363. Sleep and weight: heavy under pressure

3245

Can the Epworth sleepiness score predict the apnoea-hypopnoea index in obstructive sleep apnoea and hypopnoea syndrome: A comparitive audit of patient and partner scoring

Caroline Hughes. *Lung Function, Gloucestershire Royal Hospital, Gloucester, Gloucestershire, United Kingdom*

Obstructive sleep apnoea and hypopnoea syndrome (OSAHS) is characterised by sleep-disordered breathing and daytime sleepiness. The Epworth Sleepiness Score subjectively quantifies sleep propensity whilst the Apnoea-Hypopnoea Index (AHI) is an objective value for the severity of OSAHS. An audit was undertaken to test whether standards held true regarding OSAHS remain so in a Gloucestershire population. Firstly, that mean ESS varies between patients and partners according to their perceptions of patient sleep propensity. Secondly that there is no correlation between patient ESS and AHI and a weak correlation between partner perspective ESS and AHI as shown by previous studies. The audit also aimed to test whether severity levels of ESS were found to be independent of severity levels of AHI when the data were placed in severity categories according to guidelines.
During the audit, 40 sets of patient-partner data were collected retrospectively from a sleep database and analysed. It was found that there was no mean difference between patient and partner perspective ESS scores (p=0.906), disputing the first standard. The partner perspective ESS (r=0.464), but not the patient ESS (r=0.305) correlated with AHI therefore the second standard held true. An additional test found that severity levels of ESS were independent of severity levels of AHI both for patient and partner scoring. ESS was found to be a poor predictor of AHI. To improve this, an alternative questionnaire was devised which combines subjective and objective risk factors for OSAHS. Evaluation of this questionnaire requires stratification.

3246

Berlin questionnaire and Epworth sleepiness scale, useful screening instruments for obstructive sleep apnea syndrome?

Annemie Mensink, Steven Uil, Bart Kuipers. *Pulmonary Department, Isala Klinieken, Zwolle, Overijssel, Netherlands*

Introduction: Obstructive Sleep Apnea Syndrome (OSAS) is often not recognised by doctors. Tested and validated questionnaires are needed to assist them with the recognition of OSAS symptoms. In this study two questionnaires were validated.
Method: It concerned a retrospective validation study for the Berlin Questionnaire (BQ) and Epworth Sleepiness Scale (ESS). 63 patients completed these questionnaires prior to their first outpatient visit to our sleep clinic. All patients underwent a polygraphy to determine their Apnea-Hypopnea Index. Diagnosis was based on the anamnesis and the polygrapy results. Sensitivity, specificity and internal consistency of these questionnaires were assessed.
Results: According to the BQ, 24 patients (38%) scored a low risk of OSAS and 39 patients (62%) a high risk. ESS-scores averaged 7.9±4.4 (scale 0-24). Sensitivity of the BQ was 67% and specificity 48%. The internal consistency of the BQ ranged from moderate to good (Cronbach's α 0.61-0.80). Sensitivity and specificity of the ESS were 45% and 81% with a cut-off point of 8, which according to literature is the cut-off point between normal and abnormal sleepiness. A cut-off point of 5 appeared to be a more preferable choice for this population. Sensitivity increased to 71% and specificity decreased to 48%. Internal consistency of the questionnaires was good (Cronbach's α 0.80).
Conclusion: Given the low to moderate sensitivity and specificity, the BQ and ESS were of low value as screening tools for patients who were referred to the sleep clinic.

3247

Randomized trial of 6 auto-adapting CPAP devices

Sara Neale, Fiona Buchanan, Nicola Allaouat, James R. Catterall, Adrian H. Kendrick. *Sleep & NIV Unit, University Hospitals Bristol, Bristol, United Kingdom*

Auto-adapting CPAP (aCPAP) is used to manage patients with obstructive sleep apnoea (OSA). Different suppliers use different algorithms. We have compared 6 commercial devices - ResMed S8, Breas PV10, Weinmann Somnosmart, Goodnight 420E, Devilbiss Auto LT, Respironics M-series. Patients had used fixed pressure CPAP for 6+ months before the study and had good compliance. Each aCPAP device was used for 2 weeks in a randomized order. Data from the second week was analyzed and included CPAP use (hours), 7 day sleep diary card (SDC), and patient preference. The SDC included scores for Sleep Quality and Exercise Level (Excellent to Poor), Awakenings (0 to 6+), and a 100mm VAS (0=Alert;100=Drowsy). 23 patients were enrolled, 15 completed. Mean±SD weight - 117.8±29.2kg, age - 57±11yrs and 4% diprate 27±15. If patients could not use an aCPAP device, they used their fixed pressure device.There were significant differences between devices.

Abstract 3247 – Table 1. Summary of Response – mean (95% CI)

	Fixed	S8	Somnosmart	PV10	Auto LT	420E	M-Series
Hours Used**	7.0 (6.3–7.8)	3.8 (1.7–5.9)	3.6 (1.4–5.9)	2.6 (0.7–5.0)	3.0 (1.0–5.0)	3.4 (1.5–5.3)	5.1 (3.3–7.0)
SDC – Slept Well*	2.1 (1.6–2.7)	2.4 (1.8–3.0)	3.8 (3.0–4.5)	3.3 (2.6–4.0)	3.5 (2.6–4.3)	2.8 (1.9–3.7)	2.8 (2.1–3.5)
SDC – Awakenings*	1.6 (0.8–2.4)	4.0 (1.7–6.2)	5.7 (3.3–8.1)	4.8 (2.6–7.0)	5.5 (3.0–8.0)	3.7 (1.4–6.0)	3.1 (1.1–5.2)
SDC – Ex Level**	2.1 (1.9–2.2)	2.2 (1.7–2.7)	3.4 (2.6–4.3)	3.1 (2.3–3.9)	3.6 (2.8–4.5)	2.8 (2.0–3.6)	2.8 (1.9–3.6)
SDC – VAS (mm)**	25 (17–32)	30 (20–39)	37 (24–50)	31 (18–43)	30 (14–46)	23 (13–33)	23 (14–32)
Order of Preference		2	5	6	4	3	1

*p<0.05; **p<0.01.

We conclude that auto-CPAP devices have different outcomes and patient preferences. This may affect adherence to treatment for OSA in short-term trials.

3248

Randomized trial of 6 auto-adpating CPAP devices: Effects on quality of life

Sara Neale, Fiona Buchanan, Nicola Allaouat, James R. Catterall, Adrian H. Kendrick. *Sleep & NIV Unit, University Hospitals Bristol, Bristol, United Kingdom*

Auto-adapting CPAP is used to manage patients with obstructive sleep apnoea, with suppliers using different algorithms. We have compared 6 devices - ResMed S8, Breas PV10, Weinmann Somnosmart, Goodnight 420E, Devilbiss Auto LT, Respironics M-series. Patients were all using a fixed pressure (FP) device for at least 6 months before the study and had good compliance. Each device was used for 2 weeks, in a randomized order. Data from the Epworth Score (ESS), SF-36 and the Multidimensional Fatigue Inventory (MFI-20) was obtained at the end of each 2 week period. If the patient was unable to use a CPAP device, the highest score indicating the biggest effect on quality of life (QoL) was used. 23 patients were enrolled, 15 completed. Data was analysed using repeated measures ANOVA and are shown as mean (95%CI). With the exception of MFI-20 General Fatigue and ESS, there was a significant difference ($p<0.05$) for all 8 subscales of the SF-36 and the 5 subscales of MFI-20, including general fatigue, reduced activity and reduced motivation.
We conclude that the choice of auto-adapting CPAP device may have a significant impact on QoL, certainly in the initial stages of adaptation to this treatment.

3249

Transcutaneous measurement of pCO_2 ($p_{tc}CO_2$): Time delay from change in alveolar pCO_2 to first response in $p_{tc}CO_2$

Nils Henrik Holmedahl[1], Jon Andrew Hardie[2], Ove Fondenes[2], Ivar Ellingsen[1]. [1]*Respiration Physiology Lab, Glittreklinikken, Hakadal, Akershus, Norway;* [2]*Internal Medicine, Haukeland University Hospital, Bergen, Hordaland, Norway*

Introduction: The $p_{tc}CO_2$ delay has been estimated to 16 sec (healty subjects) [1] and <60 sec (hypercapnic patients) [2]. We simultaneously record polysomnography (PSG) and $p_{tc}CO_2$ from COPD patients and needed the response time in our setup.
Material: 9 stable COPD patients (6 male) with mean FEV1 41% of pred. (SD 20).
Method: Patient in supine position wearing face mask connected to a stopcock, inlet selecting either room air or a bag with 4% CO_2 in air. $P_{tc}CO_2$ measured by Radiometer TOSCA 500, probe on the earlobe. Arterial samples from arterial catheter analyzed by Radiometer ABL 500.
3 test-phases, each 200 sec: 1) stable phase breathing room air, 2) increasing phase after switching to 4% CO_2, 3) decreasing phase after switching back to room air. TOSCA $p_{tc}CO_2$ was read every 5. sec for 120 sec, then every 10. sec. Arterial samples were drawn 3 times during phase 1), every 5. sec the first 30 sec of phase 2) and 3), then every 30. sec for a total of 150 sec.
Results: First response time (T_{fr}) meaning time from change in alveolar pCO_2 to $p_{tc}CO_2$ >2SD off stable phase.
Mean T_{fr} (SD) in increasing phase: 54 (5,6) sec.
Mean T_{fr} (SD) in decreasing phase: 57 (15) sec.
For arterial pCO_2: 13,3 (5,6) sec and 11,7 (2,5) sec, accordingly.
Conclusion: Scoring PSG from COPD patients, the transcutane pCO_2 signal should be left-shifted 2 epochs (1 minute) as a respiratory event changing alveolar pCO_2 will show a first $p_{tc}CO_2$ response after 54-57 sec.
References:
[1] Kesten S. *et al* Chest 1991;99:1211-15.
[2] Janssens J.P. *et al* Chest 1998; 113:768–773.

3250

The effect of early use of continuous positive airway pressure (CPAP) therapy to treat acute atelectasis after cardiac surgery: Randomized study

Fouad Al Mutairi[1], Stephen Fallows[1], Elizabeth Mason-Whitehead[1], Waleed Abukhudair[2], Baharul Islam[2]. [1]*Clinical Sciences, University of Chester, Chester, United Kingdom;* [2]*Respiratory Care, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia*

Rationale: Cardiac surgery incisional pain can decrease inspiratory effort, alter normal respiratory mechanics, and increase the potential for post-operative pulmonary complications such as acute atelectasis.
This study aims to assess the effect of the early use of CPAP via mask therapy to treat acute atelectasis.
Methods: 72 participants who fit the inclusive criteria were included. The control group used Incentive Spirometry (IS) 15 times/hour and the trial group used CPAP for half hour every 2 hours both for 3days. Vital capacity (VC), RR, HR and SpO2 were measured after operation as baseline-test, after 12 hours, 24hours, 48 hours and posts the therapy. Failure was defined as a need for an advance therapy.
Result: 66 male and 6 female (mean ages; 57±5.3 years) were participated. 26/36 participants from CPAP group had succeed (72%) and 19/36 from IS group had succeed (53%). VC was increased significantly in CPAP group (baseline mean for IS group 1.31L and CPAP group 1.43L, post- therapy mean 1.59L and 1.88L respectively, p=0.02) (figure 1). SpO2 was decreased significantly in IS group (baseline 98.25%, 97.19%, post-therapy 96.53%, 96.83 respectively, p=0.003) and no significant different in RR and HR.

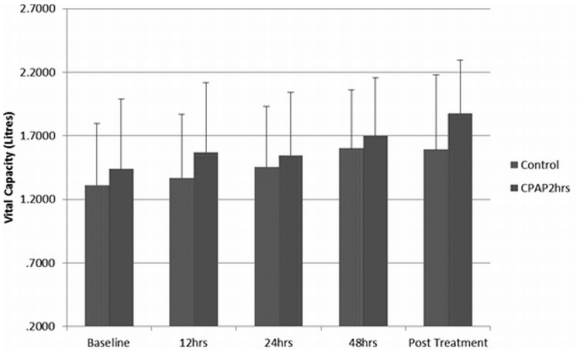


Figure 1

Conclusion: Early used of CPAP via mask therapy had better outcomes to treat post surgical atelectasis especially with smoker and elderly patients.

3251

Impact of weight on anaerobic threshold (AT) values in preoperative assessment

Bethany Howard[2], Jonathan Fuld[1], Richard Parker[3], Jennifer Colbourne[1], Karl Sylvester[1]. [1]*Lung Function Unit, Addenbrooke's Hospital, Cambridge, United Kingdom;* [2]*Medical Physics, Addenbrooke's Hospital, Cambridge, United Kingdom;* [3]*Centre for Applied Medical Statistics, University of Cambridge, Cambridge, United Kingdom*

Introduction: AT is an outcome often used in preoperative assessment. Although usually calculated using total body mass (TBM), as fat uses minimal oxygen, using lean body mass (LBM) may be more appropriate.
Method: Retrospective data was collected from 95 patients (47M/48F) performing ramp cycle ergometry. Age range 11 to 82 years, standing height 1.39 to 1.96

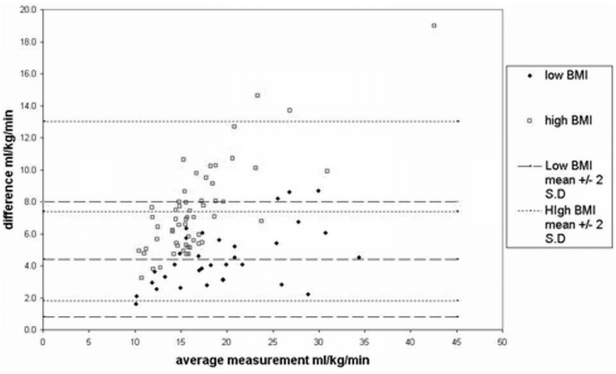
Abstract 3248 – Table 1. Summary of QoL data

	Fixed	S8	Somnosmart	PV10	Auto LT	420E	M-Series
ESS*	6 (5–7)	6 (4–7)	6 (4–8)	6 (5–7)	6 (4–8)	6 (5–7)	6 (5–8)
SF-36							
Vitality¶	65 (53–76)	58 (45–72)	29 (11–46)	40 (20–59)	38 (16–59)	52 (33–70)	53 (35–71)
General Health§	63 (53–73)	53 (41–65)	27 (12–43)	37 (20–53)	28 (10–46)	47 (29–65)	48 (32–64)
MFI-20							
Physical Fatigue§	10 (7–12)	11 (8–14)	15 (12–18)	14 (11–17)	15 (12–18)	12 (8–15)	12 (9–15)
Mental Fatigue†	7 (5–8)	8 (5–10)	13 (9–17)	11 (8–15)	13 (10–17)	10 (5–13)	9 (5–12)

*NS; ¶p<0.05; §p<0.005; †p<0.01.

metres, weight 30 to 140 kg and BMI 15.9 to 52 kg/m^2. AT was quoted as ml/kg/min for TBM and adjusted for LBM using Boer formulae.

Results: Considering AT adjustment by TBM to LBM: i) Bland Altman plots demonstrated a positive bias (fig. 1), with overweight/obese BMI (>25 kg/m^2) patients' AT adjusted to a greater proportion than underweight/normal BMI (<25 kg/m^2) patients; ii) The mean (±2SD) 95% limits of agreement for change in AT was 4.4 (±3.6) ml/kg/min in underweight/normal BMI versus 7.4 (±5.6) ml/kg/min in overweight/obese BMI; iii) Using transformed Kendall's tau 28% of patients changed relative ranking with weak correlation (Kendall tau coefficient 0.437). Using a cutoff of 11 ml/kg/min, 29% of patients were considered unfit for surgery using TBM adjustment versus 1% adjusting for LBM; here the mean change in anaerobic threshold was 5.6 ml/kg/min.



Conclusions: AT reporting by TBM or LBM has potentially important impacts. These relate to relative ranking of individuals fitness and their ability to reach preset thresholds of operative suitability, both more marked with increasing BMI.