were divided in two groups. All patients underwent an ambulatory polysomnography before (T0) and after expansion (T1) (about 1 month after cimentation of the appliance). All patients answered behavorial, anxiety and diagnostic sleep questionnaires at those visits.

Results

The preliminary results show that sleep macrostructure (sleep stage distribution), total sleep time, and sleep efficiency were maintained before and after treatment in both groups (repeated measures ANOVA treatment*group interaction $p>0.45$). Snoring was not significantly altered by RME in either group (repeated measures ANOVA). RMMA showed a slight trend of group and treatment interaction (repeated measures ANOVA treatment *group interaction $p=0.11$) and an overall group difference (repeated measures ANOVA $p=0.02$). When observing individual results, RMMA was reduced following RME treatment in six out of eight patients.

Conclusion

These preliminary results, though promising, require additional subjects to support the link between the reduction of sleep bruxism following RME treatment. Additional 17 patients have been recruited in the study and are currently undergoing treatment. Moreover, a 6-month follow-up ambulatory polysomnography is scheduled (T2) for all patients.

SLEEP DISORDERED BREATHING IN FRIEDREICH'S ATAXIA

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Introduction

There has been very little published data regarding the prevalence of Sleep Disordered Breathing in Friedreich Ataxia (FRDA) patients although some patients complain of snoring and poor sleep. The aim of the study is to document the incidence and degree of sleep disordered breathing in FRDA patients, as well as to analyse any trends observed in the type and quality of sleep.

Methods

A review of clinically indicated polysomnographic (PSG) studies on FRDA patients was conducted. Sleep parameters included in the analysis were the sleep latency(SL), rapid eye movement (REM) latency, total sleep time (TST) , sleep efficiency, NREM sleep % , REM sleep % , Respiratory Disturbance Index (RDI) and 4% Oxygen Desaturation Index (ODI).

Results

Twenty PSG studies [9 male: age 36.3 ± 11.5 years: Body mass Index (BMI) 24.2 ± 4.2 kg/m2; Friedreich's Ataxia Rating Scale (FARS score) 103±22.8] were available for analysis. Thirteen studies were performed at the Monash Sleep Centre and 7 from other sleep centres across Australia and New Zealand. No observable trend was noted in the sleep architecture with normal proportions of NREM (83.2± 9.7%) and REM (16.8 ± 9.7%) occurring. However the sleep efficiency (55.9-80.3%) (Range), Sleep Latency (0-102 min) and REM latency (32-331.5 min) were quite varied within the group. There was a high proportion of Sleep Disordered breathing amongst the group [Total RDI 16.6 ±16 /hr ; ODI 11.6 ± 15.2/hr]. Seven patients had severe OSA (RDI > 15/hr), nine had mild OSA (RDI 5- 15/hr) and four had no OSA (RDI < 5/hr).None had central sleep apnoea or nocturnal ventilation. Sleep parameters were correlated with disease parameters, measures of disease severity and related functional impairment using Pearsons correlation coefficients. The FARS score positively correlated with total RDI ($r=0.61$, $p< 0.01$) and ODI ($r=0.73$, $p < 0.05$).

Conclusion

There appears to an increased incidence of more severe OSA among FRDA patients who have greater disease impairment.

DETECTION OF ANTICARDIOLIPIN ANTIBODIES IN OBSTRUCTIVE SLEEP APNEA PATIENTS

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Introduction

Obstructive sleep apnea syndrome (OSA) is emerging as an important modifiable risk factor for stroke. However, the mechanisms involved in this relation are not completely understood. Some studies have shown that OSA is associated with impaired endothelial function and hypercoagulability. Antiphospholipid antibodies such as Anticardiolipin antibody (aCL) are established risk factors for ischemic stroke due to their procoagulating and atherogenic properties. We hypothesized that aCL may be increased in patients with OSA, contributing with the development of atherothrombotic events.

Objective

The purpose of this study is to investigate the presence of increased aCL in OSA patients.

Method

One hundred cases of moderate and severe OSA (50 males and 50 females) confirmed by polysomnography, were studied (all of them with AHI ≥ 15) and 50 subjects without OSA were selected as the control group. They were matched for age, sex, and body mass index. All participants were free of diabetes and smoking, and had similar LDL – cholesterol levels. Patients with OSA were naive to treatment. Plasma levels of aCL IgM and IgG isotypes were detected by enzyme-linked immunosorbent assay (ELISA).

Results

Plasma levels of aCL IgM and IgG were quantitatively similar in both OSA and control group (IgM = 3.9 ± 3.0 vs 3.4 ± 1.7 / p=0.286 and IgG = 4.9 ± 3.5 vs 4.7 ± 2.6 / p=0.750 respectively) Eleven individuals in OSA group showed increased aCL levels. All of them in low titer (10 – 20 U/mL), excepting two patients with medium titer (20 – 80 U/mL) Eight subjects in the control group showed increased aCL levels. All of them in low titer.

Conclusion

The present study could not demonstrate higher aCL levels in OSA patients, although a larger sample needs to be assessed. Further research is needed in order to better clarify the complex mechanisms that underlie the relation between OSA and stroke.

ISCHEMIC HEART DISEASE AND OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

Numerous articles relate the obstructive sleep apnea syndrome (OSAS) with cardiovascular risk.

Objectives

The aim of our study is to assess the relationship of the severity of sleep apnea syndrome with the risk of ischemic heart disease.

Methods

This is a retrospective study which included all patients diagnosed with OSAS in our hospital between December, 2010 and December, 2011. Information was obtained from the medical records through the Documentation Service. For contingency tables were used Chi square test and Fisher test. For continuous variables were used Wilcoxon test cases, while for parametric tests were used T-Student distribution. To check the goodness of fit was applied the Hosmer Lemeshow test.

Results

We studied 507 patients with OSAS, 355 (70%) men and 152 (30%) women, who underwent cardiorespiratory polygraphy or polysomnography. The mean age was 58 (50-67) years. We obtained an AHI 32 (19-50) and SatT90 5% (0-21). 277 (55%) patients were obese (BMI> 30) and 47 (9%) had ischemic heart disease. In the group of patients with ischemic heart disease were higher: age (p <0.001), AHI (p = 0.126), SatT90 (p = 0.3), prevalence of obesity (p = 0.036) and male sex (p = 0.107). There was an odds ratio for age of 1.06 (p <0.001), AHI 1.0005 (p = 0.89), SatT90 0.9947 (p = 0.48), obesity 2.62 (p = 0.008), male sex 2.91 (p = 0.008 .) Test Hosmer Lemeshow 0996.

Conclusions

The risk of ischemic heart disease in our population increases significantly with age, obesity, and male gender; but not in relation to severity of OSAS, measured by the AHI, and/or SatT90.

INFLUENCE OF GENDER IN PATIENTS WITH SLEEP APNEA SYNDROME

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Introduction

Most published studies of patients with obstructive sleep apnea syndrome (OSAS) include a predominantly male population.

Objectives

The aim of our study is to analyze the characteristics of the female population among our patients compared with men to know if there are differences between the genders in terms of cardiovascular risk factors, clinical symptoms, severity of OSAS and the treatment.

Methods

This is a retrospective study that included all patients diagnosed with OSAS (apnea hipopnea index (AHI) greater than 5 and clinical symptoms) between December 2010 and October 2011. Information was obtained from medical records available through the Documentation Service of the hospital. For contingency tables were used Chi square test and Fisher test. For continuous variables were used the Wilcoxon test cases, while for parametric tests were used T-Student distribution.

Results

We evaluated 373 patients with OSAS, 264 (71%) men and 109 (29%) women. The age of men was 57±12 years and women 62±12 years. Women had an AHI of 25(16-44), a SatT90 7(0-37), and a score in the Epworth test 9(6-12). Presented a history of smoking 26 (24%), obesity 70 (64%), obesity-hypoventilation syndrome (OHS) 11 (10%), hypertension 64 (58%), dyslipidemia 30 (27%), diabetes 28 (26%), ischemic heart disease 5 (5%), atrial fibrillation, 9 (8%), and stroke 4 (3%). Treated with CPAP 59 (54%), BIPAP 9 (8%), and nasal or oropharyngeal surgery 3 (3%). Men had an AHI of 35(22-51), a SatT90 3(0-12), a score in the Epworth test of 9(6-12). Presented a history of smoking 163 (62%), obesity 122 (46%), OHS 10 (4%), hypertension 118 (45%), dyslipidemia 81 (30%), diabetes 45 (17%), ischemic heart disease 30 (11%), atrial fibrillation 12 (5%), and stroke 7 (3%). Treated with CPAP 167 (63%), BIPAP 12 (5%), and nasal or oropharyngeal surgery 14 (5%). There were significant differences between genders in age, AHI, SatT90, presence of obesity and OHS, previous history of smoking, and hypertension. We did not observe significant differences in Epworth sleepiness test, presence of diabetes, dyslipidemia, atrial fibrillation, ischemic heart disease or cerebrovascular disease. With regard to treatment, there were no significant differences between groups.

Conclusions

The female population is older, have a lower AHI, but greater nocturnal desaturation, and higher prevalence of obesity and obesity-hypoventilation syndrome. Regarding to cardiovascular risk factors there were no significant differences, except for hypertension and smoking. The treatment does not differ in both genders, being CPAP the most used device.

A 10-YEAR FOLLOW-UP OF A MANDIBULAR PROTRUDING DEVICE IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA AND SNORING

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Introduction

A mandibular protruding device, MPD is used for the treatment of obstructive sleep apnea, OSA and snoring. It's the first choice treatment in patients with mild/moderate OSA or when CPAP is not tolerated.

Objectives

The aim of this prospective 10-year study was to evaluate the MPD-usage on objective and subjective effect parameters during sleep.

Methods

Seventy-seven consecutive patients were treated with an MPD. At baseline, an overnight polygraphic examination was performed delivering the oxygen desaturation index, ODI, minimum oxygen saturation, SaO2 nadir, pulse, breathing pattern, airflow and body position. Weight and neck-circumference were registered. The patients and their relatives answered a questionnaire focused on sleep-related qualities. At the 10-year follow-up the same examinations were iterated. The definition for success for OSA patients, "ODI-responder", was an ODI decrease of >50% or <5. A "Symptom responder" reduced the baseline questionnaire data with >50%.

Results

At the 10-year follow-up, 3 were deceased and 74 patients were invited to participate. Ten patients (6 not on any treatment, 3 CPAP-users, 1 MPD-user) rejected a new polygraphic recording. Sixty-four patients completed an overnight polygraphic registration using their current treatment, 45 with MPD (30 OSA, 15 snorers), 9 with CPAP and 10 not on any treatment. Fifty patients, (35 MPD-users [24 OSA, 11 snorers]; 15 MPD-ceased users) answered the questionnaire.

The 30 OSA MPD-users significantly lowered the ODI value from baseline median of 9 (range 5-61) to 3 (range 0-33)(P=0.002). Seventy percent (21 patients) were "ODI-responders" and the SaO2 nadir significantly increased from a median of 78% (range 59-91) to 85% (range 66-89) (P=0.015).

Of the "ODI-responders", 89% (17/19) who answered the questionnaire, considered themselves as "Symptom apnea responders" and so did also the 5/5 "ODI non-responders".

All CPAP-users had an ODI<5 at the 10-year follow-up. Of those who had no treatment (n=10), the OSA patients, 1 out of 4 had an ODI<5, and the snorers, 4 out of 6 remained with ODI<5.

The MPD-users who were "ODI responders" maintained their baseline neck circumference and weight in contrast to the "ODI-non-responders" who increased the neck circumference by mean 1 cm and weight by mean 6 kg at the 10-year follow-up.

The snorers, 93% (14/15), still using their MPD remained with ODI values <5, although their SaO2 nadir had decreased, from a median of 91 (range 87-98) to 87 (range 67-92)(P=0.005).

Eight out of 10 who answered the questionnaire and remained ODI<5, considered themselves as "Symptom snoring responders" and this was in consistency with the opinion of their relatives. Both OSA patients and snorers with an MPD reduced their own and their relatives complain of snoring, apneas, daytime tiredness and poor night sleep quality significantly (P<0.001) and classified as "Symptom responders".

Conclusions

The MPD is a valuable long-term treatment modality for patients with OSA/snoring problems. Weight gain seems to be a confounder that jeopardises the effect of the MPD. Both the patients and their relatives reduced complaints significantly, but still some overestimated the reduction of the apneas.

THE ROLE OF SLEEP DEPRIVATION IN EATING HABITS AND WEIGHT

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Introduction

The 20th century brought major change in sleep patterns. With the advent of electricity the day has become longer allowing for 24 hour access to the internet, TV and games. The student population seems to be strongly influenced by these factors and is progressively more sleep-deprived. Reasons for this sleep restriction are night outings, nights studying, playing and watching TV. Sleep deprivation may be total or partial.

Objectives

We intend to assess whether the number of hours of sleep is related to eating habits and can influence body weight in university students, in free-living conditions.

Methods

A total of 34 healthy subjects, 52.9% male and 47,1% female, aged between 18-27 years (mean ± 21 years, SD ± 2anos) and with a body mass index (BMI) 24 ± 4 kg/m2 (mean ± SD). They were divided into two groups, one of which was sleep deprived: group one (n = 16) had total sleep time mean of 06:21:04 hours and group two (n = 18) 07:48:06 hours. All underwent monitoring with wrist actigraphy ("SOMNOwatch") and sleep diaries, to evaluate total sleep time, during a period of six consecutive days. Concurrently all meals taken by students in the six days were recorded, indicating the location and duration of meals. In order to evaluate the quantity of ingested nutrients we used a semi-quantitative questionnaire to determine rate of feed. Information was collected relating to 12 months prior to study. Analysis of body weight was based on three weightings using the same scale. Analysis was made using Statistical Package for the Social Sciences 19 (SPSS 19).

Results

Between the two groups no statistically significant changes were found with regards to eating habits, with regards to quantity of nutrients consumed per year, or number (p = 0,426), duration (p = 0,904) and location (in home p = 0,876; outdoors p = 0,210) of meals. Likewise no differences in BMI (p = 0,227) are present to a significant level (0,05).

There is a difference in total sleep time mean between weekdays (mean = 06:42:30) and weekend (mean = 07:34:20) (p = 0,016), as well as between genders (p = 0.019) and body weight (p = 0,040) in both groups.

Conclusions

Sleep deprivation in young students is not related to changes eating habits. These findings may result from individuals consider to be recorded the amount and type of food. The women are more sleep restriction and the group without sleep deprivation has more weight. This could be explained by the differences sleep patterns between genders and less activity.

PULSOXYMETRICAL EVALUATION OF SURGICAL TREATMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME

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Objectives

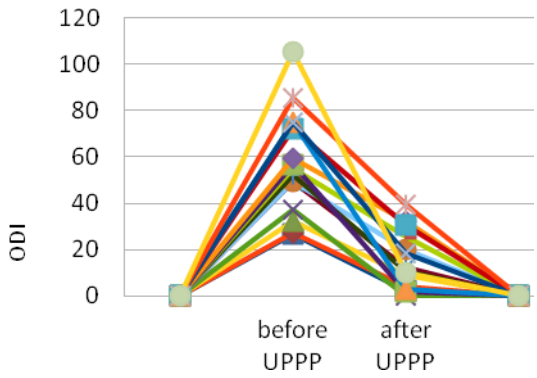
To evaluate the surgical outcomes of tonsillectomy and modified uvulopalatopharyngoplasty with the night pulse and oxygen saturation measurement.

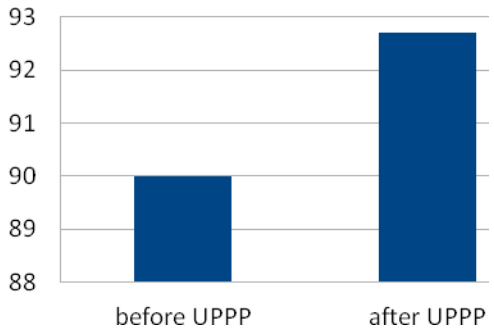
Methods

15 patients with moderate and severe obstructive sleep apnea syndrome underwent bilateral tonsillectomy, reposition of the palatopharyngeal pillars and submucosal resection of adipose tissue of the soft palate and uvuloplasty. All patients had confirmed low nasal resistance or priory underwent septoplasty or/and turbinoplasty as the first step of treatment. We made 2 channel polygraphy (heart rate and blood oxygene saturation) before and 3 months after surgical procedure. Oxygene desaturation index (ODI) and mean value of saturation were calculated. Success was defined as achieving the postoperative ODI less than 20 events per hour and greater than 50% reduction of the preoperative one.

Results

11 patients (69%) responded successfully. We achieved mean ODI reduction from 56,6 to 14,6 ($p<0,01$) and mean saturation increase from 90 to 92,7.





Conclusions

Operative treatment of obstructive sleep apnea syndrome can be performed in selected group of patient. After the surgery some patients still need to use continuous positive airway pressure equipment. All patients should have systematic follow up to evaluate long term effects.

UPPER AIRWAY VOLUME CHANGES AFTER MONO AND BIMAXILLARY ADVANCEMENT: PILOT STUDY USING CONE-BEAM COMPUTERIZED TOMOGRAPHY

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Introduction

Upper airway imaging provides substantial information about craniofacial anatomy in general and soft tissue disposition in particular, both of which are important for the understanding of the pathogenesis of obstructive sleep apnea (OSA). It is widely acknowledged that an increase of upper airway soft tissue and reduction in the size of craniofacial structures are important risk factors for OSA. Cone-beam computerized tomography (CBCT) provides a practical means for upper airway evaluation using a non-invasive, rapid, low-radiation, cost-effective scan.

Bone movement implies secondary positional and tensional changes in the attached soft tissues. Besides modifying facial appearance, these new soft tissue relationships alter the dimensions of the pharyngeal airway space. To our knowledge, this was the first study to use CBCT to compare pre- and post-orthognathic surgery pharyngeal airway volumes.

Objectives

To evaluate pharyngeal airway volume changes after forward movements of the maxilla, mandible or both using CBCT.

Methods

A retrospective analysis of 30 patients who underwent orthognathic surgery at the Institute of Maxillofacial Surgery of the Teknon Medical Center (Barcelona, Spain) was performed. Patients were randomly selected from the Institute's database according to the orthognathic procedure performed. Three groups comprising 10 subjects each were established as follows: Group 1: Bimaxillary surgery (Le Fort I maxillary osteotomy and mandibular bilateral sagittal split osteotomy (BSSO) with maxillomandibular advancement); Group 2: Maxillary advancement (Le Fort I maxillary osteotomy); and Group 3: Mandibular advancement (BSSO).

A CBCT scan was taken pre and postoperatively in each patient. Each CBCT was processed using the "SimPlant Pro Crystal" software (Materialise, Leuven, Belgium) in order to obtain the pre and postoperative pharyngeal airway volumes.

Results

The studied sample comprised 22 women and 8 men with a median age at the time of surgery of 32.2 years. The average period of time between the pre and postoperative CBCT scans was 120 days. An average increase in airway volume occurred systematically. The average percentage increase was 69.8% in group 1 and 78.3% in group 3. Group 2 exhibited a lower magnitude increase (37.7%).

Conclusions

CBCT provides a new means for airway evaluation using a non-invasive, rapid, low-radiation, cost-effective scan. Forward movements of the mandible and/or maxilla in the context of orthognathic surgery procedures can be aimed at correcting malocclusion, restoring facial harmony, and improving OSA symptoms as a result of PAS volume enlargement. According to our preliminary results, it seems the influence of mandibular advancement on pharyngeal airway volume is greater than the effect of the forward movement of the maxilla.

THE INFLUENCE OF BODY MASS INDEX BETWEEN OXYHEMOGLOBIN INDICES AND AROUSAL INDEX FOR PATENTS WITH OBSTRUCTIVE SLEEP APNEA

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Keywords: Body Mass Index, Obstructive Sleep Apnea, Polysomnography, Oximetry

Introduction

Obstructive sleep apnea (OSA) is a sleep breathing disorder characterized by recurrent airflow obstruction caused by total or partial collapse of the upper airway. The lack of airflow during apnea or hypopnea periods can lead to recurrent episodes of hypoxemia that can be detected as fluctuations in oxyhemoglobin saturation (SpO2). The arousals are transient and generally do not result in behavioral awakening, and recur in some conditions as often as once per minute. In addition, the obese is one of risk factor for OSA.

Objectives

Epworth sleepiness scale (ESS) is a self-administered questionnaire to provide a measurement of the subject's general level of daytime sleepiness currently. At present, the gold standard for a definitive diagnosis of sleep disorder is in-laboratory polysomnography (PSG). However, PSG is expensive, time consuming and labor intensive. Pulse oximetry had advantages of non-invasion, easy operation, and convenience. The objective of this study was to analysis the relationship between oxyhemoglobin indices and the arousal index (ArI) with different body mass index (BMI) groups.

Methods

Five-hundred thirty-six patients were diagnosed with OSA by standard PSG. The presence of OSA was defined as AHI >5/h. This study tested the correlation between oxyhemoglobin indices and the ArI in different group as BMI <25, 25<= BMI <30, and BMI >=30, respectively. The used indices of this study were the oxyhemoglobin desaturation index 3% (ODI3) and 4% (ODI4).

Results

The correlation between oxyhemoglobin indices and ArI were (ODI3: r =0.52; ODI4: r =0.54; when BMI <25, patients = 190; ODI3: r =0.62; ODI4: r =0.63; when 25<= BMI <30, patients = 251; ODI3: r =0.73; ODI4: r =0.74; when BMI >=30, patients = 95). When BMI is higher, the correlation between oxyhemoglobin indices and ArI was higher.

Conclusions

This study verified the relationship between oxyhemoglobin indices and ArI for patients with OSA. The results suggest pulse oximetry may be a tool for level of daytime sleepiness screening in specific group.

SIGNIFICANCE OF PLASMA VASPIN LEVELS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME: A NEW BIOMARKER FOR SEVERITY AND TREATMENT RESPONSES

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Introduction

Vaspin is a protein recently discovered as derived from adipocytes. Also, vaspin is speculated to be involved in the onset of metabolic syndrome and the development of insulin resistance in diabetic patients. However, the relationship between obstructive sleep apnea syndrome (OSAS) and vaspin has yet to be clarified.

Methods

We determined the relationship between plasma vaspin levels (pVL) and the severity of OSAS. Sixty-nine patients definitively diagnosed as having OSAS, including 8 patients receiving nasal continuous positive airway pressure (nCPAP) for 3 months, were studied. Plasma concentrations of vaspin, resistin and leptin were measured by an enzyme -linked immunosorbent assay.

Results

pVL showed significantly positive correlations with the AHI, arousal index and desaturation index, while neither the plasma resistin nor leptin correlated with any respiration indicator during sleep. pVL in the AHI ≥ 30 were found to be significantly higher than those in the AHI < 30 group. pVL in patients with OSAS decreased after treatment with nCPAP.

Conclusions

pVL are expected to serve as a useful new biological indicator for the severity of OSAS as well as for the response to treatment.

WHAT IS THE COMPLIANCE OF PATIENTS WITH SEVERE SLEEP APNOEA AND HYPOPNOEA SYNDROME WHO STARTED TREATMENT WITH CPAP IN THE 1990S?

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Introduction

The CPAP treatment in patients with severe sleep apnoea and hypopnoea syndrome has been payed by Health insurance in the Czech republi since 1994.

Objectives

We wanted to find the long compliance of CPAP therapy in our patients with severe sleep apnoe syndrome.

Methods

We started the treatment with CPAP in 137 patients with severe sleep apnoea hypopnoea syndrom in our sleep laboratory between 1994 until end of 1999. In the commencement of CPAP therapy the patient obtained information about their disease, the consequences of untreated sleep apnoea syndrome. At the same time they were instructed about the principle and mechanism of treatment by a CPAP ventilator.

We performed the setting of pressure manually in sleep laboratory of disorders of breathning during one night . The saturation of hemoglobin by oxygen was continuously monitored and patients were observed. All information was registered in a special report.

The patient received information about the principles of care for accessories, adverse impact of ventilatory treatment and possibility its prevent or resolve.

To the patients was emphasizing the necessity examination during the treatment.

Results

There are 55 patients who are still treated and they have good compliance. Additional 15 patients died and had good compliance. The total number of patients who died was 18. The remaining 3 patients had poor compliance.

The ventilatory treatment was interrupted during the treatment by 29 patients. The treatment was not tolerated from commencement in 25 patients.

Conclusions

It is known that long compliance is 46% in patients who use CPAP ventilators for more than 4 hours per night in the course of 70% of observation nights.

In our follow-up population, 42% patients with good compliance have been treated until the present.

USEFULNESS OF NASAL AIRWAY RESISTANCE IN PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

There are few reports researching relation of pediatric Obstructive Sleep Apnea Syndrome and nasal airway resistance. We examined the clinical usefulness of rhinomanometry in pediatric OSAS.

Objectives

The aim of this study is search the usefulness of nasal airway resistance for pediatric OSAS.

Methods

This research covers the 33 pediatric OSAS cases. They were performed adenoidectomy and tonsillectomy in our department between August 2009 and April 2012. Overnight polysomnography, and rhinomanometry in sitting and supine positions, were performed before and after the surgery. We measured the total nasal airway resistance of 100 Pa during quiet breathing by using active anterior rhinomanometry.

Results

In the pediatric OSAS cases, the nasal airway resistance were found to be significantly higher than normal pediatric nasal airway resistance values. However, improvement was observed after the surgery. It was also found that Apnea Hypopnea Index:AHI after the surgery significantly depending on postural change of nasal airway resistance before the surgery.

Conclusions

Nasal airway resistance before the surgery has possibility of reference for diagnosing pediatric OSAS and predicting the effects of surgical treatment.

USEFULNESS OF POSTURAL CHANGE OF PREOPERATIVE NASAL RESISTANCE IN PATIENT WITH PEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

Overnight polysomnography (PSG) is useful for the diagnosis of children with obstructive sleep apnea syndrome (pediatric OSAS). However, it is difficult to perform PSG to all patients suspected of pediatric OSAS because of the limitation of facilities with feasibility of PSG for children and because of difficulty of obtaining the cooperation of the patients. Also, it has been reported recently that the increase in nasal resistance is exacerbation factors of Adult-OSAS.

Objectives

The purpose of this study was to research whether the evaluation of nasal resistance could be auxiliary diagnosis for pediatric OSAS and whether the increase of nasal resistance would contribute exacerbation factors of pediatric-OSAS.

Methods

33 children presenting our hospital with chief complaints of snoring and sleep apnea were admitted to our hospital and found to have an apnea-hypopnea index ≥1 on overnight polysomnography and then adenotonsillectomy were performed on them from August 2009 to April 2011. Of them, 22 were boys and 11 were girls with the average age of 4.9±1.3 and the average BMI of 15.7±1.7.

PSG and rhinomanometry were performed before and after operation for all the patients. PSG was interpreted by a clinical laboratory technologist of PSG of our central clinical laboratory according to the diagnostic criteria of ICSD-2, the result of which was used for our research. Active anterior rhinomanometry was performed to patients with a nasal nozzle and a Rhinomanometer (MPR-3100, NIHON KOHDEN, Tokyo, Japan). Since it is reported that nasal resistance in Adult OSAS patients tend to be higher in the supine position than in the sitting position as compared to healthy people, we measured the nasal resistance in both supine and sitting positions.

Results

The result of PSG showed a significant postoperative improvement in the number of awakening, obstructive apneaindex, apnea-hypopnea index (AHI), apnea index, 3% oxygen desaturation index, and lowest SPO2 ($P<0.01$). There was no significant difference between pre- and postoperatively nasal resistance. With regard to the result of PSG examination, no PSG findings were observed in a significant correlation with the nasal resistance at both before and after the surgery.

Nasal resistance in the supine position showed a significant increase as compared to sitting position both before and after surgery ($p<0.01$). In addition, postural change of the nasal resistance, that is, the nasal resistance measured in the sitting position subtracted from the nasal resistance measured in the supine position, turned out to be higher in the patients with a lower postoperative AHI ($p<0.05$). Furthermore, this significance was not observed in the postoperative nasal resistance.

Conclusions

In this study, we conducted an examination over nasal resistance of pediatric OSAS patients and the results of PSG. It can be concluded that there is a possibility to be able to predict a postoperative AHI by postural change of preoperative nasal resistance, which indicated that nasal resistance value could be used to predict the therapeutic effect of pediatric OSAS.

THE ROLE OF SLEEP POSITION IN OBSTRUCTIVE SLEEP APNEA SYNDROME IN KOREAN PEOPLE

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Key words: Obstructive sleep apnea syndrome, Body position, Polysomnography, Positional therapy, Apnea-hypopnea Index

Introduction

Obstructive sleep apnea syndrome is a common clinical problem. Treatment of Obstructive sleep apnea syndrome consists of weight reduction, reducing alcohol and sedatives, mandibular advancements, and nasal continuous positive airway pressure. Although there are a lot of patients that snore louder and have more apneic episodes in supine position, limited number of studies have been reported on the role of sleep position.

Objectives

The aim of this study is to analyze the role of sleep position in obstructive sleep apnea syndrome (OSAS) in Korean people.

Methods

The subjects were 75 obstructive sleep apnea syndrome patients suffering excessive daytime sleepiness or snoring. Patients with co-morbidities of other sleep disorders such as narcolepsy or periodic limb movement syndrome were excluded. All subjects underwent polysomnography. Patients were stratified in a group of position dependent patients and a group of non-position dependent patients. We associated the apnea hypopnea index (AHI) of the supine position with the AHI of the other positions.

Results

We identified that a non-supine position was related with the decrease in AHI, especially in the position dependent patients group. BMI and AHI were higher in the non-position dependent patients group. In our study, 61.3% were position dependent patients (AHI in supine 2 times greater than AHI in other positions). In polysomnography tests, both group showed no significant difference in AHI in supine position, but non-position dependent patients group had significantly higher AHI in non-supine position. Non-position dependent patients group showed significantly higher total wake time and respiratory arousal index. Position dependent patients group had higher average oxygen saturation and higher lowest oxygen saturation.

Conclusion

This study confirms the finding that OSAS is position dependent in more than 50% of patients and non-supine position would lower the AHI of OSAS patients. AHI in non-supine position of position dependent patients group was significantly lower than AHI in supine position. Even in non-position dependent patients group, AHI in non-supine position was lower than AHI in supine position. We may need more comprehensive and in-depth studies to find the efficacy and effectiveness of positional therapy for OSAS patients.

EFFECTS OF GENIOGLOSSUS ADVANCEMENT PLUS UVULOPALATOPHARYNGOPLASTY FOR OBSTRUCTIVE SLEEP APNEA HYPOPNEA SYNDROME

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Introduction

The cause of sleep apnea hypopnea syndrome in Japanese patients is associated with maxillofacial malformation rather than obesity. Therefore, surgery is an effective option. Uvulopalatopharyngoplasty (UPPP) is a single–level obstruction procedure for the treatment of obstructive sleep apnea hypopnea syndrome (OSAHS). Since most OSAHS patients have multilevel obstruction, multilevel surgery improves the obstruction of the posterior airway space at the soft palate and hypopharynx. Genioglossus advancement (GA) is a surgical procedure designed to place the genioglossus muscle under tension, thus restricting the collapse of the tongue into the airway during sleep-induced hypotonia.

Objective

The purpose of this study was to evaluate the efficacy of genioglossus advancement (GA) plus UPPP for the treatment of OSAHS.

Methods

Twenty-eight (26 men, 2 women) Japanese OSAHS patients with multilevel upper airway obstruction were treated surgically from 2007 to 2011 at Tokyo Medical University Hospital. We evaluated symptoms and determined Epworth Sleepiness Scale (ESS) scores in all patients before and 6 months after operation. In addition, the following were performed before and 6 months after operation: physical examination, examination by flexible fiberoptic nasopharyngoscopy combined with Muller maneuver, cephalometric analysis, nocturnal polysomnography, and dynamic magnetic resonance imaging. Surgical procedures included GA and UPPP. Surgical success was defined as a 50% reduction from the patient baseline apnea-hypopnea index (AHI) or an AHI lower than 20 events per hour.

Results

Eighteen patients were successfully treated but ten patients did not respond to surgical treatment. The average AHI decreased significantly from 36.86±14.9 to 21.11±18.9, (P=0.00029). The lowest oxygen saturation significantly increased from 79.1±7.6 to 83.52±8.0, (P=0.001). The ESS significantly improved from 12.6±4.6 to 7.1±3.7, (P=0.0003). Most patients reported improved sleep quality and there were no major complications. However, 6 months after GA plus UPPP, four patients had mandibular numbness, six patients had mandibular discomfort, and one patient had throat discomfort. In the patients who did not respond to the treatment, four patients were subsequently treated with continuous positive airway pressure, two patients with oral appliance, and one patient underwent maxillomandibular advancement by an oral surgeon.

Conclusion

It is important to determine the precise narrowing sites in OSAHS patients prior to operation. GA plus UPPP is effective for moderate and severe OSAHS in Japanese

PREVALENCE OF SLEEP DISORDERED BREATHING IN JAPANESE YOUNGER ELEMENTARY SCHOOL CHILDREN

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Key words: sleep apnea, home monitoring, prevalence, children

Introduction

Sleep disordered breathing (SDB) occurs in children of all ages, from neonates to adolescents. It is thought to be most common in children around the attendance at school period, which is the age when the tonsils and adenoids are the largest in relation to the underlying airway size. Regarding Asian countries, prevalence studies on pediatric SDB have been performed in some countries, but not yet in Japan.

Objectives

We aimed to estimate the population prevalence of SDB in Japanese younger elementary
school children and to determine a correlation with polygraphic features and symptoms, upper airway morphology.

Methods

Prospective, cross-sectional study of 202 children of the first and second grade in a single public elementary school of Shiga, Japan, 6 to 8 years of age. Participants' caretakers completed questionnaires (Child and Adolescent Sleep Checklist (CASC) and OSA-18). An otolaryngologist examined children with regard to the presence or absence of nasal diseases and tonsillar hypertrophy. Nasal resistance was measured by rhinomanometry employing the active anterior method. All children underwent overnight in-home cardiorespiratory recordings of airflow, respiratory effort, oximetry, and electrocardiography. In-home cardiorespiratory recordings were performed more night when enough data were not obtained at the first night. Respiratory events were scored according to the AASM manual (2007).

Results

194 (96.0%) children's caretakers agreed to participate in this study. The enough in-home cardiorespiratory recording data were obtained from 170 (87.6%) children. The mean of total apnea hypopnea index (AHI) and obstructive apnea hypopnea index (OAHI) was1.4±1.3 and 0.4±0.6. Central apnea (CA) accounted for 70.4% among all 1926 respiratory events. The estimated prevalence of SDB in 6-8 years old children was 9.4% (OAHI□1) and 2.9% (OAHI□1). Significant difference was found in presence of habitual snoring and degree of tonsillar hypertrophy with SDB (OAHI□1) group and normal group. However, the difference of OSA-18 score and body mass index (BMI), nasal resistance were not found in SDB group and normal group.

Conclusions

SDB is a relatively common condition in 6-8 year-old children. Furthermore central apneas are frequently found in healthy children. Habitual snoring and tonsillar hypertrophy are important findings for suspecting that presence of SDB in younger elementary school children.

UNEQUAL IMPACT OF CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY ON COMPLIANCE AND SLEEPINESS DOMINANT MIXED VS. PREDOMINANT OBSTRUCTIVE VS. PURE OBSTRUCTIVE

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Keywords: obstructive sleep apnea, predominant OSA, mixed OSA

Introduction

In patients with central apnea, the instability of breathing might contribute to poorer continuous positive airway pressure (CPAP) adherence or compliance compared to those with obstructive sleep apneas. Mixed apneas share both central and obstructive components.

Objectives

We aim to investigate CPAP compliance according to types of apnea (dominant mixed apnea, predominant obstructive apnea, and pure obstructive apnea).

Methods

We enrolled 217 patients who were diagnosed with obstructive sleep apnea (OSA) by polysomnography and prescribed nasal CPAP therapy. All patients were divided into 3 types of OSA: pure-OSA (obstructive apnea 100%), predominant-OSA (70% - 100%), mixed-OSA (mixed apnea > 30% of total apneuic events). Good compliance of CPAP was defined by use in > 75% of days with > 4 h usage a night. The compliance of CPAP in all patients was analyzed and the degree of improvement of Epworth sleepiness scale (ESS) was compared among three groups after CPAP therapy.

Results

Eighty two % of patients were male. Mean age was 52.1±10.2 yrs and mean AHI was 36.4±23.2/hr. The percentage of CPAP using days was 81.3±21.2 %, and the mean CPAP usage time per night was 5.4±1.7 hours. Overall CPAP compliance of all patients was 63%. When patients were classified according to apnea types, 52 were included in mixed-OSA (AHI 42.4±17.5/hr), 90 were in predominant-OSA (41.2±16.7/hr), and 75 were in pure-OSA group (32.1±17.4/hr). There were no significant differences in ESS scores and other PSG parameters among groups. Percentage of CPAP using days and CPAP usage time per night in each group are as follows; 1) mixed-OSA, 76.1±22.3 %, 4.1±1.5 hours, 2) pure-OSA, 85.2±17.6 %, 5.3±1.2 hours, and 3) predominant-OSA group, 81.8±21.2 %, 5.1±1.3 hours. Thus, CPAP compliance was significantly poorer in the mixed-OSA group (good compliance, 41%) as compared with the pure-OSA (74%), and predominant-OSA groups (65%) (p=0.035, ANOVA). The improvement of ESS after CPAP was statistically definite in the pure-OSA (11.3±3.6 ☐ 7.5±4.0, paired t-test, p<0.001) and predominant-OSA patients (10.9±5.0 ☐ 7.1±4.1, p<0.001), not in the mix-OSA group (10.5±4.9 ☐ 8.8±4.2, p=0.062).

Conclusions

In patients with the mix-OSA, CPAP adherence were reduced compared with pure-OSA and predominant-OSA groups. Poorer CPAP compliance may affect the insufficient improvement of daytime sleepiness in mix-OSA patients with CPAP therapy.

INFLAMMATORY MYOFIBROBLASTIC TUMOR (IMT) BY METHICILLIN-RESISTANT S. AUREUS (MRSA) MIMICKING A LUNG CANCER: A CASE REPORT

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Introduction

We present the case of a patient who was hospitalized with the suspicion of a lung cancer and whose final diagnosis was pneumonia by MRSA and IMT of the lung.

Objectives

To study evolution of the case.

Methods

Retrospective analysis of the medical record.

Results

Our patient was a 57 year old man. He took steroids and infliximab due to ulcerative colitis. He went to the Emergency for left flank pain and fever. Chest X-ray showed a lung mass in the left apex. Then, he was hospitalized with antibiotics (levofloxacin and amoxicillin-clavulanate acid) and more tests were requested and these were the outcomes: Chest CT: Mass of 72 mm, with areas of necrosis; PET was requested but was made 15 days later. Bronchoscopy: Thickening of the mucosa of the left upper lobe. Bronchial biopsy and Citology: Negative for malignant cells; Bacteriological studies (Bronchial aspirates): MRSA; CT-guided biopsy: Proliferation fibromatous with mixed inflammatory component compatible with IMT. The patient improved, being asymptomatic at discharge. In the next appointment, in X-ray, the mass was decreased in size, but PET: Hypermetabolic nodule in left lung apex, with SUVmax=6, of probably neoplastic etiology. We decided to refer to the Thoracic Surgery Department of our referral hospital, but the previous control chest CT showed disappearance of the mass. In this moment, the patient is asymptomatic and does not need more appointments with us.

Conclusions

Etiology is unknow; but some theories include an inflammatory reaction to an infection. Several infectious agents have been linked to the development of IMT, but there are no reports of MRSA associated or isolated in a patient.

EXPERIENCE WITH OMALIZUMAB IN THE TREATMENT OF PATIENTS WITH SEVERE ALLERGIC ASTHMA: A FIRST APPROACH AT 16 WEEKS

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Introduction

Omalizumab is a humanized monoclonal anti-IgE antibody indicated for the treatment of severe persistent allergic asthma.

Objectives

1) Describe the profile of patients treated with omalizumab in our hospital.
2) Analyze the clinical, functional and regular medication changes observed in these patients after 16 weeks of treatment.

Methods

Retrospective study by reviewing medical records of 25 patients treated with omalizumab in our Asthma Unit. All included patients were adults, have uncontrolled severe persistent asthma and sensitization to perennial aeroallergens. The results are expressed as mean ± standard deviation for quantitative variables and percentages for qualitative ones. To compare quantitative variables we used the Wilcoxon test and for qualitative variables the McNemar test.

Results

Clinical characteristics and baseline allergic history of patients are shown in table 1. The observed changes in lung function, perception of control and medication needs are shown in table 2. Six patients had side effects (24%) but only 1 had to stop treatment for that reason. Figure 1 shows the distribution of side effects presented. The global personal assessment of patients on treatment with Omalizumab was positive in 100% of cases. There was a significant reduction in the number of exacerbations ($p < 0.001$).

Conclusions

After 16 weeks of treatment with omalizumab in a group of patients with severe persistent allergic asthma we found a clear clinical and functional improvement, also achieving a significant reduction of the daily needs of both inhaled corticosteroids and rescue medication, and in some cases it was possible to suspend the continuous intake of oral corticosteroids.

Table 1. Baseline clinical characteristics and allergic history	
No. of patients (Male/Female)	25 (8/15)
Age (years)	47 ± 12,1
Non-smokers/Ex-smokers	16/9
BMI	28,1 ± 5,6
Obese	28%
Time evolution of asthma (years)	22,3 ± 13,3
No. exacerbations per year	5 ± 2,8
Require hospitalization in the previous year	6 (24%)
Omalizumab dose (mg/month)	459 ± 258,3
Positive prick test	100%
Positive prick test to mites	84%
Positive prick test to pollens	76%
Positive prick test to epithelia	37,5%
Positive prick test to fungal	13%
Rhinitis	96%
Sinusitis	24%
Conjunctivitis	64%
ASA triad	4%
IgE (IU/ml)	329,5 ± 210,1

Table 2. Changes in lung function, perception of control and medication needs			
	Baseline	16 weeks	p
FEV1 (ml)	1835 ± 665	2194	**0,001**
FEV1 (%)	67 ± 20	82 ± 28	**0,001**
FVC (ml)	3820 ± 3822	3233 ± 1159	0,113
FVC (%)	93 ± 22	101 ± 28	**0,036**
FEV1/FVC (%)	60 ± 10	67 ± 11	**<0,001**
ACT score (Asthma Control Test)	14 ± 3	20 ± 3	0,12
Daily dose of inhaled budesonide (mcg) (n=13)	1662 ± 275	923 ± 342	**0,003**
Daily dose of inhaled fluticasone (mcg) (n=12)	2000	1417 ± 515	**0,008**
Patients requiring continuous oral corticosteroids	6 (24%)	3 (12%)	0,25
Patients requiring rescue medication daily	24 (96%)	4 (16%)	**<0,001**

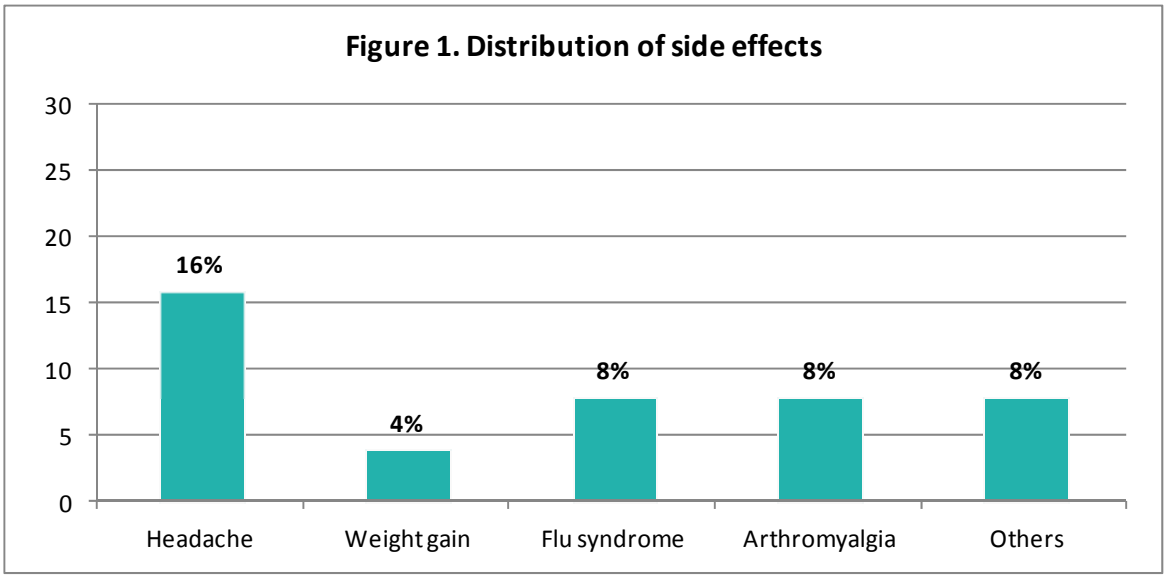
Figure 1. Distribution of side effects
30
25
20
15
10
5
0
16%
4%
8%
8%
8%
Headache
Weight gain
Flu syndrome
Arthromyalgia
Others

MIXED SLEEP APNEA IN DIAGNOSTIC POLYSOMNOGRAPHY IS RELATED TO COMPLEX SLEEP APNEA SYNDROME AND FAILURE OF CPAP TITRATION STUDY

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Introduction

'Mixed sleep apnea syndrome' has not been defined and mixed apneas considered as a part of obstructive sleep apneas by AASM guideline, however, mechanism for mixed apnea is considered to have in common with central apnea.

Objectives

To compare mixed apnea group with pure obstructive apnea group, and ultimately, to find relationship between mixed apnea, complex sleep apnea syndrome, and CPAP adherence.

Methods

We studied retrospectively patients with moderate OSA (AHI>15), who had undergone diagnostic polysomnography and CPAP titration at Asan Medical Center since 2008. We defined mixed apnea related OSA (mix-OSA) as mixed apnea index (MI) was more than 5/hr, and pure OSA as all of the apneas were obstructive apneas. CPAP titration failure was one that does not meet any one of optimal, good or adequate titration. Complex sleep apnea syndrome (comp-SAS) was defined as if CPAP titration eliminated obstructive apneas, but the residual central apnea index (CI) >5/hr or Cheyne-Stokes respiratory became prominent. CPAP acceptance was defined by whether a patient refuses CPAP within 1 month after CPAP administration. CPAP compliance was usage in >75% of days with >4 h usage each night during 3-6 months after CPAP initiation. Data were compared between Mix-OSA and pure OSA group using the independent t-test or Fisher exact test. And then, with variables that had p-values of <0.01, binary logistic regression analysis was used to select independent predictive variables for Mix-OSA. Also, Fisher exact test were used to find the relationship between Mix-OSA, Comp-SAS group and CPAP adherence.

Results

Subjects were extracted from all 447 patients (from January 2008 to July 2011), 58 patients (13.0 %) with Mix-OSA were identified and 92 patients (20.6%) were classified into pure OSA group. The rest of patients (292 patients) with 0<MI<5 were excluded. Univariate analysis indicated that neck circumference, minimal oxygen saturation, oxygen desaturation index (ODI), CI, obstructive apnea index, and arousal index were significantly different between Mix-OSA and pure OSA groups. Binary logistic regression analysis identified CI (Exp(B)=6.999, p<0.001), ODI (1.046, 0.034), and OI (1.072, 0.008) as independent factors to predict Mix-OSA group. On CPAP titration study, titration failure rate of Mix-OSA group (26.8%) was higher than in Pure OSA group. (11.3%) (p=0.041) In addition, among two groups (150 patients), 8 patients (5.3%) had Comp-SAS, in whom, 7 patients (12%) were Mix-OSA and one patient (1%) was pure-OSA. Comp-SAS and Mix-OSA related statistically significantly. (p=0.006) In Mix-OSA group, 17 patients' data were not unobtainable, excluding these subjects, 17 patients (41.5%) showed an adequate acceptance for CPAP. In Pure OSA group, 71 patients were eligible for CPAP analysis, 54 patients (76.1%) showed a good acceptance. (p=0.059) In Mix-OSA group, 8 out of 17 patients (47.1%) showed a good compliance, and, in Pure-OSA group, 22 patients (40.7%) had a good compliance. (p=0.619)

Conclusions

This study showed that mixed apneas were most related with central apneas, and, had a significant relationship with failure of CPAP titration and comp-SAS. Mix-OSA group had the higher failure rate of CPAP acceptance, however, which was not statistically significant.

ESTABLISHMENT OF RABBIT MODEL OF OBSTRUCTIVE SLEEP APNEA USING BOTULINUM TOXIN AND RADIOLOGICAL IDENTIFICATION OF UPPER AIRWAY OBSTRUCTION

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Introduction

Obstructive sleep apnea (OSA) syndrome is a very common and complex pathology.

Objectives

We present our new rabbit model of OSA using botulinum toxin(Botox) and analysis of upper airway obstruction with dynamic CT.

Methods

1. Establishment of OSA rabbit model We used 21 rabbits. 2.5 unit Botox was injected into genioglossus muscle of 8 rabbits, 5 unit Botox to 10 rabbits, 7.5 unit Botox to one rabbit and normal saline to 2 rabbits(control). During induced sleep, Apnealink was used to measure apnea-hypopnea index (AHI) to determine OSA in each group before and 1, 2, 3, 4, 6, 8 weeks after injection. Also, Embletta was used for check of sleep stage in 3 rabbits. 2. Identification of upper airway obstruction with dynamic CT We injected 2.5 unit Botox to 7 rabbits and normal saline to 7 rabbits(control). Apnealink was performed as experiment 1. Dynamic CT was scanned before and 1, 2 weeks after injection for measurement of upper airway dimensions and their change.

Results

1. Embletta findings showed some sleep spindles, no rapid eye movement, and no K-complex. Success rate of OSA induction was statistically not different between 2.5 and 5 unit Botox group (5/8 vs 7/10; P = 1.00).
2. Success rate of OSA induction was statistically higher in 2.5 unit Botox group than control group (5/7 vs 0/7; P = 0.02). In 2.5 unit Botox group, transverse diameter in palate (PT) decreased from 5.62 ± 0.80 to 5.22 ± 0.69 mm, ant. to post. diameter in palate (PAP) from 6.41 ± 1.02 to 5.81 ± 0.64 mm, transverse diameter in tongue (TT) from 5.01 ± 0.55 to 4.86 ± 0.42 mm, and ant. to post. diameter in tongue(TAP) from 4.23 ± 0.59 to 3.77 ± 0.54 mm. However, in control group, PT increased from 4.99 ± 0.60 to 5.30 ± 0.49 mm, PAP from 5.70 ± 0.58 to 5.91 ± 0.68 mm, TT from 4.90 ± 0.64 to 5.51 ± 0.64 mm, TAP from 3.82 ± 0.34 to 3.97 ± 0.41 mm.

Conclusion

We developed a new rabbit model of OSA by injecting Botox to genioglossus of rabbit tongue and a new protocol of dynamic CT for identifying upper airway obstruction.

THE INFLUENCE OF BODY MASS INDEX BETWEEN OXYHEMOGLOBIN INDICES AND AROUSAL INDEX FOR PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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Keywords: Body Mass Index, Obstructive Sleep Apnea, Polysomnography, Oximetry

Introduction

Obstructive sleep apnea (OSA) is a sleep breathing disorder characterized by recurrent airflow obstruction caused by total or partial collapse of the upper airway. The lack of airflow during apnea or hypopnea periods can lead to recurrent episodes of hypoxemia that can be detected as fluctuations in oxyhemoglobin saturation (SpO2). The arousals are transient and generally do not result in behavioral awakening, and recur in some conditions as often as once per minute. In addition, the obese is one of risk factor for OSA.

Objectives

Epworth sleepiness scale (ESS) is a self-administered questionnaire to provide a measurement of the subject's general level of daytime sleepiness currently. At present, the gold standard for a definitive diagnosis of sleep disorder is in-laboratory polysomnography (PSG). However, PSG is expensive, time consuming and labor intensive. Pulse oximetry had advantages of non-invasion, easy operation, and convenience. The objective of this study was to analysis the relationship between oxyhemoglobin indices and the arousal index (ArI) with different body mass index (BMI) groups.

Methods

Five-hundred thirty-six patients were diagnosed with OSA by standard PSG. The presence of OSA was defined as AHI >5/h. This study tested the correlation between oxyhemoglobin indices and the ArI in different group as BMI <25, 25<= BMI <30, and BMI >=30, respectively. The used indices of this study were the oxyhemoglobin desaturation index 3% (ODI3) and 4% (ODI4).

Results

The correlation between oxyhemoglobin indices and ArI were (ODI3: r =0.52; ODI4: r =0.54; when BMI <25, patients = 190; ODI3: r =0.62; ODI4: r =0.63; when 25<= BMI <30, patients = 251; ODI3: r =0.73; ODI4: r =0.74; when BMI >=30, patients = 95). When BMI is higher, the correlation between oxyhemoglobin indices and ArI was higher.

Conclusions

This study verified the relationship between oxyhemoglobin indices and ArI for patients with OSA. The results suggest pulse oximetry may be a tool for level of daytime sleepiness screening in specific group.

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THE EFFECT OF GENDER, DAYTIME SLEEPINESS, AND INSOMNIA ON DEPRESSION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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Objectives

We investigated the effect of insomnia, daytime sleepiness, and gender on depression in patients with obstructive sleep apnea.

Methods

We reviewed retrospectively the data of 410 patients who undergonepolysomnography to diagnose obstructive sleep apnea. Epworth Sleepiness Scale (ESS), Beck Depression Inventory (BDI), and insomnia were investigated.

Results

The subjects were consisted with 342 male (83.4%) and 68 female (16.6%). The average age was 47.6. The subjects who had ESS ≥10 were 159(38.78%), the subjects who had BDI ≥16 were 77 (18.78%), and the subjects who had insomnia were 192 (46.38%) respectively. There was no stastically significant effect of apnea-hypopnea index on ESS, BDI, or insomnia. When we divide the obstructive sleep apnea group with BDI<16 and BDI≥16, multivariate analysis revealed female gender (among male, 85.4% in BDI<16 group and 14.6% in BDI≥16 group. among female, 64.6% in BDI<16 group and 35.4% in BDI≥16 group. p=0.005), ESS more than 10 (36.8% in BDI<16 group vs 56.8% in BDI≥16 group, p=0.01), and presence of insomnia (41.7% in BDI<16 group vs 70.5% in BDI≥16 group, p<0.001) were significantly higher in BDI≥16 group. BDI was correlated with ESS score (correlation coefficient 0.20, p<0.001). It was more evident in patients without insomnia (correlation coefficient 0.257 in noninsomnia group, p<0.001 and correlation coefficient 0.186, p=0.0187). In male, ESS score was correlated with BDI (correlation coefficient 0.26, p<0.001), but in female, ESS score was not correlated with BDI (correlation coefficient -0.056, p=0.704).

Conclusions

Female gender, daytime sleepiness, and insomnia were higher in depression group. In male, daytime sleepiness was correlated with depression score but in female, daytime sleepiness was not correlated with depression score.

"IMPORTANCE OF NURSE INTERVENTION IN THE ADAPTATION OF PATIENT TREATED WITH CPAP. EXPERIENCE IN THE HOSPITAL COSTA DEL SOL"

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Introduction

Thanks to the nurse taxonomy NANDA, NIC, NOC (NNN), for nursing practice, now plays an important role of nursing in patient education and in monitoring treatment.

Objetives

With this descriptive study, we tried to highlight the important role of nurses in patients treated with CPAP on Sleep Disorders Unit of the Costa del Sol Health Agency

Methods

Cross-sectional study. Subjects: Patients with OSA treated with CPAP. Study period: Database Sleep Disorders Unit of the Health Agency Costa del Sol, cut in September 2011. Since the pulmonologist decided to establish the CPAP, the patient is referred to the Sleep Unit to initiate therapy. Thus began the nurse-patient relationship. In the introduction of treatment, The nurse teaches the correct use of the device, the results of short-term and the causes of their illness and possible solutions, thus reducing the anxiety this response to their fears and unknowns. Stressing the Nurse Diagnosis "Decreased anxiety" and "Management of therapeutic treatment." Cited in a month in consulting adaptation, which prizes its compliance and re-educating the patient / caregiver. We advocate here in the nurse Diagnosis "Defaulting treatment" and "deficient knowledge" to get a better match. We review the device and incidences We solve present in patients with respect to its use. The patient is cited in 2 to 3 months for autoCPAP adjustment. In consultation with autoCPAP Certification, re-evaluate the patient and their adaptation to treatment. Is performed for 2 to 3 nights Autoset titration pressure and adjusted, as reported by autoCPAP, if require. If the patient is adapted and the nurse says a good management of therapeutic treatment, he is quoted as once a year annual review in consultation where we evaluate the patient's current situation and its "effective therapeutic management." It is the patient with the Hotline Unit sleep in that year if any issues or concerns presented regarding treatment. In addition to the appointments protocol, the nurses made the management of candidates for non compliant patients (compliance <3 hours / night). In this query, nurses analyze the reason for low compliance and resolve the problem over the telephone, through the intervention of the technical team home of VitalAire or quoting them in their rehabilitation consultation.

Results

Of the 1,896 active patients as of September 2011, 186 patients complying with treatment with cpap (9.8% of total). Of these 186 patients, 131 patients (70.43% of non-compliance) are retrofitted to treatment after surgery nurse and only 55 patients (29.53% of non-compliant treatment) are written off because of intolerance or voluntary low compliance.

Conclusions

By continuing nursing intervention in these patients, the correct use of the treatment is 97.09% of all patients. It is therefore effective in adapting nursing intervention and monitoring of patients with cpap.

CYCLIC ALTERNATING PATTERN ANALYSIS IN CHILDREN WITH OSA BEFORE AND AFTER ADENOTONSILLECTOMY

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Introduction

The causes of obstructive sleep apnea (OSA) in children include upper airway disease, craniofacial morphology, obesity, and neuromuscular disease. The most common cause is upper airway obstruction due to adenotonsillar hypertrophy, which is treated with surgical removal of the obstructing tissue. In children OSA may result in inattention, hyperactivity, learning difficulties, and growth failure. Therefore, OSA is necessary to be accurately diagnosed with nocturnal polysomnography and clinical symptoms and be treated as early as possible. Children tend to exhibit less arousal than adults and can exhibit normal sleep structure despite having severe OSA diagnosed with nocturnal polysomnography. Although clinical symptoms and the apnea hypopnea index (AHI) can improve markedly after surgery, sleep structure changes little in some patients. Especially for children with OSA, there have been some limitations to judge, on the basis of sleep structure and the American Sleep Disorders Association (ASDA) arousal, whether sleep quality improves or not. Thus, more sensitive methods that reflect clinical symptoms are required. The cyclic alternating pattern (CAP), a periodic pattern of electroencephalographic activity during non–rapid eye movement sleep, is a sensitive and objective marker of sleep instability that is reported to correlate with subjective evaluations of sleep quality.

Objectives

The aim of this study was to compare changes in sleep structure; the CAP rate and the percentages of subtypes A1, A2, and A3 by means of CAP analysis; and American Academy of Sleep Medicine (AASM) rules before and after adenotonsillectomy.

Methods

The subjects were 5 boys (median age, 5 years; age range, 4 to 8 years) with OSA (median AHI, 14.3/hr). All children underwent adenotonsillectomy and underwent both preoperative and postoperative nocturnal polysomnography in a standard laboratory setting.

Results

Symptoms, such as snoring and apnea, witnessed by parents, improved in all children after surgery. The AHI decreased in all children and decreased by more than 50% and was less than 5/hr in 4 out of 5 children. Stage N1 decreased in all children, and Stage N3 decreased in 3 children, increased in 1 child, and was unchanged in 1 child. The CAP rate and the percentage of subtypes A2 and A3 decreased in all cases after surgery.

Conclusions

After adenotonsillectomy in children with OSA, the CAP rate decreased and was similar to that in age-related normative data. The observed decreases in the CAP rate and percentage of subtypes A2 and A3 may suggest decreases in non–rapid eye movement sleep instability.

IMPROVEMENT OF ADHERENCE TO THE TREATMENT WITH ADAPTIVE SERVO-VENTILATION BY A SPECIALIZED PROCEDURE IN PATIENTS WITH CONGESTIVE HEART FAILURE

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Introduction

Adaptive servo-ventilation (ASV) has being widely recognized and utilized as a highly effective treatment of patients with congestive heart failure (CHF) especially accompanied with central sleep apnea with Cheyne Stokes respiration (CSA-CSR). One of the difficulties in clinical application of ASV, however, is that the adherence to ASV therapy with such patients is low probably because such patients have fewer symptoms related to their sleep disordered breathing and this makes a higher mental resistance to such a daily mechanical intervention. Therefore, some specialized procedure that enhances the rate of acceptance and adherence of ASV usage in CHF patients has been needed.

Objective

To assess the effectiveness of specialized protocol in the stage of initiation of ASV treatment that was mainly performed by co-medical team to increase adherence to the therapy.

Methods

We retrospectively analyzed the data of our CHF patients who were treated with ASV in our institute (n=40). Patients were divided into two groups according to utilizing specialized protocol at the introduction stage: protocol group (P: n=27) and non-protocol group (NP: n=13). The patients who died but used ASV until their last day were considered as continued ASV group. The initiation protocol consisted of explaining the ASV therapy using specialized check sheet by nursing staff and precise explanation of the machine usage by medical engineering staff. In some newer cases, a refined procedure using a step introduction was utilized, which is consist of 4 steps approach; 1: an extended explanation of the reason of use, 2; an explanation of machine usage, 3; trial of using ASV during daytime, 4; using ASV during night for a gradually increasing time. Both groups were comparable in age (total average: 67.3±16.6 years), gender (27.5% female), B-type natriuretic peptide level (944.1±751.5 pg/ml), and left ventricular ejection fraction (46.5±18.8 %). Apnea hypopnea index measured by full polysomnography in 18 of P group and 8 in NP group before ASV treatment was comparable (P: 39.0±19.7/hr, NP: 46.1±31.3/hr).

Results

In the 27 patients in P group, 3 patients died using ASV and 11 live patients (40.7%) stopped using ASV. On the other hand, 4 patients died using ASV and 8 (61.5%) live patients stopped using ASV out of the 13 NP group. The rate of stopping of use of ASV was significantly lower in P group ($P<0.05$).

Conclusions

A specialized protocol introduction stage of ASV increases adherence to the treatment in CHF patients and may contribute to the better control of such patients' conditions and to their better prognosis.

VOCAL CORD ABDUCTOR PARALYSIS IN THE EARLY STAGE OF MULTIPLE SYSTEM ATROPHY: A REPORT OF TWO CASES

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Introduction

Patients with multiple system atrophy frequently develop sleep-related breathing disorders, including central hypoventilation due to degeneration of the pontomedullary autonomic respiratory center and obstructive sleep apnea due to upper airway obstruction associated with or without vocal cord abductor paralysis. Because vocal cord abductor paralysis can occur in any stage of the disease and may account for respiratory failure and sudden death during sleep, awareness of this life-threatening condition is important. Unlike typical snoring arising from oropharyngeal upper airway obstruction, nocturnal stridor is characterized by a harsh, strained high-pitched sound related to the obstruction at the level of the larynx. In the early stage, vocal cord abductor paralysis occurs only during sleep, but as the disease progresses it develops during both wakefulness and sleep. Although the mechanism of vocal cord abductor paralysis has not been completely clarified, dystonic contraction of the thyroarytenoid muscles, which act to adduct the vocal cords, and/or the neurogenic atrophy of the posterior cricoarytenoid muscles, which act to abduct the vocal cords, have been implicated.

Methods

We report two patients showing vocal cord abductor paralysis as the predominant and early signs of multiple system atrophy, contributing to its diagnosis.

Results

Patient 1: A 59-year-old obese woman who had been under continuous positive airway pressure therapy for obstructive sleep apnea syndrome for approximately one year but later developed acute respiratory failure because of vocal cord abductor paralysis. On laryngoscopic examination, the movement of the patient's larynx was normal during wakefulness, but vocal cord abductor paralysis, paradoxical movements of the vocal cord and a floppy arytenoid were observed during drug-induced sleep. Because nocturnal oxygen desaturation was severe and frequent, a tracheostomy was performed. A cerebellar-type multiple system atrophy was diagnosed based on the cerebellar atrophy in the brain magnetic resonance imaging and clinical findings such as truncal ataxia and neurogenic bladder. Patient 2: An 82-year old man developed hoarseness that lasted for 2 months, and was followed by acute respiratory distress. On admission, his vocal cords were fixed in a mid-line position, and an urgent tracheostomy was therefore performed. Although no severe atrophy of the cerebellum or brainstem was shown by brain magnetic resonance imaging, the presence of asymmetric rigidity, truncal ataxia and difficulty in urination suggested multiple system atrophy of the Parkinsonian type.

Conclusions

We emphasize that the recognition by general practitioners of vocal cord abductor paralysis and laryngopharyngeal abnormalities as early signs of multiple system atrophy is crucial not only for preventing respiratory failure and sudden death, but also for diagnosing a patient who shows subtle Parkinsonism or cerebellar signs.

THE ASSESSMENT OF MICRODEBRIDER TECHNIQUE FOR ADENOTONSILLECTOMY IN PEDIATRIC PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

The cause of the obstructive sleep apnea syndrome (OSAS) of children is probably hyperplasia of palatine tonsil and adenoidal hypertrophy. Adenotonsillectomy is the most common surgical procedure performed for children in otolaryngology. Traditional adenotonsillectomy in children is cold technique adenotonsillectomy or mixed technique adenotonsillectomy (cold adenoidectomy and electrocautery tonsillectomy). Recently, various instruments for the adenoidectomy are developed, and microdebrider adenoidectomy is performed with a larynx automatic fiberscope.
We report here comparison of classical method and microdebrider technique for adenotonsillectomy in pediatric patients with OSAS.

Objective

To compare the classical method and microdebrider technique for adenotonsillectomy in pediatric patients with OSAS .

Methods

We retrospectively reviewed the medical records of children, who underwent adenoidectomy/adenotonsillectomy for treating OSAS. Since the study was designed to collect data in the course of standard treatment for OSAS, it was classified as an exempt by the local institutional review board. The microdebrider group (Group I) were 20 pediatric Japanese OSAS patients of 15 boys and 5 girls. For comparison, 29 children undergoing the classical adenoidectomy (Group II) were selected among the 90 pediatric Japanese OSAS patients. These Group II children were matched in age, sex and Kaup index with the Group I.

Results

The results could indicate that the microdebrider adenoidectomy is more effective for reducing the severity of sleep apnea than the classical operation, even with the identical amount of residual adenoid. There was no difference in operative time and amount of bleeding between the Group I and Group II.

Conclusion

Though microdebrider is disposable instrument at a high price as compared with the others, The adenoidectomy is recommended using microdebrider. The newly developed microdebrider adenoidectomy for pediatric OSAS patients with adenotonsillar hypertrophy is more accurate and therefore effective for ameliorating sleep apnea than the standard adenoidectomy.

A REVEALING POLYSOMNOGRAPHY: AN UNEXPECTED TYPE I CHIARI MALFORMATION

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We present a case of type I Chiari malformation that was diagnosed because a polysomnography (PSG) was performed for snoring and breathing pauses during sleep in a 5-year-old girl with adenoids and tonsils hypertrophy.

Case report

The neurological examination was normal, but a PSG revealed not only obstructive apneas but also a lot of central apneas. Obstructive Apnea Index was 3,6/h, Central Apnea Index: 16,5/h, Apnea/Hypopnea Index: 24,5/h. All central apneas lasted less than 20 sec. and 40% less than 10 sec., O2 saturation mean was 96,5%, with rare significant desaturations but a severe bradycardia followed each apnea.
These results suggest to perform an encephalic Magnetic Resonance that revealed a type I Chiari malformation with abnormal liquor flow. The girl underwent a craniocervical surgical decompression with duraplasty.

Discussion

Our case reveals that central apneas also of short duration and without O2 desaturation, might lead to a neuroimaging in order to exclude encephalic malformation. In this case severe bradycardia is the more significant haemodynamics signum.

Conclusions

Central sleep apnea can be the initial symptom of type I Chiari malformation in children. PSG is indispensable for differential diagnosis between central and obstructive apneas because it is impossible to formulate with only clinical data.

OBSTRUCTIVE SLEEP APNEA SYNDROME AND METABOLIC SYNDROME IN OBESE CHILDREN AND ADOLESCENTS

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Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is associated with Metabolic Syndrome (MS) in adults. Some studies have demonstrated this association also in obese children.

Objective

To examine the correlation between OSAS, insulin resistance and dyslipidemia in obese children and adolescents.

Methods

We performed a retrospective observational study on 73 obese children.
All patients performed a metabolic syndrome assessment with biochemical markers (fasting glucose and insulin, HDL-LDL cholesterol and triglycerides); insulin resistance was estimated by Homeostasis Model Assessment (HOMA). In patients with symptoms of OSAS overnight polysomnography (PSG) was performed.
OSAS was diagnosed when Apnea/Hypopnea Index (AHI) results >1 and classified: slight (AHI 1-3), mild (AHI 3-5), moderate (AHI 5-10), severe (AHI>10).
Statistical methods: to study the relationship between OSAS and metabolic markers of MS we used a covariance analysis.

Results

We studied 73 obese patients (39 boys, mean age: 10,3 +/-3, Body Mass Index (BMI): 27,97 +/-3,58, z score BMI 2,13 +/-0,42).
After PSG 28 patients resulted affected of OSAS :18 slight, 6 mild and 4 moderate.
We refer our data in children with OSAS (group 1) compared with 37 obese patients without OSAS (group 2).

Group 1: Insulin: 19,2 mUI/ml (+/-11,1), HOMA index: 4,2 (+/- 2,6), Cholesterol LDL: 107 mg/dl (+/-26,8), Cholesterol HDL: 45,8 mg/dl (+/-7,3), triglycerides: 97,5 mg/dl (+/- 43,3).

Group 2: Insulin:18,3 mUI/ml (+/-10,5), HOMA Index: 4 (+/- 2,4), LDL Cholesterol: 103,3 mg/dl (+/- 28,4), HDL Cholesterol: 45,4 mg/dl (+/-10,1), Triglycerides: 98,6 mg/dl (+/- 51,8).
Covariance analysis showed no difference between the two groups.

Conclusions

Data showed OSAS seems not to be an additional risk factor for MS in obese children, maybe because OSAS are less severe than other authors have described.
Further research is necessary to specify the role of OSAS in the increasing risk of metabolic syndrome in obese children.

"MANAGEMENT OF THE OSA PATIENT IN A SPECIFIC SLEEP NURSE DEPARTMENT IN THE AGENCIA PUBLICA EMPRESARIAL SANITARIA COSTA DEL SOL"

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Introduction and objetives

The purpose was to describe the assistance process implemented in the hospital and how to handle patients suspected of having OSA referred to the sleep disorder nursing department until the starting of treatment, establishing a monitoring procedure for assuring correct compliance with the treatment.

Material and methods

When the patient came to the hospital for the first visit with the neumologist and there is a suspect of OSA, a sleep test is ordered (poligraphy). The patient return to the neumologist in 3 months (more or less). The sleep test apply go to the sleep nurse department when the patient recived an appoinment for the test. The test is performed at home, the patient come to the sleep nurse department and is instructed by the nurse through a talk and a practical demonstration in how to performance the poligraphy at home. On the following day, the informationt is downloaded and analysed by the sleep nurse. When the patient have the new appoinment with the neumologist the result of the study is given to the patient and if there is a positive for OSA, the CPAP is implemented by the sleep nurse the same day in the hospital. After a month with the cpap , the patient have a new date with the sleep nurse to see if there is any problem with the adaptation of the treatment (mask, secundary effects,..), if there is a problem, that is beeing solved by the nurse. Two months later the patient have another date in the sleep department with the nurse to make an adjustment test with an autocpap (Autoset Spirit© by resmed). If everything is correct and the patient is adapted to the treatment only will have a new appointment once a year in the sleep nurse department. If the sleep nurse detected any problem with the patient they received a new appointment with the neumologist.

Results

Activity of the sleep nurse department in 2011 : Polysomnography performed : 39; Polygraphys performed :997; Adjustments with autocpap: 413 ;First month with cpap Adaptation: 442; 53 patients abandoned treatment. New patients with cpap: 567. In january 2012 we have 2060 cpap patients with cpap at home and only 41 patients don't use the machine at least 4 hours a day.

Conclusions

Adaptation is easier and faster when the patient is treated as soon as diagnosed and until the start of treatment by one nurse.The patients feel safer having someone they know in the hospital to solve their doubts and problems, only a few patients abandoned treatment. Better control of treatment was achieved by the pneumologist and the sleep nurse.

PILLAR IMPLANT REDUCING SPECTRAL POWER OF SNORING

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Introduction

Snoring affects about 19% of adults, and has been found to be an independent risk factor for the evolution of carotid atherosclerosis and stroke, irrespective of nocturnal hypoxia or obstructive sleep apnea/hypopnea syndrome (OSAHS). The management of snoring even in a nonapneic condition thus has considerable implications in terms of public health. Surgery has been one of the major options for the cure of snoring over the past few decades, although severe pain on swallowing (or dynamic pain) may persist up to two weeks postoperatively. In one of our recent studies, local treatments targeting at "sweet spots" has been shown to help reducing dynamic pain. However, the conclusions on the alleviation of dynamic pain due to traditional surgeries of oropharynx have been indecisive. Pillar implantation has been a minimal invasive method for the management of primary snoring and/or OSAHS. A significant decline in loudness of snoring can always be observed following the surgery in selected patients.

Objectives

By using spectral analysis, this study aimed to reveal the changes of snoring sound frequency due to the intervention of pillar implantation.

Methods

Twenty-five males with primary snoring and/or OSAHS treated with pillar implantation were studied. Polysomnography (PSG) and snoring sound recording were performed before and 3 months after pillar implantation. Spectral analysis was used to evaluate the pre- and post-operative differences in the snoring sound frequency.

Results

Snoring sound frequency was around 230 Hz in average. An obvious decrease in the power of snoring sound frequency was noted after pillar implantation ($p<0.001$). There was no frequency shift for the snoring sound post-operatively.

Conclusions

Pillar implant reduced spectral power of snoring sound frequency. No frequency shift could be found for the snoring sound after the operation. Our finding invites further studies to correlate the improvement of PSG parameters and the degree of decrease in spectral power caused by pillar implantation.

SLEEP BREATHING SCALE REFLECTS THE OBJECTIVE SEVERITY OF OBSTRUCTIVE SLEEP APNEA

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Introduction

Excessive daytime sleepiness (EDS) has been recognized as a major contributing factor for motor vehicle and word-related accidents in obstructive sleep apnea (OSA), the identification of the risk factor for EDS is imperative. And many self-report questionnaires have been used to evaluate symptoms and severity of OSA. Epworth Sleepiness Scale (ESS) is widely accepted screening tool as examine EDS in OSA patients, however, the correlation of the ESS with OSA severity is a matter of considerable controversy. The aim of this study was to determine the relationship between several self-report questionnaires and objective OSA severity in polysomnography (PSG).

Objectives

It is to determine the relationship between severeal self-report questionnaires and the objective OSA severity in PSG

Methods

We studied retrospectively patients with snoring and EDS who underwent a complete PSG at our sleep laboratory from January 2009 to May 2011. Patients completed six questionnaires including ESS, sleep breathing scale (SBS), Multidimensional Fatigue Inventory-20 (MFI), Beck Depression Inventory (BDI), the Short Form (36) health survey (SF-36) and State-Trait Anxiety Inventory (STAI) at the day of PSG. We evaluated these questionnaires to assess a correlation with AHI, RDI, minimal Saturation O2 (MinSaO2) and Wake after sleep onset (WASO) by the Pearson correlation test. And then, with variables that had p-values of <0.05, stepwise multiple linear regression analysis was used to select independent predictive variables.

Results

We evaluated 677 patients (562 men, 115 women, average age 47.7 ± 12.6) who were mildly obese with an average BMI of 25.6 ± 3.6. The mean AHI was 25.4 ± 21.8 and RDI was 32.0 ± 21.1 consistent with moderate OSA. The AHI were significantly correlated with SBS ($r=0.308$, $p<0.001$), MFI (-0.098, $p=0.011$), BDI (-0.099, $p=0.01$), STAI ($r=-0.133$, $p=0.001$) and SF36 ($r=0.103$, $p=0.008$). Stepwise multiple regression analysis identified SBS ($\beta=5.361$, $p<0.001$) and STAI ($\beta=-0.283$, $p<0.001$) as independent factors related with AHI. In addition, SBS ($\beta=-1.758$, $p<0.001$) and SF36 ($\beta=-0.064$, $p=0.017$) were independent factors for MinSaO2. ESS did not correlate with AHI, RDI, minimal SaO2 nor WASO, however, positively correlated with BDI ($r=0.219$, $p<0.001$) and MFI ($r=0.328$, $p<0.001$).

Conclusion

We concluded that in patients with OSA, it is not possible to predict severity on the basis of the ESS score, which more correlated with depression and fatigue scale. SBS was significantly correlated with AHI, RDI, and MinSaO2, and was an independent factor by stepwise multiple regression analysis. SBS was the best described questionnaire to evaluate the severity of OSA.

SLEEP-RELATED BREATHING DISORDERS IN PATIENTS WITH MULTIPLE SYSTEM ATROPHY

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Introduction

Patients with multiple system atrophy manifest a variety of sleep-related breathing disorders including vocal cord abductor paralysis, obstructive sleep apnea, central hypoventilation, and dysrhythmic breathing patterns. Vocal cord abductor paralysis can occur in the early stage of the disease and its awareness is of great importance, given that vocal cord abductor paralysis is associated with respiratory failure and sudden death during sleep. Nocturnal stridor due to vocal cord abductor paralysis is characterized by a harsh, strained high-pitched sound reflecting the obstruction at the level of the larynx, whereas a low pitched snoring results from oropharyngeal upper airway obstruction. Degeneration of the pontomedullary autonomic respiratory center is attributed to the central sleep apnea. In the early stage, stridor occurs only during sleep, but as the disease progresses it can be observed even during wakefulness. The cause of the stridor is yet to be fully understand; however, dystonic contraction of the thyroarytenoid muscles, a vocal cord adductor, and/or the neurogenic atrophy of the posterior cricoarytenoid muscles, the only abductor of the vocal cords, have been implicated.

Objectives

To evaluate a relationship between sleep-related breathing disorders and clinical symptoms in patients with multiple system atrophy.

Methods

A total of 11 patients with multiple system atrophy who were admitted to the Department of Neurology, Dokkyo Medical University Hospital between 2007 and 2011 were included in this study. All patients underwent detailed neurologic examinations and imaging studies. Diagnosis of multiple system atrophy was made on the basis of the established criteria. Laryngoscopic examination and polysomnography were performed to detect sleep-related breathing disorder and abnormal movement of vocal cords and larynx.

Results

Out of 11, 10 patients (91%) showed sleep-related breathing disorders, defined as five or more episodes of apnea and/or hypopnea per hour, with predominantly hypopnea. Among the 9 patients who underwent laryngoscopic examination, 6 patients (67%) showed vocal cord abductor paralysis, 2 of whom exhibited vocal cord abductor paralysis only during sleep. Four patients had abnormal laryngeal movements, 2 of whom (33%) showed floppy arytenoid (type 1) and one showed omega type (type 2) according to the classification of sleep-induced laryngomalacia in multiple system atrophy, and the remaining showed an unclassified pattern. Daytime sleepiness positively correlated with the 3% oxygen desaturation index. Patients with vocal cord abductor paralysis tended to be older and have more frequent dysphagia, neurogenic bladder, and severe sleep-related breathing disorders as compared with those without vocal cord abductor paralysis. No correlation was found between vocal cord abductor paralysis and disease duration or orthostatic hypotension.

Conclusions

Our study demonstrated a high prevalence of comorbid sleep-related breathing disorders in patients with multiple system atrophy. Physicians should be aware that vocal cord abductor paralysis and laryngopharyngeal abnormalities may be the initial or early signs of multiple system atrophy. Our study results suggest that patients with multiple system atrophy with older age, dysphagia, neurogenic bladder, or sleep apnea syndrome should be screened for vocal cord abductor paralysis and laryngopharyngeal abnormalities by laryngoscopic examination.

STUDY OF AMBULATORY BLOOD PRESSURE MONITORING, CIRCADIAN RYTHM AND CARDIOVASCULAR FACTORS IN HYPERTENSIVE PATIENTS WITH AND WITHOUT SLEEP APNEA SYNDROME

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Introduction

The obstructive sleep apnea syndrome (OSAS) is associated with high cardiovascular risk.

Objectives

We have compared, in hypertensive patients with and without OSAS, blood pressure (BP) profile and risk factors that may be associated with OSAS.

Methods

We studied 130 hypertensive patients referred to our Sleep Unit with suspected OSAS, randomly chosen, 95 of which were OSAS and 35 non-OSAS. Patients answered a questionnaire on cardiovascular health. After 3 days without farmacological antihypertensive treatment were determined anthropometric measurements, office blood pressure, 24- hour ambulatory blood pressure monitoring (ABPM), and a blood test. Statistical analysis were performed using SPSS version 17. In the univariated analysis were used T test and Chi square test depending on quantitative or cualitative variables. A logistic regression model was used to identify sex, body mass index (BMI) and smoking habit as possible risk factors. A p level of 5% ($p < 0.05$) was considered as significant outcomes.

Results

We obtained two groups (hypertensive OSAS/hypertensive non-OSAS). (93.7%/80% male, $p<0.02$), with a mean age (54.4±8/52.8±8.8 years, NS) and BMI (33.1± 4.5/ 29.5±8.8 kg/m², $p<0.01$). 38.9% of OSAS were smokers, and 14.7% of non-OSAS. There were no significant differences in blood parameters. Office BP: systolic (154.9±18.5/148.0±13.5mmHg, $p<0.04$); diastolic (97.2±11.5/93.2±10mmHg, $p<0.02$); and pulse pressure (57.7±14.0/54.6±9.3, NS). The following table, shows the results of ABPM: overall 24h, daytime and nighttime in systolic (SBP) and diastolic (DBP) blood pressure, and percentages of nighttime SBP and DBP reduction. There were differences in overall SBP 24h (145.2±14/138.2±11mmHg,$p<0.05$); nighttime SBP (138.3±16.3/127.4±13.2mmHg,$p<0.05$); percentage of fall nighttime SBP (9.5±6.9/13.6±7.8%, $p<0.01$) and percentage of fall nighttime DBP (11.5±7/15.5±8.5%, $p<0.01$). 52.7% of hypertensive OSAS subjects were non-dippers, and 34.2% of non-OSAS ($p<0,05$). Finally we performed a logistic regression model to evaluate the effects of sex, smoking and BMI as risk factors to develop OSAS.

ABPM (mmHg)	Overall SBP 24h*	Overall DBP 24h	Daytime SBP	Daytime DBP	Nighttime SBP *	Nighttime DBP	Fall nighttime SBP (%)**	Fall nighttime DBP (%)**
Hipertensive with OSAS	145,2±14	89,4±9,3	149,4±15,2	92,7±10,5	138,3±16,3	83,4±9,7	9,5±6,9	11,5±7,0
Hipertensive non OSAS	138,2±11	86,7±8,4	144,1±12,5	91,1±8,8	127,4±13,2	79,3±10,6	13,6±7,8	15,5±8,5

*: p<0,05 **:p<0,01

Conclusions

Hipertensive OSAS had significantly higher overall 24h and nighttime SBP, with a reduction in the fall in nocturnal SBP and DBP. Using the logistic regression model, we found that obesity is 8.7 times higher risk for developing OSAS; male sex 8 times, and smoking 4.15 times. This regression model correctly classified 94.6% of OSAS, 45.8% for non-OSAS, and 84.3% of all patients. In our study; obesity, male sex and smoking are factors predisposing to development of OSAS.

PRESENCE OF METABOLIC SYNDROME AND CHARACTERISTICS IN HYPERTENSIVE PATIENTS WITH AND WITHOUT SLEEP APNEA SYNDROME

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Introduction

The relationship between obstructive sleep apnea syndrome (OSAS) and the metabolic syndrome (MS) is still being studied, since the MS could be a mediating factor between OSAS and cardiovascular disease. Similarly, the MS could increase the effects of OSAS in cardiovascular disease.

Objectives

In our study we compared, in hypertensive patients with and without OSAS, the prevalence and characteristics of metabolic syndrome defined as: presence of 3 or more classification criteria by Adult Treatment Panel III (ATP III).

Methods

We studied 130 hypertensive patients referred to our Sleep Unit with suspected SAHS, randomly selected, 95 of which were OSAS and 35 non-OSAS. Patients answered a questionnaire on cardiovascular health. After 3 days without farmacological antihypertensive treatment, were determined anthropometric measurements, office blood pressure, 24-hour ambulatory blood pressure monitoring (ABPM), and a blood test. Statistical analysis were performed using SPSS version 17. In the univariated analysis were used Student T test and Chi square test, depending on quantitative or cualitative variables.

Results

Of the 95 hypertensive OSAS, 74 patients met criteria for MS, and 22 of the 35 hypertensive non-OSAS. We get two groups: MS and OSAS: 74 patients/MS non OSAS, 22 patients. (93.2%/81.8% male, NS), with a mean age of 55 years. There were differences in body mass index (BMI) (33±4.2/31±3.6 kg/m², p<0.01) and greater presence of obesity in those with MS (75.7%/50%, p<0.01). Likewise there were significant differences in cervical circumference (45.6±3.2/42.1±1.8 cms, p<0.001) and waist (116.3±10.6/111±6.2 cms, p<0.005). 40.5% of the MS-OSAS were smokers, compared with 19% of the MS non-OSAS (p<0.005). There were not significant differences in blood parameters, ABPM or circadian rhythm (non dipper: 42%/38%, NS). Finally, we studied the percentages of the different criteria of MS in patients with OSAS. Logically, hypertension was present in 100% of them, followed by waist circumference (89% male, 100% women), 47.4% triglycerides, HDL 52.8% and glucose 35.8%. As for the cumulative percentages of each criterion of MS: 1 (0%); 2 (16.8%); 3 (37.8%); 4 (29.4%); 5 (10.5%).

Conclusions

Our hypertensive patients have a high prevalence of MS, being even higher in those with OSAS. Unlike that non-OSAS, the first also are more obese and smokers. The presence of MS contributes to further increase the cardiovascular risk of OSAS patients, which calls for a global therapeutic action on these risk factors.

SNORING IS ASSOCIATED WITH IMPAIRED MOTOR FUNCTION, DISEASE SEVERITY, AND QUALITY OF LIFE, BUT NOT DAYTIME SLEEPINESS, IN PARKINSON'S DISEASE

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Introduction

Sleep disturbances are common problems in patients with Parkinson's disease (PD), and they affect a patient's quality of life. In PD, increased comorbidity of sleep apnea syndrome (SAS) and snoring has been reported in association with excessive daytime sleepiness. In contrast, several investigators have reported no increased frequency of SAS in PD, suggesting SAS may not be a clinically relevant problem in PD.

Objectives

To investigate the relationship between snoring and its clinical correlates in patients with PD.

Methods

A total of 93 PD patients and 93 age- and gender-matched controls were selected from a previously conducted cross-sectional, case-controlled study at the Department of Neurology, Dokkyo Medical University, between January 2011 and May 2011. To evaluate sleep problems, Parkinson's disease sleep scale (PDSS)-2, Epworth sleepiness scale (ESS), and Pittsburgh Sleep Quality Index (PSQI) were administered. Snoring was defined as a snoring frequency of > or 2 days [2 or greater scores of the PDSS-2 sub-item 15]. Snoring frequency itself was also evaluated.

Results

Snoring (defined as at least 2 days / week) was more prevalent in patients with PD compared with snoring in the controls (14% vs. 1.1%, $p < 0.0010$). The background factors, including body mass index, age, and gender ratio, were similar between patients with PD and the controls. The PD patients with snoring showed a higher disease severity and worse scores on the motor section of the Unified Parkinson's Disease Rating Scale (UPDRS) and on the Parkinson fatigue scale. The same patients also showed worse scores in the Parkinson's Disease Questionnaire (PDQ-39) domains, such as mobility, activity of daily living, emotional well being, communication, and bodily discomfort, compared with those without snoring. Interestingly, however, no between-group differences were found in PSQI or daytime sleepiness as measured by ESS, although the PDSS-2 total score was significantly higher in the PD patients with snoring. We compared the motor features between the PD patients with and without snoring. The comparison revealed that a higher proportion of the UPDRS motor score for bradykinesia was found in those with snoring. Multiple logistic regression analysis showed that the PDQ-39 mobility domain and the proportion of UPDRS scores for bradykinesia were significant predictors of snoring in PD.

Conclusions

We found that snoring was more frequent in PD patients compared with controls and that snoring in PD patients was associated with disease severity, impaired motor function, particularly bradykinesia, and worse quality of life, but not EDS. These findings support the importance of evaluating snoring or sleep apnea syndrome in PD; however, the association between daytime sleepiness and snoring in PD requires further study.

NASAL SURGERY FOR MILD OSAS WITH NASAL OBSTRUCTION

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Introduction

Nasal surgery is said to be not effective for OSAS (Obstructive Sleep Apnea Syndrome) patients in several reports [1],[2]. We reported that two-thirds of OSAS patients don't breathe normally through the nose during sleep and oro-nasal breathing is regarded as the main cause of sleep apnea especially in mild OSAS patients[3]. So it is crucial to estimate the effectiveness of nasal surgery for OSAS patients.

Objectives

The Objectives in this study is to know:

1) What percentages of mild OSAS patients with nasal obstruction could recover through nasal surgery?
2) Which types of mild OSAS patients with nasal obstruction could recover through nasal surgery?

Methods

In this study 90 OSAS patients (whose AHI is under 30 /h or whose BMI is under 25kg/m2) with nasal obstruction underwent nasal surgery after PSG and cephalometric studies. According to their causes of rhinostenosis, 43 patients underwent nasal deviatomy and conchotomy ,45 patients had laser conchotomy and 2 patients had ESS(Endoscopic Sinus Surgery). The results of the PSG study 3months after surgery, the patients were divided into two groups (good responders and poor responders). The patient whose AHI was <5 or decreased more than 50% after surgery were classified as a good responder. We compared several factors between good responders and poor responders.

Results

The success rate of each surgery was respectively 73.3% in nasal deviatomy and conchotomy, 79.1% in laser conchotomy and 100 % in ESS. Good responders had significantly higher nasal resistance (mean 2.4Pa/cm3/sec, poor responder=1.4) and higher APN (mean APN=154.3, poor responder=135.2°) . There was no difference in BMI, AHI and ANB before surgery between good responders and poor responders.

Conclusions

The success rate of nasal surgery to mild OSAS with nasal obstruction was 76.7%. The nasal surgery is effective for the mild OSAS patients who have higher nasal resistance and high arched palate.

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GLYCATED HEMOGLOBIN IMPROVEMENT BY ORAL APPLIANCE THERAPY IN OBSTRUCTIVE SLEEP APNEA SYNDROME PATIENTS WITH DIABETES MELLITUS

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Introduction

It has been indicated that obstructive sleep apnea syndrome (OSAS) is independently associated with glucose intolerance and insulin resistance. The effects of treatment with CPAP on glycemic control has remained controversial.

Objectives

The aim of this study was to evaluate the influence of oral appliance (OA) therapy on glycated hemoglobin (HbA1c) of OSAS patients with diabetes mellitus.

Methods

Ninety-eight diabetes mellitus patients (mean age: 54.3 years) diagnosed with OSAS (mean AHI: 18.5) were studied before and after the insertion of an OA with an average interval of 90 days. The patients were randomly assigned to periodontal treatment and control groups. Patients in the periodontal treatment group were divided into three groups (normal, mild and moderate, and severe) according to the severity of periodontal disease.

Results

AHI showed a significant ($p<0.01$) fall to 5.3 in all patients. HbA1c reduced significantly ($p<0.01$) from 6.9 to 6.5 %. Both the periodontal treatment (n=50) and control (n=48) groups showed a significant reduction of HbA1c. The severe periodontal (n=22) showed a significant reduction in HbA1c. Otherwise, normal (n=10) and mild and moderate (n=18) groups showed no significant reduction. Insulin sensitivity is influenced by chronic inflammation in periodontal disease. Most OSAS patients breathe through their mouth during sleep. An OA can prevent the drying of patients' oral cavities due to nocturnal mouth breathing. This could result in the amelioration of periodontal disease and inflammation, and, consequently, a significant reduction of HbA1c.

Conclusions

This data suggest that dental treatment such as OA therapy and periodontal treatment for OSAS patients with diabetes mellitus can lead to a substantial reduction in HbA1c.

FUNCTIONAL BRAIN IMAGING IN RESPONSE TO ORAL AND COGNITIVE TASKS ASSESSED BY NEAR-INFRARED SPECTROSCOPY IN OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction

Nocturnal respiratory disturbances and disrupted sleep architecture due to obstructive sleep apnea syndrome (OSAS) cause daytime sleepiness and cognitive deficits.

Objectives

The aim of this study was to evaluate the functional brain imaging of OSAS patients during oral and cognitive tasks.

Methods

Ten Japanese patients with OSAS (mean age: 52.5 years, mean AHI: 18.9) and ten normal subjects (mean age: 50.8 years) were examined. We recorded the activity of brain tissue in response to oral function tasks (mouth opening, tongue protrusion, phonation) and a cognitive function task (word fluency task) using near-infrared spectroscopy (ETG-4000 Optical Topography, Hitachi Medical, Tokyo, Japan). In the word fluency task, the subjects were requested to generate as many words of which the initial syllables were /a/, /ka/, or /sa/ as they could. Fifty-two measurement points were placed on subjects' frontal and bilateral temporal regions. During measurements of the oral function tasks, the subjects repeated 30 s' rest and 10 s' tasks for 5 times. The cognitive activation consisted of a 30 s' pretask baseline, a 60 s' word fluency task, and a 60 s' posttask baseline.

Results

In response to the oral function tasks, an event-related increase in total hemoglobin (Hb) was evident, and all subjects showed significant ($p<0.01$) changes in total Hb over the bilateral temporal cortex. No significant differences were observed between the two groups. During the word fluency task, clear oxy-Hb increases were observed in the lower frontal and anterior lower channels. The increases in the Hb during the word fluency task were significantly ($p<0.05$) reduced in the patients compared to the controls.

Conclusions

The results may be related to prefrontal lobe dysfunction in OSAS patients.

SUB MUCOSAL UVELOPLASTY, A PAINLESS SURGICAL PROCEDURE

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Uveloplasty has been the difficult segment in sleep apnea surgery. The post-operative throat pain associated with this procedure, has been the major concern of the ENT surgeon, and the morbidity to the patient.

Various surgical procedures have been developed in the past to reduce the volume of the uvula. Various lasers were used. The post-operative morbidity in the form of pain continues to be the limiting factor in all those procedures.

In the past three years we have developed a surgical technique to reduce the volume of the uvula. The advantage of this procedure is the reduction of pain in the post-operative period to a negligible rate. The main source of pain after uveloplasty surgery was the raw surfaces of the palate that were left to heal secondarily. This obviously produces an inflammatory process, and as such, the pain associated with swallowing, talking, or even at rest.

Technique

A circumferential incision is mad in the uvula at the junction with the soft palate. The uvula is excised. The mucosa is then dissected circumferentially from the muscular core of the base of the uvula anteriorly for about five millimeters. This muscular base of the uvula is excised and the mucosa is sutured by interrupted sutures.

The incision heals primarily in a week. Post operatively there was no pain associated with this procedure. The volume of the uvula decreased significantly post operatively and continued to decrease in size in time as healing takes place. The patient's airway improved as early as two days.

In the past three years, we have performed twenty four cases of sub mucosal reduction of the uvula in conjunction with other nasal and sinus surgery for our sleep apnea patients. We had no significant pain post operatively in all our patients. All patients healed primarily. The palate volume reduction was adequate to produce pharyngeal patency and competense. No patient suffered from pharyngeal insufficiency.

In the text, we have presented a complete run down of the patient's age, sex, and the details of the preoperative work up.

DIAGNOSTICS AND SURGERY OF OBSTRUCTIVE SLEEP APNEA HYPOPNEA IN ADULTS

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Introduction

Snoring and obstructive sleep apnoea syndrome (OSAS) are prevalent and important causes of sleep disturbance. The pathophysiology of OSAS is related with local anatomical predispositions to OSA such as craniofacial anomalies, adenoid and tonsillar hypertrophy, macroglossia, hypertonic oropharyngeal soft tissue, base of tongue proptosis, mandibular hypoplasia, posterior mandibular displacement, maxillary retrusion, enlarged uvula, retrognathia, and inferior positioning of the hyoid.

Objectives

The aim of the study was to evaluate the usefulness of several diagnostic tests in sleep apnea patients as well as to obtain the efficacy of performed surgical procedures.

Material and methods

86 randomly selected patients with snoring and varying degrees of sleep-disordered breathing were included in this study. All patients were evaluated by otolaryngological examination and rhinometry which is an objective method for nasal resistance measurements. All patients had also preoperative test using Poly-Mesam as a reliable, screening examination for recognition of the characteristics of ventilatory disorders and for diagnosis of OSAS and preoperative craniofacial CT scans for cephalometric evaluation. Variables examined include age, sex, body mass index (BMI), respiratory disturbance index (RDI) and lowest oxygen saturation. We divided patients for two groups: snoring patients and OSAS patients. OSAS patients had at least RDI more than 5, minimal oxygen saturation less than 85% and more than 50% of sleeping time were snoring. These patients were divided into three groups: mile, moderate and severe OSAS. The nasal patency to airflow was estimated by means of active anterior rhinomanometry. After laryngological examination and diagnostic tests evaluation the patients were classified into the following procedures: CO2 laser mucotomy, septoplasty, laser assissted uvuloplasty (LAUP), uvulopalatopharyngoplasty, lateral pharyngoplasty and termoablation of tongue base (RITT).

Results

The improvement, defined as decreasing some sleep parameters, such as a respiratory disturbance index (RDI) more than 50%, decreasing the loudness of snoring, decreasing the number of hypopneas and better values of blood saturation was observed in most cases. Six months after laser mucotomy rhinomanometry showed a reduction in mean total resistance from the pretreatment level. After UPPP we noticed changes in retropalatal space, soft palate dimensions and uvula–posterior pharyngeal wall distance. LAUP occurred as well tolerated and quick procedure for snoring patients. The main complain reported by patients was mild pain in the operated area during first three days after the surgery. Patients underwent RITT showed mild improvement concerning snoring and sleep parameters. We obtained better results after 2-3 sessions. Patients after tongue base reduction experienced sometimes discomfort and throat pain lasting from two to four days.

Conclusions

OSAS is associated with significant changes in three levels: nose, nasopharynx and middle pharynx. Cephalometric analysis based on cranofacial computed tomography adds further information regarding the anatomical assessment of OSAS patients. Multilevel surgery after the precise diagnostic tests is usually required to obtain the best efficacy.

RADIOFREQUENCY SURGERY FOR SNORING AND SLEEP APNOEA

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Abstract

Radiofrequency surgery proves to be a useful tool for snoring and sleep apnoea cases .its advantages include relative precision in incision making, relatively bloodless fields if used appropriately, decrease post operative pain and excellent healing with fibrosis which aids in stiffening tissue.

Keywords: radiofrequency, snoring, sleep apnoea

Introduction

The various surgeries performed with radiofrequency include various types of palatoplasties, somnoplasties, tongue base reduction,up3 etc. Patients of sleep apnoea are managed by various modalities like weight reduction, dietary changes, CPAP and by surgery Tonsillectomy is frequently required for snoring and sleep apnoea cases. Paediatric sleep apnoea requires tonsillo adenoid resection and adult sleep apnoea cases have tonsillectomy as a part of UP3 and indicated for tonsils grades 3-4.

Objectives

To assess radiofrequency as a tool for routine surgeries for snoring and sleep apnoea

The pre and post-operative parameters studied were : pain scores, bleeding levels, reduction in subjective snoring sounds by patient and partner, the reduction in AHI pre and post op and clinical examination assessing widening, stiffening…

Methods

The radiofrequency SUTTER 7180 machine was used to assess cases over a two year span period of 2008-2010.The power settings used varied from 2-4 in the cutting and coagulation mode.

The procedures can be carried out under general or local anaesthesia and with oral intubation and a throat pack.

Radiofrequency tonsillectomy: Exposing the tonsil on either side, the to-bite radiofrequency forceps or the bipolar one is used to incise/open the plane for tonsillar dissection .Dissection is carried out with the same achieving haemostasis at the same time. If properly done bleeding is minimal and pain scores are low post operatively. Fossa deepens and stiffens post operatively.

Radiofrequency adenoidectomy: Can be performed after retracting the palate with tongue depressors or tourniquets and coagulating with bipolar forceps. Bleeding is negligible and wound heals well. No case of post- operative haemorrhage.

Radiofrequency somnoplasty achieves stiffening of the palate by delivering rf energy to the soft palate and causing fibrosis. Blanching has to be avoided. The subsequent stiffening of the palate reduces snoring. Procedure can be done under local anaesthesia, procedure involves no bleeding and pain scores are low.

Radiofrequency tongue base reduction creates channels on delivering energy which then lead to volume reduction. Three sittings of reduction gives a significant reduction in tongue base tissue. There was no incidence of tongue base oedema or infection. The procedure can be done under local or general anaesthesia.

Radiofrequency UP3 is achieved by uvular and lateral cuts and tonsillectomy with pillar suturing. The post-operative widening , contracture /stiffening helps in achieving a good result .

RAUP for snoring definitely gives good results due to the stiffening of tissues and tonsillar fossa if tonsillectomy is combined. Subjective decrease in snoring is achieved and patient cannot further emanate the sound of snoring.

Results and Conclusions

Radiofrequency appears a useful tool due:

1. Decrease in blood loss
2. Decrease pain levels
3. Fibrosis and stiffening of tissue
4. Use of a dynamic tool
5. Procedures can be performed under local/general anaesthesia
6. Instruments are autoclavable/recurring cost is low
7. Machine is ambulatory

COBLATION ASSISTED SOFT PALATAL WEBBING FLAP PALATOPLASTY: A NEW TECHNIQUE FOR THE TREATMENT OF SNORING

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Introduction

Until now no single palatoplasty procedure has been proven to have the ideals that justify its use over the others.

Objective

This study assessed a modified uvulopalatoplasty based on a soft palatal webbing flap to improve the short and long term results in cases of snoring

Methods

In accord with Institutional Review Board approval, 93 Patients complaining of snoring +/- mild OSA were treated with this modified uvulopalatoplasty between April 2006 and June 2010 and fitting certain preoperative criteria, with minimum follow up period of six months. All patients had preoperative subjective assessment of snoring, daytime sleepiness and Polysomnogram if needed. Main parameters included: subjective improvement of snoring, subjective assessment of postoperative pain, shape of the postoperative new palate and postoperative complications.

All statistical analyses were performed using T-test. Data is displayed as means +/- standard deviation (SD). Statistical significance was accepted when $P < 0.05$.

Results

87 patients completed the study; 5 patients did not continue the follow up period. 80 (91.9%) patients were complaining from snoring while 7(8.1%) patients were found to have mild obstructive sleep apnea (OSA) in sleep study. Snoring cured in 68 (78%) patient, improved in 14 (16%) patient and failure occurred in 5 (6%) patients. No recurrence of snoring was observed during the 6 months of follow up period. Postoperative pain reduced in both duration and severity. No distortion of the shape of the new palate was observed due to significant fibrosis in all patients. No patient demonstrated clinically significant postoperative velopharyngeal incompetence after 6 months follow up. No major perioperative complications occurred.

Conclusion

This new surgical technique may offer benefits over other palatoplasty modalities in patients with snoring. The procedure has promising results regarding snoring cure, elimination of the possibility of snoring recurrence & reduction of severity of postoperative pain, is anatomically sound and has minimal complications.

ACCEPTANCE AND COMPLIANCE TO VENTILATION TREATMENT IN OSAS PATIENTS

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Key words: OSAS, apnoea, ventilation therapy, treatment effectiveness

Ventilation treatment is regarded as the "gold standard" in OSAS patients. Adherence to ventilation treatment is a primary concern for a good therapeutic effect. Some patients complete reject the therapy and remain untreated, also compliance rates to treatment vary greatly and the use of the device is often considered cumbersome and not well tolerated. We studied OSAS patients who came to the pneumology department of S. Andrea Hospital of Rome and the ENT service of Casa di Cura Citta' di Roma from 2006 and 2011. All patients were submitted to ENT and pneumologic evaluation with flexible-endoscopy of upper airways and polisomnographic examination. They were classified on age, gender, apnoea hypopnoea index (AHI) and body mass index (BMI). We considered the patients who accepted the ventilation tratment. The aim of the study was to assess the compliace criteria to treatment, the average time of effective ventilation, the device prescribed and the correct use of the device.

EVALUATION OF LINGUAL TONSIL HYPERTROPHY IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: MAGNETIC RESONANCE IMAGING STUDY.

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Introduction

This study is aimed to identify lingual tonsil (LT) hypertrophy and its associated factors in patients with obstructive sleep apnea (OSA) using a magnetic resonance imaging (MRI).

Methods

Patients underwent MRI of the upper airway and a full-night WATCH-PAT. OSA patients whose AHI was higher than 5 per hour were included. The thickness of LT was measured in the axial views of upper airway MRI, and laryngopharyngeal regurgitation (LPR) was evaluated by endoscopic examination. Age, sex and body mass index (BMI) were also analyzed.

Results

A total of 85 patients were included in the present study. The mean apnea hypopnea index (AHI) was 21.8 ± 3.3. Thirty patients had mild OSA (5 <AHI<15), 35 moderate OSA (15<AHI<30) and 20 severe OSA (30<AHI). The mean thickness of LT was 4.3 ± 2.4 mm. The thickness of LT was significantly correlated with BMI ($r = 0.256$, $p = 0.018$). The median thickness of LT was significantly different ($p = 0.002$) between patients without LPR (3.04 mm, interquartile 2.14 – 4.93) and with LPR (5.21 mm, interquartile 3.88 – 8.29). Age, sex and AHI were not significant factors for hypertrophy of LT.

Conclusion

Hypertrophy of the LT in OSA patients may be associated with higher BMI and presence of LPR

THE EFFECT OF AN EXTERNAL MECHANICAL STIMULUS DEVICE TO TREAT OBSTRUCTIVE SLEEP APNEA.

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Introduction

100 million people worldwide have obstructive sleep apnea (OSA), of which more than 80% remain undiagnosed. Current OSA treatment has side effects which lead to OSA sufferers failing to comply with treatment. An external mechanical stimulus device to treat OSA that is comfortable and convenient has been tested in hopes of leading to a higher compliance and treatment of OSA.

Methods

A prospective, multicenter, open label, single group safety and efficacy clinical trial. Adult patients with previously diagnosed OSA, previous CPAP experience, and a completed sleep medicine evaluation were included. A total of 25 patients completed the study. Patients underwent a ten day study including seven days in the home with the investigational device. Type 1-PSG results were compared from baseline (device off) to the last night after using the device for ten days (device on). Epworth Sleepiness Scale (ESS) and Functional Outcomes of Sleep Questionnaire (FOSQ) completed prior to study were compared to ESS and FOSQ completed at end of study. Questionnaires comparing patients' preference to current OSA treatment versus the investigational device were filled.

Results

Type-1 PSG results indicated that the Apnea Hypopnea Index (AHI) decreased significantly and oxygenation improved with the device on versus when the device was off. ESS dropped and FOSQ increased indicating overall improvement in daytime sleepiness and function. A majority of the patients preferred the investigational device to CPAP and 99% of patients felt that the investigational device was very easy to use.

Discussion

Use of the investigational device significantly improved AHI and enhanced the patients' health by improving oxygenation levels while they slept. Also, subjective daytime sleepiness and function improved with the use of the investigational device which patients felt were comfortable and easy to use.

TONSILLOTOMY OF OSAS TREATMENT CONFIRMED BY POLYSOMNOGRAPHY IN CHILDHOOD

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Introduction

Obstructive sleep apnea syndrome (OSAS) in childhood is often caused by hypertrophy of the palatine tonsils. The only objective examination is polysomnography.

Objectives

Recommended method of treatment for hypertrophy of the palatine tonsils with symptoms of OSAS is a tonsillectomy. The goal is to prove that an adequate method of the treatment of OSAS in children with tonsils hypertrophy is a both side tonsillotomy. The study was controled by polysomnography before and after surgery treatment. Determine the effectiveness of the tonsillotomy to apnea pauses and other symptoms caused by this hypertrophy.

Methods

In the period 2006-2012 were examined 50 patients in age from 2 to 10 years old at Pediatric ENT Clinic in University Hospital in Brno and ENT Department in Benešov. All patients have tonsillar hypertrophy more than 50 percent of the pharyngeal space. Positive anamnestic symptoms were apnea and snoring. Overnight polysomnography test of all children had to realized at Pediatric Neurology Clinic in University Hospital in Brno. OSAS were confirmed in 33 patients. The value of AHI were in the range of 1.2 to 42. 17 patients were confirmed only ronchopathy with AHI < 1. Both side tonsillotomy was made in the group of 26 patient. The control polysomnography was performed between 6 weeks and 3 months after healing.

Results

The group to polysomnographic examination before and after tonsillotomy included 33 patients. 7 patients had AHI =0 after tonsillectomy. AHI value was zero after tonsillotomy in 25 children. Only 1 patient was found AHI of 0,9 (before surgery was AHI 42). No recurrent tonsillitis were found. No recurrent hypertrophy was found.

Conclusion

Therapeutic effect of tonsillotomy (success rate 94.4%) is comparable with tonsillectomy (success rate in literature 70-90%). Reduction radikality does not change the effect of OSAS treatment , while maintaining the functional part of the palatine tonsils in children age is importance for the development of the immune system and it is the positive effect of tonsillotomy.

SCREENING OF SLEEP APNEA THROUGH NOVEL AMBULATORY TELEMEDICAL POLYSOMNOGRAPHY FOR PRIMARY HEALTH CARE

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Introduction

Obstructive sleep apnea (OSA) is an underdiagnosed clinical entity. Traditional sleep laboratory polysomnography is labour intensive and too time consuming for the screening of patients at the risk of OSA in primary health care.

Materials and Metods

An easy-to-use and cost-efficient telemedical polysomnography service targeted for primary care as well as secondary care physicians has been available in Finland since 2002. In this setup more than 15.000 patients in Finland have been screened by means of ambulatory polysomnography. Sophisticated analysis tool and secure data transfer system through internet is used to guarantee reliable analysis and a prompt delivery of the reports made by qualified specialists.

Results

The service operator equips the primary healthcare facility with the polysomnography device. A nurse advices the patient about the device setup for the overnight registration. On the following day, the patient returns the device and the data is uploaded to a remote server over a standard and secured internet connection. The data is checked by technicians and then sent to the specialist. The specialist analyses the registration thoroughly and creates a report with treatment recommendations. Finally the report is delivered back to the primary care physician.

Conclusions

This service model reduces queues to secondary care by allowing patients to be quickly and reliably screened before referral. This service model is cost effective and enhances the accessibility of high quality diagnostics especially in primary healthcare. Easy-to-use screening of OSA is a practical diagnostic tool for any doctor´s office in primary health care.

SLEEPING APNEA AND THE METABOLIC DISORDERS

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Introduction

Regardless the literature shows that sleep apnea (SA) and Diabetes Mellitus (DM) are linked in their physiologic pathways throw the lipid metabolism, several authors are seeking for other associations between the two conditions. The existence of other relations is supported by the evidence of circadian alterations in glucoses homeostasis associated with sleeping disorders. However, the causality mechanisms involved are not totally explained, and the relation itself is not taken for granted yet. Nevertheless, the descriptive studies published are in favor of a positive association between DM and SA.

Objectives

This study aims to characterize a population submitted to a level 1 polisomnography (PS1) by searching for demographic and clinical differences between the diabetic (pDM) and non diabetic population (npDM). It is also intended to perform the same analyses with dislipidemic (pD) and non dislipidemic population (npD)

Methods

It was employed a convenience non-probabilistic and retrospective sampling. In the sample were included all patients who performed a non-therapeutic type 1 polisomnography between 1/1/2010 and 31/7/2011. The population's normality was assessed using the Kolmorov-Smirnov and the Shapiro-Willk tests and variables independence was determined by the Chi2 and the Pearson correlation tests. The Wilconxon test was used to evaluate the differences among the populations. The data was processed using SPSS 19.0.

Results

The study included 202 patients from which 68 were females (33,7%) and 134 were males (66,3%) with a mean age of 55 years old (yo) (STDV 12,7). From these, only 150 patients answered the Epworth questionnaire (E_q) and had a mean score of 11,84 (STDV 6,13). 72% of the patients fulfilled SA diagnosis criteria, whose severity distribution as mild, moderate and severe was 41,9%, 33,8% and 24% respectively. The DM and the Dyslipidemia (Dys) prevalence was 15,2 % and 28,6% respectively.

From the 30 individuals of the pDM, 9 were females (30%) and 21 were males (70%) with a mean age of 63 yo (STDV 11,5). The mean E_q was 12,2 (STDV 7,39). 86,7% of the patients fulfilled SA diagnosis criteria, whose severity distribution as mild, moderate and severe was equally distributed.

From the 57 individuals of the pD, 16 were females (28%) and 41 were males (72%) with a mean age of 58 yo (STDV 9,9). The mean E_q was 10,6 (STDV 6,01). 86,7% of the patients fulfilled SA diagnosis criteria, whose severity distribution as mild, moderate and severe was 42,8%, 28,6% and 28,6% respectively.

The presence of SA and its severity had statistical significance ($p<0,001$) between diabetic population and the non-diabetic population. The same was observed between the dyslipidemic and non dyslipidemic population. About the E_q we verified the non-independence of its relation with DM but its independence to the npDM.

Conclusions

The population studied has similar characteristics to the ones described in the international literature. The sub analyses performed did not prove the independence between the metabolic diseases and SAS. A relation between DM and Dys with SAS diagnosis, and its severity, was found.

EFFECT OF NASAL AIRWAY STENT (NAS) ON OBSTRUCTIVE SLEEP APNEA.

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Background

The concept of nasopharyngeal intubation to maintain upper airway patency during sleep was originally reported in the literature in the 1970s. Recently, we have invented nasal airway stent (NAS) of which device for treating OSA. The device is constructed using a resilient semi-rigid silicone rubber and was designed to be safely auto inserted into the upper airway. The NAS contains an expandable distal end, located near the retropaltal oropharynx, that is encapsulated by a nontoxic water-soluble material. Following device placement, the distal end the device is slowly released and expands to maintain an air flow passage way diameter of 5-10mm.

Method

Effectiveness of the NAS on sleep disordered breathing was assessed by polysomnographic studies before and during placement of the device in seven male patients with OSA (BMI: 26.2±4.5 kg/m^2, age: 43.6±8.9 yrs).

Results

The NAS significantly improved the apnea hypopnea index (from 32.9±17.6 to 16.2±13.7 events/hr, $p<0.01$), 3% oxygen desaturation index (from 28.3±24.4 to 10.3±11.6 events/hr, $p<0.01$) and arousal index (from 28.4±17.3 to 14.5±9.7 events/hr, $p<0.01$). None of the patients experienced traumatic side effects such as nasal bleeding, pain, or discomfort following placement of the device.

Conclusion

The NAS has not normalized the disordered breathing, but appears to be useful alternative treatment for patients with OSA. The device may be used as an immediate therapeutic tool while a patient undertakes a weight lost program or as an alternative for patients who cannot tolerate a CPAP treatment. The NAS affects obstruction of nasopharynx and partly oropharynx but not of hypopharynx, therefore the combination of the NAS and an oral appliance may provide additional benefits.

This study was partly supported by a Health Science Research Grants (Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes and Diabetes Mellitus).

PREVALENCE AND SEVERITY OF OBSTRUCTIVE SLEEP APNEA IN INFANTS WITH ROBIN SEQUENCE

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Background
Infants with Robin Sequence (RS) are at risk for developing obstructive sleep apnoea (OSA) secondary to micrognathia and glossoptosis. Even though a diagnosis of OSA has important consequences for further airway management, prevalence and severity studies of OSA in the paediatric RS population are scarce.

Objective
The aim of this study is to determine prevalence and severity of OSA in infants with RS.

Methods
Retrospective study of all infants born between 2000 and 2010 with RS in which a polysomnography (PSG) was performed or an immediate tracheostomy was necessary due to upper airway obstruction. The PSG consisted only of cardio-respiratory measurements. According to the standard criteria the apnoea-hypopnoea index (AHI) was used to divide OSA in mild, moderate and severe.

Results
In a ten-year period 66 children were diagnosed with RS. In 27 infants (41%) a clinical PSG was done whereas in 5 infants (8%) immediate tracheostomy was necessary within 30 days after birth. The mean age at PSG was 107 days (range 5-348 days). Results from the PSG were: 6 normal (22%), 3 immature breathing patterns (11%), 2 upper airway resistance syndromes (7%) and 16 OSA (59%). Concerning classification of OSA: 3 were mild, 4 moderate and 9 severe. The average AHI was 16,3 (range 1,0 – 56,0). The average oxygen desaturation index (ODI) was 15,4 (range 2,0 – 40,0).

Conclusion
PSG showed abnormalities in 78% of the recordings and OSA was seen in 59% of the infants. These results show the high prevalence of sleep disordered breathing in infants with RS and support the importance of screening of breathing disorders with PSG in infants with RS.

THE DIFFERENCE OF POLYSOMNOGRAPHY BETWEEN MAN AND WOMEN, YOUNG AND OLD PEOPLE IN OBSTRUCTIVE SLEEP APNEA GROUP.

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Objectives

The aim of this study was to investigate the influence of gender and age on the polysomnographic differences between men and women with obstructive sleep apnea.

Materials and Methods

A retrospective review of the 128 consecutive snoring patients (98 males, 30 females) suspected of OSA was performed. Polysomnography was performed for each patient. Comparisons of polysomnographic parameters between genders and age were performed using Mann–Whitney U-tests.

Result

OSA was diagnosed in men about three times more often than in women. Women were significantly older but were not heavier than men.

Sleep structure showed no significant differences between men and women except that men had more stage 1 and women had more stage 2 sleep respectively.

The apnea hypopnea index (AHI) and that in non-rapid eye movement sleep were higher in men, but in rapid eye movement sleep AHI in women was not different to men.

The total and respiratory arousal indices (AI) and oxygen desaturation index (ODI) were higher in men than in women.

The AHI were increased as one grows older.

Conclusion

The more stage 1 sleep and the greater AHI, AI and ODI in men suggest that sleep quality may be worse in men than in women patients.

A SEVERE OCULAR COMPLICATION OF OSAS DUE TO MANDIBULAR RETHROGNATHIA

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Keywords: bilateral central retinal vein occlusion, obstructive sleep apnea syndrome

Abstract:

Introduction

We report a case of a severe ocular complication of OSAS due to mandibular rethrognathia. Bilateral central retinal vein occlusion (CRVO) has been never reported as the primary manifestation in patients with obstructive sleep apnea syndrome (OSAS). The severe retinal vaso-occlusive diseases can cause severe damage to visual function in spite of treatment.

Materials and Methods

A 52-year-old Italian man presented with bilateral visual loss (BCVA was 20/200 in both eyes). The diagnosis of bilateral CRVO was suggested by the ocular presentation, fluorescein angiography images and OCT values (macular thickness - right eye: 820 microns; left eye 740 microns). Clinical evaluation and laboratory studies were negative for conventional risk factors. An internist was consulted for proper evaluation and management of any systemic medical problem and an appropriate medical workup was conducted.

Results

Physical examination and blood screening were negative for known etiologies of retinal vaso-occlusive disease. The medical interview disclosed a history of frequent nocturnal arousals, snoring, excessive daytime sleepiness, sexual dysfunction and hypertension. The diagnosis of OSAS was suspected on the basis of patient's history and confirmed by polysomnography and extensive ENT evaluation. Diagnosis of severe OSAS due to mandibular retrognathia was made.

Discussion

OSAS is a very common disease and has recently been increasingly incriminated in the initiation and progression of numerous cardiovascular, neurologic, and ophthalmologic diseases. Bilateral central retinal vein occlusion has never been reported as the primary manifestation in patients with OSAS. In conclusion the local and systemic effects of OSAS could explain, in some patients, the occurrence and/or the aggravation of retinal vein occlusion (RVO). In patients with CRAO, OSAS should be considered since the retinal vaso-occlusive disease may manifest as the primary symptom. Therefore, we recommend that a polysomnography evaluation and accurate ENT examination be conducted regularly in patients with vaso-occlusive retinopathy a no other conventional risk factors.

ANATOMICAL ANALYSIS OF STUFFY PATIENT WITH SNORING

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Introduction

The stuffy patient with snoring is common. After septal surgery, snoring symptom is improved often. So when evaluating patients with snoring for septoplasty, it is important to assess for nasal airway obstruction.

Objectives

In this study, we evaluated the relationship between subjective nasal obstruction and the corresponding anatomic nasal parameters in patients with nasal obstrtuction and snoring using PNS CT so as to acquire better result.

Methods

Between July 2008 and March 2011, A total of 264 patients who underwent PNS CT imaging for preoperative evaluation were divided into 2 groups; 197 patients with nasal septal deviation who underwent septoplasty with nasal obstruction and snoring were enrolled in the study group and 67 patients without nasal septal deviation who underwent transsphenoid pituitary tumor operation without nasal obstruction were enrolled in the control group.

The subjective nasal obstruction was measured by NOSE scale and NO-VAS.

A preoperative coronal CT image was used for calculation of both nasal cavity cross-sectional areas at the three level of the internal nasal valve, ostiomeatal unit(OMU) and choana and used for calculation of septal deviation angle at the two level of internal nasal valve and OMU in both the study and control groups.

We compared cross-sectional areas and septal deviation angles derived from both groups and evaluated the relationship between subjective nasal obstruction and the anatomic nasal parameters in the study group.

Results

In the study group, there was correlation between subjective nasal obstruction and the septal deviation angle, the sum of both nasal cavity cross-sectional areas and the larger area of both nasal cavity cross-sectional areas respectively at the OMU level. And in the same group, there was correlation between subjective nasal obstruction and the sum of both nasal cavity cross-sectional areas, the larger area and the smaller area of both nasal cavity cross-sectional areas respectively at the choana level. There was a difference between the study group and the control group in all anatomical nasal parameters(septal deviation angle, the sum of both nasal cavity cross-sectional areas and the area gap between both nasal cavity cross-sectional areas) at the three level of internal nasal valve, OMU and choana.

Conclusions

This study indicated that the septal deviation angle and nasal cavity cross-sectional areas at the level of OMU and choana are related to subjective nasal obstruction. So when we evaluate nasal obstruction in patients with snoring, the middle and posterior part patency of nasal cavity is also important along with anterior nasal valve part.

POLYGRAPHY VS. POLYSOMNOGRAPHY: MISSING OSAS DIAGNOSIS IN SYMPTOMATIC SNORERS – A WAKE-UP CALL FOR CLINICINAS

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Introduction

Polygraphy (PG), or ambulant sleep apnea recording, is a common method for diagnosing obstructive sleep apnea syndrome (OSAS) because it is easy to use and cost-effective. However, PG does not measure sleep as polysomnography (PSG) with EEG, EOG, and EMG does, thus the arousals caused by airflow limitation are not shown.

Objectives

To investigate the usefulness of PG in diagnosing obstructive sleep apnea syndrome (OSAS) in sleepy/tired snorers compared to polysomnography (PSG), with different definitions of hypopnea criteria.

Methods

187 sleepy/tired snorers, median age 44 (range 17–70), had undergone ambulant PG considered to be normal, using AASM´s hypopnea criteria A. After approximately 7 months, in-lab PSG was performed using AASM´s hypopnea criteria B, where arousals are also recognized. Validated questionnaires (ESS, HAD, and self-rated general health) were answered. In a subgroup of 70 consecutive patients, the sensitivity and specificity were calculated for the flow limitation index (FLI) and flattening index (FlatI) in PG, compared with the respiratory distress index (RDI) in PSG.

Results

At PSG the median RDI was 11.0 (range 0–89.1). 90% had OSA and 64% had moderate OSA. The sensitivity and specificity were low (< 70%) for FLI and FlatI. The patient group rated high anxiety and depression, as well as low general health. The gender distribution was even.

Conclusions

PG is not useful for diagnosing OSA when the respiratory events are mainly associated with arousals. When PG is "normal" and patients have symptoms of snoring and sleepiness/tiredness, a full-night PSG should be offered. These patients experience low general health and are therefore a concern for society.

ADVANTAGE OF POWER ASSISTED PARTIAL TONSILLECTOMY VS.CONVENTIONAL "TOTAL"TONSILLECTOMY IN THE POINT OF OBSTRUCTED AIRWAY

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Introduction

The conventional „total" tonsillectomy widely performed procedure in Oman, when the airway is obstracted due to adenotonsillar hypetrophy. The unnecessary removal of the tonsilar tissue, put the child into a higher risk for intra and postoperative bleeding and hardly managable pain. Any postoperative complication also could not be easily assessed due to the high distance of healthcare providers and poor ambulance service.

Materials and Methods

In 2002, Dr. Koltay and his colleagues introduced a new method, using endoscopic microdebrider to „shave off" those parts of the lymphatic tissue, which are markedly blocking the airway and keeping its function unremained. Kaahlan et al. in 2007 with histopathology method, showed faster healing and less pain, then electrocautery. Since 2007 in the USA, the partial tonsillectomy is performed in outpatient condition and the patient is discharged in the same day.

In our current study, we introduced the new method and confirmed that the power assisted partial tonsillectomy (n=32) vs. conventional tonsillectomy (n= 139) is causing less pain, faster recovery time and lower postoperative complications.

Results

We have found, this new technique is safe and reliable. We have not had any problem with chronic infection of the remaining tonsils in any of the cases, that were treated so far.

Conclusion

We are planning to implement the use of power assisted partial tonsillectomy instead of conventional total tonsillectomy in the case of obstructing adenotonsillar hypetrophy widely in Oman.

HIGH PREVALENCE OF SLEEP BREATHING DISORDERS IN ORTHODONTIC PATIENTS

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Introduction

The etiology of obstructive sleep apnea (OSA) is multifactorial. Even in children where large tonsils and adenoids are often major contributors, other factors particularly orthodontic issues exist. For example morphologic features related to a long and narrow face (dolichofacial, high mandibular plane angle, narrow palate and significant crowding in the maxilla and mandible) have recently been found.

Objective

We therefore hypothesized that sleep disordered breathing would be much more prevalent in orthodontic patients.

Methods

Patients (or their parents on behalf of their children) attending the Orthodontic Department of the Sydney Dental Hospital who had known orthodontic issues requiring treatment were surveyed (after obtaining consent) using a validated questionnaire (Bruni Sleep Disturbances Scale for children). This is part of a larger study.

Results

Thus far 22 patients aged 11 to 16 have been surveyed (aim > 150). Mean age was 13.2 (+/-2.7). Mean BMI was 22.4 (+/-3.6). Thirteen patients were male. Focusing on the Bruni questions 13, 14 and 15 which relate specifically to sleep breathing disorders, there was a high likelihood of sleep breathing disorders with 55% scoring 7 or more.

Conclusions

Childhood prevalence of OSA is estimated to be 2-4%, with habitual snoring as high as 20%. However, this study has shown significantly higher levels of likely sleep breathing disorders in this orthodontic population, although patient numbers are currently small. Nevertheless, if the complete study confirms this high prevalence then greater awareness of this vulnerable population is needed to reduce neurocognitive and potentially cardiovascular morbidity. Future research to subcategorize the specific orthodontic complaints, perform polysomnography on these patients as well as evaluating whether the sleep breathing disorder is ameliorated following orthodontic treatment is ongoing.

COMPUTED TOMOGRAPHY IN THE EVALUATION OF RAPID MAXILLARY EXPANSION: SKELETAL EFFECTS IN OSAS CHILDREN

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Introduction

OSAS patients show craniofacial abnormalities involving both the jaws as well as skeletal structures of the dynamic breathing space.

Objectives

Children who suffer from respiratory problems and obstructive sleep apnea (OSA) commonly exhibit disturbances of craniofacial morphology. A significant number have nasal obstruction associated with a narrow maxilla; maxillary constriction may increase nasal resistance and after the tongue posture, leading to narrowing of the retroglossal airway and OSA .Our aim is to identify the real anatomic changes after R.M.E. treatment, which allows functional improvements.

Methods

14 children (with a case history of oral breathing, snoring and night time apnoeas were studied.) An orthognathodontic investigation was performed using X-rays that included not just the usual examinations (postero-anterior cephalographs, and intraoral X-rays) but also computed tomographic scans. All the investigations, except Tc Dentascan, were carried out before the orthodontic therapy (pre-treatment T0), after one month (T1) with the device still on, and four months after the end of orthodontic treatment which lasted 6-12 months.

Tc Dentascan was carried out only before treatment (T0) and after about twenty-thirty days (at the end of active expansion (T1)) with the device still on.

Exams were performed with a Multislice Speed Plus CT scanner (GE) equipped with Dentascan Reconstruction program from the same company. The scanning technique consisted in a preliminary scan performed in the anteroposterior (AP) and laterolateral (LL) projections, with the following acquisition parameters: 80 kV, with 20 mA. The standard maxillary study has been modified increasing the scan number to the half of maxillary sinus; each study has been completed with MPR and volume rendering reconstruction.

In all treated cases the authors obtained an opening of the midpalatal suture.

Results

In all treated case we obtained, as it always happens in our cases, an opening of midpalatal suture to whom follow anatomic changes: the interincisive space increased in width and all cross-section diameters increased at intermolar and intermaxillary level. CT volume rendering of maxilla pre and post RME shows that the expansion occurs not only in the maxillary arch but also in the nasal cavity.

Conclusion

Our findings clearly show a significant increase at cross sectional level that allows a relevant improvement in nasal airflow. Increasing of upper jaw cross-section clearly affects the nasal cavities and it is just this anatomic change which brings about an increased patency of the upper airways. This is also the basis for the positive effects induced by Rapid Maxillary Expansion on the respiratory function.

COBLATION ASSISTED TONGUE BASE EXCISION – A NOVEL TECHNIQUE

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Introduction

Management of tongue base for Obstructive Sleep Apnea (OSA) has been a challenge over the years. Many techniques have evolved to address this particular problem with its own advantages and disadvantages. In many centers, volume reduction of Tongue base is performed by direct coblation of the midline dorsal tongue base. This could be some times tedious and time consuming. A modification of volumetric tongue base reduction has been described in this article

Objectives

To design a less time consuming but more effective way of achieving volumetric tongue base reduction.

Materials

34 patients with diagnosis of OSA (by Polysomnography) who could not tolerate CPAP were identified. Friedman's Staging and Sleep Endoscopy were used to identify the site/ level of obstruction. 14 out 34 patients had high tongue base obstruction along with palatal level obstruction. 11 out of 14 tongue base obstruction were dealt with classical tongue base coblation. 3 out of 14 underwent the new technique in which the tongue base was excised using coblator instead of ablation. Doppler of tongue base was done in all patients preoperatively to identify the location of neurovascular bundle. Its course was marked over dorsum of the tongue. In classical technique, the coblator Evac 70 wand was used to gradually ablate the tongue base tissue in the midline of tongue just posterior to foramen cecum. It is a slow technique were in tongue base is coblated millimeter by millemeter. Instead in new technique, the desired dimension was marked over the posterior tongue base. After initial coblation of the margins of the marked portion of tongue, an Allis forceps was used to hold the tongue base that needs to be excised. Using coblator with setting of 9 and 5(ablation and coagulation respectively) a large chunk of tongue more than 2.1cm in vertical dimension and 2.6cm in horizontal dimension was removed in the midline dorsum of the tongue. Care was taken not to go too deeper as dissection was proceeded to lateral tongue base, werein the neurovascular bundle would be more superficial.

Results

A more effective reduction was quickly achieved in the novel technique. The chance of clogging of the coblator wand that happens during the traditional tongue base ablation did not occur in the novel technique. All the 3 patients recovered well postoperatively. The tongue discomfort lasted for 4 days. None of the three patients developed any infection or bleeding at the site of surgery. Post operative endoscopy at one week showed a pale yellowish healing mucosa over the operated site. The second week post operative endoscopy showed a healed tongue base.

Conclusion

Tongue base can be excised with the coblator instead of slowly ablating the midline tongue base. This will give very effective tongue base reduction. Furthermore, this procedure would be quicker than traditional technique. Ofcourse this technique has to be validated with a study with larger sample size.

AUTOADJUSTING PAP OR PRESSURE CHANGE OF FIXED CPAP IN PATIENTS WITH SEVERE OSA AFTER ADEQUATE CPAP TITRATION.

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Introduction

Autoadjusting positive airway pressure (APAP) might be an alternative treatment to fixed continuous positive airway pressure (CPAP). However, APAP showed no superiority to fixed CPAP titrated during polysomnography (PSG) in terms of patient preference and even in selected patients like those with a high within-night variability in pressure requirement.

Objectives

We evaluated the mode of delivery and modification of positive airway pressure therapy in Korean patients with severe obstructive sleep apnea (OSA) (respiratory disturbance index, RDI ≥ 30 per hour on polysomnography) after adequate CPAP titration in the sleep laboratory.

Methods

After CPAP titration, all patients with severe OSA received for one week either a fixed CPAP or an APAP therapy, followed by the alternative mode therapy using the same APAP machine for one week. Fixed CPAP was set at the level determined during the PSGs. APAP was set to deliver pressure levels ranging from 4 to 18 cm H_2O. At the end of two weeks the mode of PAP therapy was determined considering patient preference and the residual apnea-hypopnea index (AHI) during PAP use and in the case of fixed CPAP use, CPAP level was adjusted by ± 1 cm H_2O during the follow-up period.

Results

The mean age of 55 patients included were 57.2 ± 1.5 years and body mass index (BMI) was 27.7± 4.7 kg/m^2; 87.3% of patients were male. The mean Epworth sleepiness scale (ESS) score was 12.8 ± 5.7 before CPAP titration. The mean value of AHI and RDI was 47.2 ± 17.6 and 51.7 ± 15.3 per hour. Residual AHI and RDI at the PAP determined was 2.1 ± 2.9 and 5.5 ± 5.2, respectively. After two weeks of cross-over use of fixed or APAP, fixed CPAP was chosen in 39 (70.9%) patients and APAP in 16 (29.1%) patients as ongoing treatment.

Among 55 patients, 24 patients (45.5%) required pressures of 8 to 10 cm H_2O for adequate CPAP titration, 13 (23.6%) patients above 10 cm H_2O, and 17 (30.9%) patients below 8 cm H_2O. Therapeutic CPAP could not be determined in one patient. Of the 13 patients with titrated CPAP above 10 cm H_2O, APAP was selected for 4 patients, and of 9 patients using fixed CPAP. CPAP level was decreased by 5 cm H_2O in one patient and by 1 cm H_2O for 4 patients during the follow-up period. Moreover, among 17 (30.9%) patients whose CPAP was below 8 cm H_2O, APAP was selected for 6 patients in terms of patient preference and optimizing residual AHI

during PAP therapy and CPAP level of 3 patients in the remaining 11 patients who selected fixed CPAP was adjusted to increase ≥ 2 cm H_2O. Therefore, nine (52.9%) of 17 patients whose required pressure was below 8 cm H_2O needs APAP or major change in CPAP level.

Conclusions

Even after adequate CPAP titration, APAP or pressure change of fixed CPAP can be considered in patients with severe OSA, especially if their titrated CPAP level is within higher or lower range.

MODIFIED EXPANSION SPHINCTER PHARYNGOPLASTY: SURGICAL TECHNIQUE AND RESULTS

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Introduction

Multilevel obstruction of the upper airway due to the lateral pharyngeal wall collapse is common in OSAS patients. This often causes the failure of the "classical" oropharyngeal surgical treatment even though a good selection of the patients. Expansion Sphincter Pharyngoplasty, a surgical technique introduced by Pang and Tucker Woodson in 2007, has shown a promising success rate in OSAS therapy. However, we found a high rate of post-operative complications during our initial experience with the technique. Therefore, we introduced some modifications in order to reduce complications and improve post-operative results.

Objective

In this study we describe our modification of the surgical technique and related results as an isolated treatment for OSAS.

Methods

From December 2009 to February 2012 41 patients suffering from moderate/severe OSAS underwent to this surgery. The procedure consists of bilateral supero-laterally rotation of the palatopharyngeus muscular flaps and suture on to soft palate musculature to create lateral wall tension and reduce the bulk of the lateral pharyngeal wall. The palatal muscles and the uvula are completely preserved at the end of the procedure.

The inclusion criteria were a complete oropharyngeal lateral wall collapse and absence of hypopharyngeal obstruction at videosleependoscopy. The mean AHI was 33.3/h, the mean ODI was 25.4/h, the mean age was 42.7 y, the mean time of SAT<90% was 11.1%. Ten out of 41 included in the study were non compliant n-CPAP patients (24.3%).

Results

The polysomnografic control was performed at 3 and 6 months after surgery.

The mean postoperative AHI was 11.7/h, the mean ODI was 10.6/h and the mean postoperative time of SAT< 90% was 4.6%. Selecting a threshold of AHI index inferior to 15 without co-morbidity, or AHI<5 in patients with co-morbidity, the observed success rate was 70%. No dysphagia, or swallowing disturbances were referred. Only 3 cases of bleeding from tonsillar fossa were reported.

Conclusion

Modified Expansion Sphincter Pharyngoplasty is a safe and effective surgical procedure in selected moderate to severe OSAS patients, characterized by lateral pharyngeal wall collapse. This procedure resulted to be of particular interest also in n-CPAP failure. Our technique modifications preserve the anatomy and function of velum and uvula with promising success rate both in AHI reduction and daytime symptoms.

MULTI LEVEL UPPER AIRWAY IMPLANTS FOR TREATMENT OF OBSTRUCTIVE SLEEP APNEA: TOLERANCE IN CANINES AND FINITE ELEMENT ANALYSIS OUTCOMES.

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Introduction

Obstructive sleep apnea (OSA) is a common medical condition. Although multiple treatment options exist, novel approaches are needed.

Objectives

To evaluate the tissue response to a novel, minimally-invasive and implanted device in the canine soft palate and tongue and to examine upper airway changes with finite element analysis.

Methods

The implant is designed to support the tongue and soft palate using a spring-like, silicone rubber material. Eighteen canines were implanted under general anesthesia, with implants inserted into the palate (36) and the right and left sides of the tongue (32 total). Histology was evaluated in a sub-group (5/18) at 14 weeks, 6 and 12 months. Finite element analysis (FEA) uses sophisticated mathematical techniques to model soft tissue changes and dynamic airway behavior to predict and optimize implant placement. Ethics committee review and approval were obtained.

Results:

All implants were well tolerated with normal canine behavior, swallowing, and oral intake without airway obstruction noted over 1 year of follow-up. Complications were uncommon (3/64 implants) and were limited to abscess in 1 tongue site, 1 palate implant exposure and 1 palate implant not present two weeks post implantation. At 6 and 12 months following implantation, histological evaluation showed minimal inflammatory or fibrous response along the length of the implant and encapsulation of the implant ends (favorable anchoring in soft tissues). FEA demonstrated favorable implant placement locations and indicated that implant properties were consistent with maintaining airway patency during sleep.

Conclusions

These data support a favorable risk profile for this minimally-invasive, multilevel therapy. FEA also suggests that this approach would prove effective. Future human clinical trials will systematically examine safety, feasibility and effectiveness in humans.

CLINICAL AND POLYSOMNOGRAPHIC EVALUATION OF OBSTRUCTIVE SLEEP APNEA IN ADULT

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Introduction

Prevalence of snoring and obstructive sleep apnea is increasing and there is very little data of combined study of clinical presentation, etiological factors and polysomnographic features of obstructive sleep apnea (OSA) in adult. We therefore carried out a study to evaluate these factors in adult presenting to an ENT clinic.

Materials and Methods

Hundred consecutive patients were referred from the ENT outpatient for overnight polysomnography because of symptoms suggestive of obstructive sleep apnea (OSA). A complete general, physical and systemic and ENT examination, including height, weight, BMI, was conducted.

Results

The age of the patients varied from 20 to 76 years. A male preponderance was noticed (91%). Maximum numbers of the patients were overweight (87%). Most of the patients complained of snoring (87%). The other symptoms noted were Excessive daytime sleepiness (67%); frequent wake-up (50%); Gasping (40%); non-refreshing sleep (31%); Nasal Blockage (29%) and morning headache (18%). Poor work performance was seen in 25%. The upper airway examination (clinical and endoscopic) showed that Inferior turbinate enlargement was the most common cause of upper airway obstruction (80%) among these patients. The other findings were low soft palate (54%), deviated nasal septum (27%), tonsil enlargement (25%), enlarged uvula (6%), polyp (3%) ,big tongue (3%) and enlarged adenoid (3%). Neck circumference was greater then 16 inches in 81% of the patients. Polysomnography showed that 81% patients had OSA. About 86% patients showed significant oxygen desaturation.

Conclusions

In conclusion it can be said that every person who snores and whose neck circumference is greater then 16 inches is a suspected case of OSA. So there should be proper evaluation and management at the earliest to prevent potentially serious complications. Polysomnography is the best method of diagnosis of OSA.

SAFETY IN PERFORMING SINGLE STAGE MULTILEVEL PROCEDURES FOR OSA

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Introduction

Single stage multilevel procedures in the management of OSA has for always been associated with high morbidity and necessity for admission in high dependency units. We present a series of cases post operatively managed in the post operatory recovery and not in the surgical ICU.

Objective

To assess the safety of single stage multi level procedures for mild and moderate osa

Methods

A total of 70 patients from 2009 to 2012 operated at our department for mild/moderate OSA studied retrospectively in whom, multilevel procedures such as septoturbinoplastes; uvulopalatoplasty (classical; modified), base tongue procedures (wedge resection; RF application) were done at a single sitting, all monitored at the post op recovery.

Results

The over all complications were as follows: haemorrhage-10 patients (7%) (nasal and oropharyngeal); 4 patients desaturated requiring CPAP (2,8%), 3 patients had tongue oedema (2,1%). There are other complications reported in the literature in immediate post operative period such as pulmonary oedema etc but we have been lucky to have not seen any of these complications.

Conclusions

Based on our data single stage multilevel surgery for OSA need not be treated as a complicated and complex surgery requiring high dependency ICU care routinely. They can be managed effectively in the post op recovery with good monitoring facilities and if in need can be shifted to an ICU, saving money for the patients.

QUALITY OF LIFE OUTCOMES FOR ADULT OBSTRUCTIVE SLEEP APNEA: COMPARISON STUDY OF UPPER AIRWAY SURGERY, CPAP AND MANDIBULAR ADVANCEMENT SPLINTS

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Background

Treatments for alleviating the symptoms of adult obstructive sleep apnea (OSA) include continuous positive airway pressure (CPAP) therapy, mandibular advancement splints (MAS) and upper airway surgery (UAS). The aim of this study was to measure the long-term quality of life (QOL) improvement following these three treatment modalities.

Methods

Consecutive, simultaneously treated adult patients with obstructive sleep apnea having CPAP (N=83), MAS (N=79) or UAS (N=83) were studied. Glasgow benefit inventory (GBI), change in snoring severity scale (SSS), Epworth sleepiness scale (ESS) and side effects in all three groups were measured at a mean of 34.5months after therapy. CPAP and MAS compliance was defined as use for more than 5 hours each night. The One way ANOVA testing with Bonforroni correction was applied for multiple comparison of treatment groups.

Results

Analysis showed UAS demonstrated a statistically significant QOL benefit over MAS. All three groups showed a significant improvement in SSS with UAS and CPAP groups both significantly better than MAS. There was a significant improvement in ESS in all three groups post intervention but comparison between groups was not statistically significant. Main CPAP side effects reported were air leak, facial discomfort/pressure and nasal congestion. Main MAS side effects reported were temporomandibular joint pain, teeth and gum problems. Main side effects from UAS were temporary (<6 months) speech/voice changes and dysphagia..

Conclusions

All treatment modalities demonstrated improved in QOL, SSS and ESS outcomes. However, patients undergoing contemporary UAS showed a significant improvement in QOL outcomes compared to MAS. UAS and CPAP improved snoring control compared to MAS. This data supports the role for contemporary upper airway surgery when devices fail or are poorly tolerated.

TONSILLOTOMY OF OSAS TREATMENT CONFIRMED BY POLYSOMNOGRAPHY IN CHILDHOOD

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Introduction

Obstructive sleep apnea syndrome (OSAS) in childhood is often caused by hypertrophy of the palatine tonsils. The only objective examination is polysomnography.

Objectives

Recommended method of treatment for hypertrophy of the palatine tonsils with symptoms of OSAS is a tonsillectomy. The goal is to prove that an adequate method of the treatment of OSAS in children with tonsils hypertrophy is a both side tonsillotomy. The study was controled by polysomnography before and after surgery treatment. Determine the effectiveness of the tonsillotomy to apnea pauses and other symptoms caused by this hypertrophy.

Methods

In the period 2006-2012 were examined 50 patients in age from 2 to 10 years old at Pediatric ENT Clinic in University Hospital in Brno and ENT Department in Benešov. All patients have tonsillar hypertrophy more than 50 percent of the pharyngeal space. Positive anamnestic symptoms were apnea and snoring. Overnight polysomnography test of all children had to realized at Pediatric Neurology Clinic in University Hospital in Brno. OSAS were confirmed in 33 patients. The value of AHI were in the range of 1.2 to 42. 17 patients were confirmed only ronchopathy with AHI < 1. Both side tonsillotomy was made in the group of 26 patient.

The control polysomnography was performed between 6 weeks and 3 months after healing.

Results

The group to polysomnographic examination before and after tonsillotomy included 33 patients. 7 patients had AHI =0 after tonsillectomy. AHI value was zero after tonsillotomy in 25 children. Only 1 patient was found AHI of 0,9 (before surgery was AHI 42). No recurrent tonsillitis were found.

No recurrent hypertrophy was found.

Conclusion

Therapeutic effect of tonsillotomy (success rate 94.4%) is comparable with tonsillectomy (success rate in literature 70-90%). Reduction radikality does not change the effect of OSAS treatment, while maintaining the functional part of the palatine tonsils in children age is importance for the development of the immune system and it is the positive effect of tonsillotomy.

SLEEP ENDOSCOPY : MONITORING THE ANESTHETIC DEPTH USING ENTROPY ®

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Introduction

Treatment of obstructive apnea depends closely on the etiology of the upper airway obstruction. In this context, sleep endoscopy has become the golden standard but required general anesthesia. Propofol is the intravenous anesthetic agent of choice, but the level of anesthetic depth remains difficult to define. Indeed, it is mandatory to achieve an adequate sedation level while maintaining spontaneous breathing and avoiding an excessive oro-pharyngeal muscle relaxation.

Objective

This retrospective study evaluated the usefulness of a monitoring of anesthetic depth based on cerebral entropy (Datex Engström, Plano, TX-USA). to achieve the desired anesthetic level.

Methods

Ninety-four patients were evaluated in this study. They were anesthetized with propofol using a target concentration infusion (TCI) system provided by the Diprifusor electric syringe (Alaris, Hampshire,UK) using the pharmacokinetic model of Marsh (1). In each patient the propofol perfusion was started to obtain a plasmatic concentration of 1.5 ug/ml and incremented by steps of 0.5 µg/ml to reach the cerebral concentration associated with snoring. State entropy (SE) was measured at the time of snoring.

Data are presented as median [interquartiles]. Effects of age and BMI on calculated cerebral propofol concentration and SE values was analyzed using a Mann Whitney U test. A $p<0.05$ was considered significant.

Results

	SE	p	TCI propofol (µg/ml)	p
Global population (N=94)	53 [41-66]		1.7 [1.3-2.2]	
Age				
>50 years	60 [47-71]		1.5 [1.2-1.8]	
< 50 years	51 [37-64]	0.191	1.8 [1.3-2.3]	0.013
BMI				
>25 kg/m²	53 [41-66]		1.5 [1.2-1.9]	
<25 kg/m²	52 [45-69]	0.768	1.9 [1.7-2.5]	<0.001

Age, and body mass index (BMI) influenced significantly calculated propofol cerebral concentration associated with snoring but not the SE value. In obese patients, the weight to be introduced in the pharmacokinetic model is difficult to define. However this parameter significantly influences the targeted concentration that will be obtained. Gender and tobacco use did not have any significant influence on the two measured variables.

Conclusion

Entropy® monitoring appeared to be a better tool to achieve the desired anesthetic depth than the target propofol concentration. These results need to be confirmed by a well designed prospective study.

1. Marsh B, White M, Morton N, Kenny GN. Pharmacokinetic model driven infusion of propofol in children. Br.J. Anesth. 1991; 67 : 41-48.

EXPANSION SPHINCTER PHARYNGOPLASTY (ESP) PLUS ANTERIOR PHARYNGOPLASTY (AP) IN THE TREATMENT OF OSAHS

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Retropalatal airway segment is the main contributor to airway obstruction in sleep apnea. Direct visualization of the pharynx during drug-induced sleep and pathophysiological studies emphasized the role of the lateral pharyngeal wall collapse in the origin of obstructive events. Based on these findings, new surgical techniques which create adequate lateral pharyngeal wall tension to prevent its collapse have been proposed. The expansion sphincter pharyngoplasty (ESP), consists in creating a palatopharyngeus muscular flap and its superolaterally rotation, aimed to stenting lateral pharyngeal wall and increasing retropalatal airway space; the procedure allows to achieve better functional outcome than UPPP on pharyngeal collapsibility without pharyngeal discomfort and swallowing disturbance. The reported success rate in appropriately (video sleep endoscopy) selected patients is 80%. Many patients selected for ESP who present a remarkable redundancy of the soft palate or a narrowing in the upper retropalatal segment, require an additional surgical procedure in order to remove the bulky palatal tissue and stiffen the proximal soft palate. The Anterior Pharyngoplasty, a modified CAPSO (Cautery Assisted Palatal Stiffening Operation)technique used for snoring and mild OSAS treatment and based on removal of a mucosal rectangle of the anterior surface of the soft palate and subsequent suture of the margins with sparing of the underlying muscular plain, allows to obtain this aim avoiding retracting scars with abnormal persistent narrowing at the level of the palate arch as observed in many patient treated with a classic or modified UPPP. Moreover this technique is able to amplify the functional effect of the ESP without additional morbidity. The authors propose a surgical technique that combines the ESP plus AP in patients with OSAHS due to lateral pharyngeal wall collapse and proximal retropalatal narrowing. The video shows the surgical steps and the functional and anatomical outcome of the ESP plus AP in a patient with severe OSAHS caused by retropalatal obstruction.

REVISION PALATOPLASTY BY SOFT PALATAL FLAP: A NEW SURGICAL TECHNIQUE FOR TREATMENT OF FIBROSED POST PALATOPLASTY SOFT PALATE

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Introduction

Many palatoplasty surgeries end with fibrosed soft palate with snoring recurrence and postoperative OSA

Objective

To evaluate the effectiveness of this technique for treatment of snoring +/- OSA in patients with post-palatoplasty narrow oropharyngeal isthmus and posteriorly retracted soft palate.

Methods

In accord with Institutional Review Board approval eighty one Patients were treated with this technique between June 2007 and December 2011and fitting certain preoperative criteria, with minimum follow up period of six months. All patients had preoperative subjective assessment of snoring, daytime sleepiness. Polysomnogram was done for suspected cases of OSA. Main parameters included; subjective improvement of snoring, morphological improvement of the narrowed oropharyngeal isthmus & posteriorly retracted soft palate and postoperative complications.

Results

72 (88.8%) patients were complaining from snoring and mild obstructive sleep apnea while 9 (12.2%) patients were complaining from mild OSA. Snoring cured in 59 (72.8%) patient, improved in 14(17.2%) patient and failure occurred in 8 (10%) patients. subjective improvement in OSA occurred in 7 (77.7%) patient, while no improvement occurred in 2 (22.3%) patient. Morphological improvement of the narrowed oropharyngeal isthmus achieved in 63 (77.7%) patients. No patient demonstrated clinically significant postoperative velopharyngeal incompetence after 6 months follow up. No major perioperative complications occurred.

Conclusion

This new surgical technique may be an effective and safe method for selected patients with snoring +/-OSA and narrow oropharyngeal isthmus after uvulopalatoplasty surgeries. The procedure has promising results regarding snoring cure or improvement, anatomically sound and has minimal complications.

IT SHOULD BE A: SNORING CLINIC

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Introduction

Preoperative accurate assessment is the key of success in snoring and OSA patients. A lot of patient loss their way during referral from one clinic to the other during assessment and treatment plan process.

Objective

To introduce the concept of snoring clinic team as a routine daily evaluation of snoring and OSA patients.

Methods

Two hundreds and fifteen patient included in this study between January 2011 and January 2012. The idea of snoring clinic was introduced to the high committee of the hospital for discussion and approval 2 months before the start. Communications between different specialties related to the clinic were established and a common outpatient evaluation sheet with treatment plan protocol was finalized. Follow up for patient progress and satisfaction was observed throughout the study period.

Results

192 patients complete the study. 123 (64%) patients were simple snorers; 92 (74.7%) of them were having positive nose and soft palate and 31 (25.3%) were having nasal problems only; while 69 (36%) patients were having OSA;11 (16%) were having mild to moderate OSA, 18 (26%) were having moderate to severe OSA and 40 (58%) were having sever OSA. DISE was done for patients having mild to moderate &moderate to severe OSA. BMI was calculated; 25-30 in 116(60.4%) patients, 30-35 in 54(28%) patient, 35-40 in 22(11.6%) patients. Cephalometry was positive in 5 (2.6%) patients. Simple snorers were treated with single stage nasal and soft palatal webbing flap or nasal surgeries alone. CPAP was done for 40 (48%) patients. Sphincteric lateral pharyngotomy was done in 9(13%) patients. radiofrequency tongue base reduction was done in 20 (29%) patients. 21 (10.9%) patients under went sleeve operation.

Conclusion

To go through organized clinical pathway is very important to avoid unnecessary snoring surgeries especially platoplasties and to avoid patient confusion and loss Snoring clinic team is gaining more patient satisfaction and saving too much time for both patients and doctors.

MANDIBULAR ADVANCE INTRAORAL APPLIANCES. REVISION.

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Abstract: In the last years, intraoral appliances have been considered a valid alternative for treating certain types of upper airway obstructions.

There is today a large number of brands and trademarks of different appliances. Those of fixed and adjustable mandibular advance prevail. Their action consists in increasing the pharyngeal area and preventing the tongue and soft palate collapse while sleeping. According to literature, with these appliances a reduction of about 60% in the index of apnea/hypoapnea is achieved, the response rate is of 60%, and the overall patient acceptance is of above 80%. These figures are comparable to those of positive pressure appliances (CPAP) for breathing disorder treatment during sleep; and better than these in patient acceptance and with considerably less secondary effects.

SURGICAL TREATMENT OF SLEEP RELATED BREATHING DISORDERS: HANDLING OPTIMIZATION USING DRUG INDUCED SLEEP ENDOSCOPY

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Introduction

Surgical procedures for sleep related breathing disorders (SRBD) are vast and common.
Outcomes can though present variability, as it is a multifactor problem, and techniques are very poorly standardized. Drug induced sleep endoscopy (DISE) is a valuable tool as it can indentify with more precision the origin of the trouble(s) and therefore it guides the indication and also the procedure. We wanted to correlate our outcomes using the DISE to those commonly reported in the literature, and evaluate the eficiency of the whole procedure and the amelioration that it could bring.

Method

We retrospectively analyzed 22 patients by DISE selected (15 male, 7 female subjects) suffering from SRBD. Mean age was 53,4 years. Selection and indication was based on polysomnography and DISE and initial office treatment indication was reevaluated after all of the subjects underwent DISE. We then performed surgery applied to the obstructive zone indentified by DISE. Tonsillectomy with veloplasty were selected in 9 cases, multilevel or elective radiofrequency in13 cases.
Patients performed control polysomnography 6 months after surgery.

Results

Mean AHI decreased from 17,2/h to 8,9 /h($p=0,02$), Mean snoring % time decreased from 28,3 to 20,6 % ($p=0,02$). Success whas reached in 15 cases (68 %). We observed 7 failures (32 % - $p< 0,05$). Subjective snoring score was significantly reduced and quality of life score significantly raised. Patients presented no major complications.

Conclusion

SRBD surgical handling is optimized by the use of DISE. DISE is an useful tool. Combined to polysomnography, it helps us selecting patients who will underwent surgery, or not, benefit from CPAP, or mandibular propulsion device. It also permits a better understanding of the trouble in a dynamic way and therefore, raises up the surgical success by orienting the indication and the technique.

TREATMENT OF OBSTRUCTIVE SLEEP APNEA WITH A NOVEL HYPOGLOSSAL NERVE STIMULATION SYSTEM: SINGLE CENTER EXPERIENCE WITH RECRUITMENT, SCREENING AND ENROLLMENT

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Introduction

Positive airway pressure (PAP) has been shown to be effective in treating obstructive sleep apnea (OSA). However, PAP is often poorly tolerated with poor patient usage. Thus an ongoing issue for clinicians is providing alternative, effective treatments for OSA. In feasibility studies, stimulation of the hypoglossal nerve (HGN) has shown promise as an effective treatment. We report a single center's experience in assessing participants for a randomised controlled trial of a novel HGN stimulation (HGNS®, Apnex Medical, Inc) system.

Objective

To report on the characteristics of patients seeking an alternative therapeutic option for treating OSA and to describe the clinical process for identifying and preparing appropriate participants for this therapy.

Methods

Potential research subjects were identified from the clinic patient population at the Austin Hospital, a newspaper article and direct referrals from sleep physicians. Research volunteers were pre-screened for history of CPAP failure/intolerance and body mass index ≤35 kg/m2. Individuals and their partners were then invited to attend group information sessions conducted by the study physician and research co-ordinator. These sessions were tailored to provide detailed information on the device and how it works, the surgical procedure, follow-up visits and issues associated with having a permanently implanted medical device. Those who chose to progress were then further evaluated clinically, which included a complete medical history and physical examination, in-lab overnight polysomnography and nasoendoscopy.

Results

Since September 2011, our research center has contacted 220 patients from our database of patients started on CPAP therapy in the past 2 years and 890 people telephoned us following a small informative article in a tabloid newspaper in December 2011. Of those from the CPAP database, 100% were eligible at pre-screening, 20% were interested in receiving further information and 1% have been implanted. Of those who contacted us after the newspaper article, 69% were eligible at pre-screening, 69% were interested in receiving further information and to date 2% have been implanted.

The baseline demographics of implanted subjects are: 82% male, 54±9 years old and a baseline AHI of 34±14 (2007 American Academy of Sleep Medicine alternative definition). Complete baseline clinical data on all enrolled and randomized participants will be presented.

Conclusions

At our center, there was a high degree of interest in participating in this clinical trial with over 1000 individuals evaluated for participation in a 10 month period. Many potential participants who initiated contact with our research office were still using CPAP for 2 – 4 hours per night, but very keen to try an alternative form of therapy. These individuals were not enrolled in the study. To date we have consented and completed screening for 44 participants of whom 17 have passed screening and progressed to implantation of the HGNS system.

FURTHER OBSERVATIONS BETWEEN NEUROPSYCHIATRIC DISORDERS AND OSAS

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In a previous work (2003) the AA. evidentiated the frequent occurrence of neurological disorders, expecially an anxious-depressive chronic state, in 19 of 118 patients (16,10%) suffering from Obstructive Sleep Apnea Syndrome (OSAS). These clinical data were confirmed after a 3-year-follow up and a similar clinical evidence was found in 197 new patients admitted to the study. Preliminary results showed the coexistence of tension-type headache, diagnosticated by IHS criteria, and OSAS in 87 patients (44,16% of 197 cases) whereas a weak relation appears to exist between depressive mood-disorders and nocturnal apneas (126 patients, i.e.63,96 % of all 197 depressive patients).

In 48 patients (24,36% of 197 cases) a depressive mood-tension type headache (TTH) was associated to OSAS. In a previous work on 2003, we studied the possible association with some neurological disorders, expecially anxious-depressive chronic state and the coexistence of nocturnal sleep apnea episodes. Continuing in this follow-up and enrolling incoming patients, we have noted the coexistence of the previously noted association.

As preliminary results, the coexistence of tension-type headache, diagnosticated by IHS criteria, and OSAS emerges in 87 patients/197 (45,07% of total patients),whereas a tighter relation appears between depressive mood-disorders and nocturnal apneas (126 patients - 63,96 % of all depressive patients).

In 48 patients (24,36%) coexists depressive mood-tension type headache (TTH) and OSAS.

A COMPREHENSIVE REHABILITATION PROGRAM TO IMPROVE SLEEP APNOEA SYNDROME. A PILOT STUDY

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Keywords: Individualized exercise training, metabolic syndrome, OSA syndrome, visceral fat

Introduction

Obstructive sleep apnoea/hypopnoea syndrome (OSAS) is a prevalent sleep disorder particularly among middle-aged, obese men strongly associated with metabolic syndrome (MS). Sedentary life leads to visceral fat accumulation and MS. Exercise training is an effective therapy to reduce visceral fat accumulation and to prevent or treat MS patients. Exercise training improves cardiovascular compartments and exercise capacity. Recently a randomized controlled trial have shown a modest but clear effect on OSAS severity of exercise training alone (Kline CE, Sleep 2011).

Objectives

The objective of this randomized controlled trial study is to determine the benefits of a short inpatient individualized exercise training (IET) program in sedentary obstructive sleep apnoea patients with altered metabolic status.

Methods

Twenty-two patients with moderate to severe OSAS (Apnoea-Hypopnoea Index (AHI)>15/h) were randomly assigned either to one month education activity sessions (n=11, control) or to inpatient rehabilitation program (n=11) including IET, education activities sessions and dietary management.

Full polysomnography, mean sleep latency (MSL) by an Osler test, body composition with bio-impedance analyzer, anthropometric measurements and MS components were performed at baseline and at study end point.

Results

Patients randomized to IET group had a significant decrease in OSAS severity from baseline measure (AHI: 28.0 +/- 19.3 vs. 40.6 +/- 19.4 events/h; p<.001; Desaturation index: 17.6 +/- 13.2 vs. 23.1 +/- 15.8 events/h; p<.01), in anthropomorphic measurements, fasting glycemia and diastolic blood pressure. Change in fat mass and neck circumference correlated inversely with changes in AHI. No change occurred in the control group in all variables.

Conclusions

IET significantly reduces OSAS severity with improvement of MS components. IET within a comprehensive rehabilitation program could represent a real prospect of treatment for moderate to severe OSAS with metabolic co-morbidities.

RANDOMIZED CLINICAL TRIAL EVALUATING COMBINATION THERAPY WITH SLEEP POSITION TRAINER AND MANDIBULAR ADVANCEMENT DEVICE IN RESIDUAL POSITIONAL SLEEP APNEA PATIENTS

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Introduction

Positional sleep apnea (POSA), defined as having a supine apnea/hypopnea index (AHI) of twice or more as compared to the AHI in non-supine position, occurs in about 56% of patients with obstructive sleep apnea (OSA). Therefore, avoidance of supine sleeping position can be crucial where appropriate. To this goal, a new chest-worn device (NightbalanceTM, Delft, the Netherlands) was developed: it consists of an active sensor that continuously monitors sleep position and offers a soft variable vibration when in supine position. Oral appliances, such as mandibular advancement devices (MAD), have proven to decrease the AHI, although often resulting in a residual supine OSA. Up to this date, the combination of a sleep position trainer (SPT) and MAD treatment has not yet been investigated.

Objectives

The objective of this study was to assess the efficacy of combination therapy of SPT and MAD in patients with residual POSA, as well as the efficacy of each treatment (MAD and SPT) individually.

Methods

A randomized clinical trial was set up that compared the efficacy of combination therapy of MAD and SPT, and the efficacy of both treatments individually.

Eight patients with residual POSA under MAD treatment (age: 49 ± 9 y; men/women: 4/4; AHI: 25.3 ± 16.1 /h; Supine AHI 36.1 ± 19.1 /h, Non supine AHI 11.9 ± 9.3) were selected. Baseline PSG and follow-up PSG with MAD were performed and selected patients were invited for 2 consecutive sleep studies in a randomized order: 1/PSG with SPT and 2/PSG with the combination of SPT and MAD. Ethical committee approval for this study was obtained and patients gave written informed consent. To compare the outcome measures of the different sleep studies (baseline PSG, PSG with MAD, PSG with SPT and PSG with SPT + MAD), a Friedman test was performed.

Results

The results of this randomized clinical trial are summarized in Table 1. The SPT was effective in reducing the time spent in supine position compared to baseline, from 36±26% to 0.3±0.4% (p=0.043). The time in bed (TIB) in supine position with the combination of SPT and MAD was also significantly lower when compared to baseline (p=0.043).

Both MAD and SPT were individually effective in reducing AHI values significantly when compared to baseline (Table 1). The combination of SPT and MAD therapy further reduces the OSA severity statistically when compared to both MAD alone (p=0.012) and SPT alone (p=0.036) (Table 1).

Table 1: Results of the different sleep studies

	Baseline PSG	PSG with MAD	PSG with SPT	PSG with SPT + MAD
AHI (#/h)	25.3 ± 16.1	9.9 ± 3.9*	11.5 ± 10.8*	5.0 ± 5.0*,+,-
AHI supine (#/h)	36.1 ± 19.1	19.4 ± 7.2*	13.4 ± 32.3	5.5 ± 10.1*,+
AHI non supine (#/h)	11.9 ± 9.3	3.7 ± 3.1*	11.4 ± 10.8+	4.5 ± 3.8*,-
% TIB in supine position	36 ± 26	41 ± 15	0.3 ± 0.4*,+	3.7 ± 9.1*,+

*: **statistically significant (p < 0.05) as compared to baseline**

+: **statistically significant (p < 0.05) as compared to PSG with MAD**

-: **statistically significant (p < 0.05) as compared to PSG with SPT**

Conclusions

Positional therapy is effective in reducing the AHI. The preliminary results of this randomized clinical trial indicate that the combination of a sleep position trainer and oral appliance therapy leads to a statistically significant higher reduction in AHI as compared to the therapeutic effect of each of the individual treatment modalities.

SENSORY AUDITORY HAIR CELLS ALTERATIONS AND RETINAL NERVE CHANGES DUE TO OSAS

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Keywords: nerve fiber layer, hypoxia, imaging/image analysis: clinical

Purpose

Obstructive sleep apnea syndrome (OSAS) is responsible for the reduction of oxygen saturation in arterial blood (SaO2) and therefore hypoxia; they are the direct consequence of the repeated episodes of partial or complete upper airway obstruction. Hypoxia can result in damage to the neurosensorial structures both visual and cochlear. The aim of this study was to evaluate the effect of hypoxia on the cochlear external ciliated cells and the retinal nerve fiber layer in patients with severe OSAS.

Methods

28 patients, 17 females and 11 males, with severe OSAS (AHI>30) were studied; their ages were between 35 and 70 years (mean age = 48.03). The OSAS group was compared with a control group consisting of 20 without OSAS (AHI<5), their ages were between 40 and 75 years (mean age = 52.19). Each patient was subjected polysomnographic examination, pure-tone audiogram (PTA), transient evoked acoustic emissions (TEOAE), distortion product otoacoustic emissions (DPOAE) and retinal nerve fiber layer evaluation (RNFL).

Results

PTA was within normal values in both ears of all patients. 21 out of 28 OSAS patients presented pathological TEOAE and DPOAE with a significant reduction in the amplitude of the DP-gram for frequencies 3.0 and 4.0 kHz (P=.004). Moreover we found a positive correlation between AHI, TEOAE and DPOAE with an increase in the AHI associated with an increase of cochlear damage. The thickness of RNFL was reduced in patients with OSAS compared to controls. The mean RNFL thickness was 103.13 ± 5.9 μm in glaucomatous eyes, less than in normal (110.11 ± 7.3 μm) with no significant statistical difference between the two study groups.

Conclusions

Chronic hypoxia may be responsible for a damage to cochlear external ciliated cells and retinal nerve fiber layer alterations. Otoacustic emissions and RNFL can be considered a valid instrument for identifying subclinical neurosensorial damage induced by hypoxia. CPAP therapy is the treatment of choice to prevent episodes of apneas and hypoxia.

CPAP THERAPY CAUSE OCULAR AND ACOUSTIC DISCOMFORT

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Purpose

Continuous Positive Airway Pressure (CPAP) therapy is considered the treatment of choice for patients with moderate and severe Obstructive Sleep Apnea Syndrome (OSAS). The chronically use of it, every night, prevent the severe cerebro and cardiovascular complications of this pathology. The aim of this study was to determine the impact of ocular symptoms and noise on the compliance to CPAP therapy in patients wearing different types of masks.

Methods

We interviewed 200 patients (mean age= 41,08 years) who had been using CPAP for moderate to severe OSAS (BMI: 32±5 kg/m2; RDI = 49±17/h). Individuals with previous ocular surface diseases, contact lens or ocular drug users were excluded from the study. Patients were divided into two groups: 93 (group A) wore full face mask, while the rest 107 (group B) wore an nasal mask. The CPAP titration was 4 cm/H2O for the minimum pressure and 16 cm/H2O for the maximum pressure; relative humidity and environmental temperature and noise were monitored. Each patient answered a questionnaire.

Results

As determined by the questionnaire, 30% of patients included in the study stopped using the CPAP device: 48.7% of group A, 59.3% of group B. Among patients included in group A 61.5% of patients complained ocular discomfort, 27.5% nocturnal device noise; 11% both ocular discomfort and device noise, 5% other reasons. Among patients included in group B, 51.3% complained ocular discomfort, 33.8% nocturnal device noise; 13.7% both ocular discomfort and device noise, 2,8% other reasons. No statistically significant difference between the two groups was found. All these patients stopped the treatment not later than 5 weeks.

Conclusions

Ocular discomfort and nocturnal device noise are the main reasons for early interruption of CPAP therapy. An improvement in CPAP devices is needed in order to improve the compliance of patients to therapy. Artificial tear eye drops might be a useful tool in order to reduce ocular discomfort.

INTER-PTERYGOID DISTANCE AS A PREDICTOR OF SUCCESS IN MODIFIED EXPANSION SPHINCTER PHARYNGOPLASTY

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Introduction

Modified expansion sphincter pharyngoplasty (MESP) is a novel surgical technique designed to improve both retro-palatal collapse and lateral pharyngeal wall stability in OSAS patients. Although no plane indications for this procedure have been reported in the literature, the current main indications are retro-palatal obstruction and lateral pharyngeal collapse pattern.

Objective

The aim of the study was to identify possible clinical indicators of post-operative success.

Methods

Data of patients undergoing MESP at our institution were collected prospectively during the period february 2009 – October 2011 and included clinical features, sleep endoscopy features, Cephalometric measures, CT scan measures, pre and post-operative polysomnographic data. Success was defined as RDI<15 in patients without co-morbidity and RDI<5 in patients with co-morbidity. Univariate analysis was conducted to identify possible predictors of success. Pearson correlation between continuous clinical variables and reduction of the preoperative RDI were explored as well.

Results

39 patients underwent MESP alone and 30 patients MESP plus hyoid suspension. Total success rate was 65.8% (patients not requiring CPAP). No single predictor of success resulted from univariate analysis. Pre-operative RDI ($p<0.001$), pre-operative supine AHI ($p=0.001$), tonsil grade ($p=0.001$) and inter-pterygoid distance measured on CT scan ($p=0.008$) showed a significant direct correlation with the post-operative RDI improvement. Age showed a significant inverse correlation with RDI improvement ($p=0.038$). Interestingly, inter-pterygoid distance maintained a significant correlation with RDI improvement when controlled for hyoid suspension, tonsil grade, age, supine AHI and preoperative RDI.

Conclusions

No significant predictors of success were identified. However, several variables appear significantly correlated to the post-operative RDI improvement. Among these, inter-pterygoid distance measured on CT scan is a promising lateral anatomical parameter not commonly assessed in the routine diagnostic workup, that may be included in the selection criteria of patients fitting the current clinical indications for MESP. Further study on a wider population is needed to confirm these results and to validate a cut-off value for the clinical practice.

MAD SIMULATOR DURING DRUG INDUCED SLEEP ENDOSCOPY IN OSAS PATIENTS: OUR EXPERIENCE AND COMPARISON WITH ESMARCH MANOUVRE

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Introduction

Understanding the sites of upper airway collapse and its pattern is mandatory for non ventilatory treatment decision-making and its efficacy in OSAS patients. The results and clinical outcomes of OSAS patients treated with mandibular advancement device (MAD) can not be adequately predicted using awake parameters.

Objective

The aim of the study is to analyze the changes in pharyngeal airway size both performing DISE with George Gauge bite fork and without it, before the MAD application.

Methods

After an accurate orthodontic assessment and the bite fork registration, MAD simulator was inserted in 16 awake patients before performing DISE. A standard DISE was carried out in all patients using TCI propofol sedation. After registration of parameters with MAD during adequate sedation, the bite fork was removed and a basal DISE parameters were recorded. Finally we performed an Esmarch manuvre gently advancing by up to 5 mm the mandible in order to observe its impact on airway patency and snoring and to compare it with the MAD results. All DISE procedures were carried out by the same, experienced, ENT surgeons team. The endoscopic results, both with and without MAD, have been classified, according to Sher modified staging: site, degree of airway narrowing, and configuration of obstruction.

Results

Preliminary results showed that the pattern of obstruction and snoring can change in a different ways performing DISE with a MAD simulator or with Esmarch manoeuvre, with an increase of retrolingual space due to the anterior repositioning of the tongue base and a stabilization of the lateral walls of hypo-velopharynx.

Conclusion

Several studies have proved that DISE offers possibilities as a prognostic indicator for MAD therapy. Because the response of the airway to MAD is dynamic, DISE could be expected to be a better therapeutic predictor than a static, awake, and frequently upright cephalometric assessment. Performing DISE with George Gauge bite fork gives the advantage to investigate the effectiveness of a repeatable protrusion and vertical opening of the mandible. Furthermore it can be used to produce the real MAD, without changing the parameters of registration. Our results support this technique as a promising additional tool to optimize the oral appliance treatment effectiveness and the patient selection. Further studies are necessary to better understand the effect of MAD on the anatomy of upper airway.

THE USAGE OF PALATAL IMPLANTS FOR OSAS TREATMENT IN PATIENTS AFTER LASER-ASSISTED UVULECTOMY

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Introduction

In case of upper airways' obstruction on the level of soft palate due to its flabbiness, the effectiveness of different uvulotomy methods turns to be insufficient and obstructive episodes remain.

Objective

To evaluate the effectiveness of palatal implants for OSAS treatment in patients after laser-assisted uvulotomy.

Methods

Prospective study included 22 non-obese adults, who still had OSAS findings in spite of previously performed laser-assisted uvulectomy. Preliminarily all the patients underwent cardio-respiratory monitoring and drug-induced sleep endoscopy for detecting of obstruction level. The following examination included the estimation of life quality (LQ, SF-36), intensity of snoring according to visual analogue scale (VAS) and also daytime sleepiness, evaluated by Epworth Sleep Scale (ESS). The study also included rhinomanometry and spirometry. The surgical procedure of palatal implants insertion corresponded to the published method (Restore Medical Inc, Saint-Paul, Minnesota). 3 months after the operation eftsoon cardio-respiratory monitoring and drug-induced sleep endoscopy were made. The effectiveness of treatment was also evaluated on the base of statistically calculated significant decrease of apnea/hypopnea index (AHI). Objective success of treatment implied AHI decrease >50%.

Results

Improvement in the treatment group turned to be significant; this conclusion is based on the results of AHI evaluation ($P < 0,0001$), LQ, SF-36 ($P < 0,0001$), VAS of snoring intensity ($P < 0,0001$) and ESS ($P = 0,0002$).

Conclusion

This study showed that uvulectomy in patients with OSAS and ronchopathy contributes to decrease the intensity of snoring, but doesn't influence significantly on AHI and LQ.

Structural support of palatal implants provokes the compiling of fibrous tissue and lets achieve the induration of soft palate and decrease its vibrating. As a result, the hardening of soft palate leads to descenting of sleep apnea episodes and OSAS course improvement.

EVALUATION OF TEMPERATURE – CONTROLLED RADIOFREQUENCY TREATMENT OF TONSILLAR AND TURBINATE HYPERTROPHY IN PATIENTS WITH SLEEP DISORDERED BREATHING

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Introduction

Tonsillar and inferior turbinate hypertrophy is one of the most common causes of upper airway obstruction in patients with sleep disordered breathing. Due to its minimally invasive character, temperature - controlled radiofrequency surgery has become a topic of increasing attention, especially to the surgical treatment of sleep-related breathing disorders. It is an established treatment option for the treatment of snoring.

Objectives

The aim of this study was to evaluate the temperature - controlled radiofrequency submucosal volumetric tissue reduction (RFVTR) method, and to investigate its safety and efficacy in patients with snoring and mild or moderate obstructive sleep apnea syndrome (OSAS).

Methods

We followed 56 patients, 15 to 65 years of age (mean body mass index (BMI) =28.16, mean apnea-hipopnea index (AHI) =18.44, mean score on Epworth Sleepiness Scale (ESS) =11.6) with a case history of oral breathing, snoring and night-time apneas. The patients presented with tonsillar and inferior turbinate hypertrophy with or without septal deformity. According to the anatomical findings (the size of the tonsils, inferior nasal turbines and uvula), the patients underwent RFTVR of the hypertrophy tonsils, inferior nasal turbines and soft palate. The surgery procedure was performed with different combinations. RFTVR of the soft palate, tonsils and inferior nasal turbines were performed in 34 patients. 22 of 56 patients had RFTVR of hypertrophy tonsils and inferior nasal turbines. 30 patients had nasal septum deformity and surgical intervention for correction of nasal septum was performed too. All the patients underwent preoperative polysomnography examinations to exclude severe OSAS. Pre – and postoperative snoring was evaluated based on a 0-10 score system by the patient's partner.

Results

All patients were reviewed on the 1 month, and 6 months after surgery. Primary outcomes show sustained increases in oropharyngeal size in 50 (89.3%) patients, snoring reduction of 47 (83.9%), no change was found in 9 (16.1%) patients. Fifty two patients (92.8%) significantly improved their nasal breathing postoperatively. All these changes improved sleep quality in all patients. No one reported problems with speech and swallowing. All final outcomes were improved from baseline and were normalized after the treatment.

Conclusions

FRVTR method significantly improved OSAS-specific quality of life, abnormalities in daytime somnolence. The results of this study demonstrate that FRVTR is safe, minimally invasive and effective method for reduction of turbinate and tonsillar hypertrophy for the treatment in patients with sleep disordered breathing.

12-MONTH FOLLOW-UP OF UPPER AIRWAY STIMULATION (UAS) FOR OBSTRUCTIVE SLEEP APNEA

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Background

Previous studies have shown that electrical stimulation of the hypoglossal nerve can improve obstructive sleep apnea (OSA). The current clinical study was used to identify patient selection criteria that could be used to predict success in Upper Airway Stimulation.

Methods

The patients selected for this research were moderate-to-severe OSA patients intolerant to continuous positive airway pressure (CPAP). The UAS system (Inspire Medical Systems, Maple Grove, MN) which was implanted in these patients uses respiratory-triggered stimulation of the hypoglossal nerve. The study was conducted in 2 phases. In Phase 1, patients were enrolled with broad selection criteria. At pre-implant and 2, 4, and 6 months post implant we obtained subjective data (Epworth Sleepiness Scale, and FOSQ) and objective data (Apnea hypopnea index (AHI) which was collected using lab-based polysomnography). In Phase 2, patients were enrolled using selection criteria derived from the experience in Phase 1. These criteria were: baseline BMI ≤ 32, AHI between 20 and 50 events/hour, and absence of retropalatal airway collapse on sleep endoscopy. Among 34 subjects treated with implant, 18 had entered the study meeting selection criteria and 14 had not. AHI was determined by comprehensive polysomnography at all time points, and patients were monitored for adverse events through 12-months of follow-up.

Results

Among patients meeting selection criteria, the AHI reduction and Subjective improvements were maintained at 12 months.

AHI (events/hr)	Baseline	6-Mon	12-Mon
Meeting Selection Criteria (n=18)	33.9±6.2	17.0±18.5*	11.0±10.8*
Not meeting selection criteria (n=16)	50.4±17.4**	51.3±27.6**	46.2±25.6**

* p<0.01

** p<0.05

Conclusion

UAS to treat OSA is safe through 12 months follow-up to date. In those who are less obese, with AHI in a higher but not very severe range, and/or without palatal level obstruction, efficacy is sustained through 6 and 12-months post-implant, while those not meeting these criteria fail to improve.

APNOEA LOAD - A NEW SUPPLEMENTARY INDEX FOR ASSESSING SLEEP APNOEA

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Obstructive sleep apnoea syndrome (OSAS) is a common disorder (with an incidence of 3-5%) and an important risk factor for e.g. cardiovascular events. The severity of obstructive sleep apnoea is assessed by the apnoea-hypopnea-index (AHI)2, which is based only on the average number of apnoea-events (with a minimum duration of 10 seconds) per hour. It is obvious, however, that a patient with long apnoeas has a more severe disease than another patient with the same AHI but with short apnoeas. I suggest the use of a complementary index, the apnoea load (AL), defined as AI (average number of apnoeas per hour) x average duration of apnoeas in minutes. Thus the limit for a moderate sleep apnoea is AL 3 and for severe AL 5. Under AL 0,4 would be considered normal. Example: A patient with a "mild" AHI of 10 may be underdiagnosed, because with long apnoeas he may have a severe AL of over 5. The use of AL to complement AHI and ODI (oxygen desaturation index) clarifies especially the borderline cases and may contribute to a better treatment of the patients.

Bibliografia

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MIXED SLEEP APNEA IN DIAGNOSTIC POLYSOMNOGRAPHY IS RELATED TO COMPLEX SLEEP APNEA SYNDROME AND FAILURE OF CPAP TITRATION STUDY

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Introduction

'Mixed sleep apnea syndrome' has not been defined and mixed apneas considered as a part of obstructive sleep apneas by AASM guideline, however, mechanism for mixed apnea is considered to have in common with central apnea.

Objectives

To compare mixed apnea group with pure obstructive apnea group, and ultimately, to find relationship between mixed apnea, complex sleep apnea syndrome, and CPAP adherence.

Methods

We studied retrospectively patients with moderate OSA (AHI>15), who had undergone diagnostic polysomnography and CPAP titration at Asan Medical Center since 2008. We defined mixed apnea related OSA (mix-OSA) as mixed apnea index (MI) was more than 5/hr, and pure OSA as all of the apneas were obstructive apneas. CPAP titration failure was one that does not meet any one of optimal, good or adequate titration. Complex sleep apnea syndrome (comp-SAS) was defined as if CPAP titration eliminated obstructive apneas, but the residual central apnea index (CI) >5/hr or Cheyne-Stokes respiratory became prominent. CPAP acceptance was defined by whether a patient refuses CPAP within 1 month after CPAP administration. CPAP compliance was usage in >75% of days with >4 h usage each night during 3-6 months after CPAP initiation. Data were compared between Mix-OSA and pure OSA group using the independent t-test or Fisher exact test. And then, with variables that had p-values of <0.01, binary logistic regression analysis was used to select independent predictive variables for Mix-OSA. Also, Fisher exact test were used to find the relationship between Mix-OSA, Comp-SAS group and CPAP adherence.

Results

Subjects were extracted from all 447 patients (from January 2008 to July 2011), 58 patients (13.0 %) with Mix-OSA were identified and 92 patients (20.6%) were classified into pure OSA group. The rest of patients (292 patients) with 0<MI<5 were excluded. Univariate analysis indicated that neck circumference, minimal oxygen saturation, oxygen desaturation index (ODI), CI, obstructive apnea index, and arousal index were significantly different between Mix-OSA and pure OSA groups. Binary logistic regression analysis identified CI (Exp(B)=6.999, p<0.001), ODI (1.046, 0.034), and OI (1.072, 0.008) as independent factors to predict Mix-OSA group. On CPAP titration study, titration failure rate of Mix-OSA group (26.8%) was higher than in Pure OSA group. (11.3%) (p=0.041) In addition, among two groups (150 patients), 8 patients (5.3%) had Comp-SAS, in whom, 7 patients (12%) were Mix-OSA and one patient (1%) was pure-OSA. Comp-SAS and Mix-OSA related statistically significantly. (p=0.006) In Mix-OSA group, 17 patients' data were not unobtainable, excluding these subjects, 17 patients (41.5%) showed an adequate acceptance for CPAP. In Pure OSA group, 71 patients were eligible for CPAP analysis, 54 patients (76.1%) showed a good acceptance. (p=0.059) In Mix-OSA group, 8 out of 17 patients (47.1%) showed a good compliance, and, in Pure-OSA group, 22 patients (40.7%) had a good compliance. (p=0.619)

Conclusions

This study showed that mixed apneas were most related with central apneas, and, had a significant relationship with failure of CPAP titration and comp-SAS. Mix-OSA group had the higher failure rate of CPAP acceptance, however, which was not statistically significant.

BIPOLAR QUANTUM MOLECULAR RESONANCE® TONSILLECTOMY VERSUS COLD-STEEL DISSECTION TONSILLECTOMY: A PROSPECTIVE STUDY

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Introduction

We performed an extracapsular dissection using an angled bipolar forceps Quantum Molecular Resonance® (RQM) compared with a technique of cold-steel dissection (CD) and bipolar diathermy haemostasis.

Objectives

The study was designed to compare the outcome of RQM tonsillectomy and CD tonsillectomy in pediatric population.

Methods

50 children that underwent tonsillectomy over a 6-month period, 27 males and 23 females between 2 and 18 years, with a mean age of 6,7.Affected by adeno-tonsillar or tonsillar isolated hypertrophy (grade III – IV) associated with moderate to severe OSA with mean RDI of 13,7 for RQM group and 13,3 for CD group. Of these 25 undergoing RQM tonsillectomy and 25 CD tonsillectomy. 33 undergone simultaneously cold adenoidectomy by trans-oral route. During the intervention were assessed surgical time and blood loss. Trough a smiley scale was evaluated the degree (1 to 10) of pain present during the first week after surgery in three different moments of the day ,previously set on the degree of pain and dysphagia proven in the worst episode of acute tonsillitis the patient recalled. It 'was prompted for the type and amount of painkillers taken during the day, the discomfort in fluid the presence of any associated disorders such as bleeding, ear pain, interrupted sleep and apneic episodes reported by parents.

Results

The mean duration of surgery was 37 min with DF and 24 min with RQM. The intraoperative blood loss was an average of 40 ml with CD and 5 ml with RQM. One patient experienced an immediate post-operative hemorrhage CD.

14 patients required painkillers in the first 24 hours, 6 after CD and 8 after RQM.

The pain degree in the preoperative tonsillitis was a mean of 6,75 in CD and 7,71 in RQM , whit a painful dysphagia grade of 3 in CD and 5 in RQM. After discharge was a case of late hemorrhage on the fifth day after CD and one case on the sixth day after RQM. The average degree of pain was 3.2 for DF, and 4.5 for RQM. The patients who took painkillers were 6 for CD and 10 for RQM, with a mean of 1.8 days for CD and 2.2 days for RQM. Reflex otalgia was reported in 1 patient for 6 days after DF and in 7 patients for a mean of 4 days after RQM. 8 patients reported painful dysphagia after DF for a mean of 5.1days versus 13 for a mean 5.5 days after RQM. 4 patients after DF reported interruptions in sleep for an average of 2.3 days versus 3 patients for 3 days after RQM. At the control after one week, parents have reported almost complete resolution of the ronco-apneic episodes.

Conclusions

In our hands the RQM has proved an easy to use tool that allowed us to reduce by 35% on average operative time for tonsillectomy, guaranteeing a virtually bloodless surgical field.

In postoperative controls we have highlighted in the patients undergoing RQM a greater thickness of the pseudomembranes of fibrin in the tonsillar loggias, whose posting has resulted in a case to an abundant hemorrhage on sixth day. In our hands the technique was slightly more painful than the CD, especially as regards the appearance of reflected otalgia.