Journal Scan

U. C. Ojha
Senior Chest Physician, ESI Hospital, Basaidarapur, New Delhi

Indian J Sleep Med 2009; 4.2, 70-74

Anaesth Intensive Care. 2008 May; 36(3):379-84.

Preoperative assessment for obstructive sleep apnoea and the prediction of postoperative respiratory obstruction and hypoxaemia.

Blake DW, Chia PH, Donnan G, Williams DL.
Department of Anaesthesia and Pain Management, Royal Melbourne Hospital, Melbourne, Victoria, Australia.

Patients scheduled for elective surgery requiring general anaesthesia and hospital admission were assessed for risk of obstructive sleep apnoea (OSA) using history, body mass index and upper airway examination to determine any relation between OSA risk and the rate of respiratory events after surgery. Anaesthesia and postoperative analgesia were at the discretion of the treating anaesthetist, who was made aware of any suspicion of OSA. Respiratory monitoring for apnoeas (central or obstructive), hypopnoeas and oxygen desaturations was continuous for a 12-hour period on the first postoperative night. We used automated analysis and visual scanning of respiratory recordings, but sleep stages were not assessed. Patients classified as OSA risk had more respiratory obstructive events per hour than controls (38+/-22 vs. 14+/-10) and an increased proportion of the 12-hour monitored period with oxygen saturation <90% (7+/-12% vs. 2+/-5% of the 12-hour period). Perioperative morphine dose was predictive of central apnoeas for both OSA risk and control patients (P=0.002).

This study suggests that preoperative suspicion of OSA should lead to increased postoperative monitoring and efforts to minimise sedation and opioid dose. It also supports the routine use of supplemental oxygen with patient-controlled opioid analgesia.

Address for correspondence:
E.mail : ucojha@rediffmail.com

Can J Anaesth. 2008 Nov;55(11):739-47.

Automated respiratory inductive plethysmography to evaluate breathing in infants at risk for postoperative apnea.

Brown KA, Aoude AA, Galiana HL, Kearney RE.
Division of Pediatric Anesthesia, McGill University Health Center/Montreal Children's Hospital, 2300 Tupper Street, Rm. C-1118, Montreal, Quebec H3H1P3, Canada. roula.cacolyris@muhc.mcgill.ca

PURPOSE: Although respiratory inductive plethysmography (RIP) is the method of choice for the assessment of sleep disordered breathing, it has not been applied to the study of infants at risk for postoperative apnea (POA). The purpose of this study was to apply RIP to evaluate breathing in these infants. An additional purpose was to implement, simultaneously, three novel algorithms to detect movement artifact, respiratory pauses, and thoracoabdominal asynchrony, since their combined output both detects respiratory pauses and classifies them as obstructive or central in origin.

METHODS: A prospective study design was employed to record the analogue output of RIP, saturation, and finger plethysmography in a convenience sample of infants. The data record underwent a dual analysis: 1) automated detection of respiratory events; and 2) visual coding of the cardio respiratory data. A novel index, coined pause density, was calculated as the sum of all respiratory pauses.

RESULTS: Twenty infants, whose mean postconceptional ages and weights were 44.47 +/- 2.88 weeks and 4.21 +/- 0.99 kg, respectively, were recruited. Data recording ranged from four to 24 hr. Ten infants (term = 5) experienced POA: central apnea = 5, mixed obstructive apnea = 6, and two former premature infants experienced both. Twenty-five central apneic events were detected, and the majority followed a sigh. Infants who experienced apnea also had high values of pause density.

CONCLUSION: Respiratory inductive plethysmography may provide a useful method to evaluate breathing in infants at risk for POA. The study of short respiratory pauses may prove useful in predicting apnea risk.

Clin Geriatr Med. 2008 Nov; 24(4):607-24, vii.

Preoperative pulmonary update

Smetana GW, Conde MV.
Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, Harvard Medical School, 330 Brookline Avenue, Boston, MA 02215, USA. gsmetana@bidmc.harvard.edu

Postoperative pulmonary complications are an important source of surgical morbidity. In this paper, the authors review recent studies that shed light on emerging risk factors, a multifactorial index for respiratory failure, and the value of specific risk reduction strategies. Novel risk factors include advanced age, congestive heart failure, pulmonary hypertension, and obstructive sleep apnea. Important risk reduction strategies include postoperative lung expansion maneuvers, the selective use of nasogastric tubes, epidural analgesia, and inspiratory muscle training.

J Clin Sleep Med. 2008 Aug 15;4(4):333-8.

Persistence of obstructive sleep apnea after surgical weight loss.

Lettieri CJ, Eliasson AH, Greenburg DL.
Pulmonary, Critical Care and Sleep Medicine Service, Walter Reed Army Medical Center, Washington, DC 20307, USA. christopher.lettieri@us.army.mil

STUDY OBJECTIVES: Weight loss may reduce the severity of obstructive sleep apnea (OSA), but persistence of OSA following surgical weight loss has not been defined. We sought to clarify the impact of bariatric surgery on OSA. We hypothesized that, despite substantial weight loss and reductions in the apnea-hypopnea index (AHI), many will have persistent disease.

METHODS: Consecutive patients referred for preoperative sleep evaluation underwent polysomnography before and 1 year following bariatric surgery. We compared the effects of weight loss on body mass, OSA, and continuous positive airway pressure requirements. We defined OSA severity using the AHI (normal < 5 events per hour, Mild 5 to 14 events per hour, moderate 15 to 29 events per hour, and severe 30 or more events per hour). We identified predictors of OSA severity following weight loss and assessed compliance with therapy.

RESULTS: Twenty-four patients (aged 47.9 +/- 9.3 years; 75% women) were enrolled. At baseline, all subjects had OSA, the majority of which was severe. Weight loss reduced body mass index from 51.0 +/- 10.4 kg/m2 to 32.1 +/- 5.5 kg/m2 ($p < 0.001$) and the AHI from 47.9 +/- 33.8 to 24.5 +/- 18.1 events per hour ($p < 0.001$). At follow-up, only 1 patient (4%) experienced resolution of OSA. The majority (71%) had moderate or severe disease. The most important predictor of the follow-up AHI was the baseline AHI (R2 =0.603). All patients with residual OSA required continuous positive airway pressure to ablate apneic events, but the required pressures decreased from 11.5 +/- 3.6 cm H2O to 8.4 +/- 2.1 cm H20 ($p = 0.001$). Only 6 patients were compliant with continuous positive airway pressure therapy at the follow-up visit.

CONCLUSIONS: Surgical weight loss reduces the AHI, but many patients have residual OSA one year after bariatric surgery.

Anesthesiology. 2008 May;108(5):822-30.

Validation of the Berlin questionnaire and American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients.

Chung F, Yegneswaran B, Liao P, Chung SA, Vairavanathan S, Islam S, Khajehdehi A, Shapiro CM.
Department of Anesthesia, University of Toronto, Toronto Western Hospital,University Health Network, Toronto, Ontario, Canada. frances.chung@uhn.on.ca

BACKGROUND: Because of the high prevalence of obstructive sleep apnea (OSA) and its adverse impact on perioperative outcome, a practical screening tool for surgical patients is required. This study was conducted to validate the Berlin questionnaire and the American Society of Anesthesiologists (ASA) checklist in surgical patients and to compare them with the STOP questionnaire.

METHODS: After hospital ethics approval, preoperative patients aged 18 yr or older and without previously

diagnosed OSA were recruited. The scores from the Berlin questionnaire, ASA checklist, and STOP questionnaire were evaluated versus the apnea-hypopnea index from in-laboratory polysomnography. The perioperative data were collected through chart review.

RESULTS: Of 2,467 screened patients, 33, 27, and 28% were respectively classified as being at high risk of OSA by the Berlin questionnaire, ASA checklist, and STOP questionnaire. The performance of the screening tools was evaluated in 177 patients who underwent polysomnography. The sensitivities of the Berlin questionnaire, ASA checklist, and STOP questionnaire were 68.9-87.2, 72.1-87.2, and 65.6-79.5% at different apnea-hypopnea index cutoffs. There was no significant difference between the three screening tools in the predictive parameters. The patients with an apnea-hypopnea index greater than 5 and the patients identified as being at high risk of OSA by the STOP questionnaire or ASA checklist had a significantly increased incidence of postoperative complications.

CONCLUSIONS: Similar to the STOP questionnaire, the Berlin questionnaire and ASA checklist demonstrated a moderately high level of sensitivity for OSA screening. The STOP questionnaire and the ASA checklist were able to identify the patients who were likely to develop postoperative complications.

Chest. 2008 May;133(5):1128-34.

Association of sleep-disordered breathing with postoperative complications.

Hwang D, Shakir N, Limann B, Sison C, Kalra S, Shulman L, Souza Ade C, Greenberg H.
Division of Pulmonary, Critical Care, and Sleep Medicine, North Shore Long Island Jewish Health Systems, 410 Lakeville Rd, Suite 107, New Hyde Park, NY 11040, USA. dennis.hwang@nyumc.org

BACKGROUND: Obstructive sleep apnea (OSA) is associated with increased perioperative risk, but the incidence of postoperative complications and the severity of OSA associated with increased risk have not been established. We investigated the relationship between intermittent hypoxemia measured by home nocturnal oximetry with the occurrence of postoperative complications in patients with clinical signs of OSA identified during preoperative assessment for elective surgery.

METHODS: This study was performed at a tertiary care hospital. Home nocturnal oximetry was performed on elective surgical patients with clinical features of OSA. The number of episodes per hour of oxygen desaturation (or oxygen desaturation index) of > or = 4% (ODI4%) was determined. Subjects with five or more desaturations per hour (ODI4% > or = 5) were compared to those with less than five desaturations per hour (ODI4% < 5). Hospital records were reviewed to assess the incidence and type of postoperative complications.

RESULTS: A total of 172 patients were investigated as part of this study. No significant differences were observed between groups in terms of age, body mass index, number of medical comorbidities, or smoking history. Patients with an ODI4% > or = 5 had a significantly higher rate of postoperative complications than those with ODI4% < 5 (15.3% vs 2.7%, respectively [p < 0.01]; adjusted odds ratio, 7.2; 95% confidence interval, 1.5 to 33.3 [p = 0.012]). The complication rate also increased with increasing ODI severity (patients with an ODI4% of 5 to 15 events per hour, 13.8%; patients with an ODI4% of > or = 15 events per hour, 17.5%; p = 0.01) Complications were respiratory (nine patients), cardiovascular (five patients), GI (one patient), and bleeding (two patients). The hospital length of stay was similar in both groups.

CONCLUSION: An ODI4%> or = 5, determined by home nocturnal oximetry, in patients with clinical features of OSA is associated with an increased rate of postoperative complications.

Obes Surg. 2008 Jan;18(1):134-8

Challenges in pulmonary risk assessment and perioperative management in bariatric surgery patients.

Kaw R, Aboussouan L, Auckley D, Bae C, Gugliotti D, Grant P, Jaber W, Schauer P, Sessler D.
Department of Hospital Medicine, Cleveland Clinic Foundation, 9500 Euclid Avenue-S70, Cleveland, OH 44195, USA. Kawr@ccf.org

Bariatric surgery has serious associated medical comorbidity and procedure-related risks and is, thus, considered an intermediate-to-high-risk non-cardiac surgery. Altered respiratory mechanics, obstructive sleep apnea (OSA), and

less often, pulmonary hypertension and postoperative pulmonary embolism are the major contributors to poor pulmonary outcomes in obese patients. Attention to posture and positioning is critical in patients with OSA. Suspected OSA patients requiring intravenous narcotics should be kept in a monitored setting with frequent assessments and naloxone kept at the bedside. Use of reverse Tredelenburg position, preinduction, maintenance of positive end-expiratory pressure, and use of continuous positive airway pressure can help improve oxygenation in the perioperative period.

Anesthesiology 2008; 108:822–30

Validation of the Berlin Questionnaire and AmericanSociety of Anesthesiologists Checklist as Screening Tools for Obstructive Sleep Apnea in Surgical Patients

Frances Chung, F.R.C.P.C.,* **Balaji Yegneswaran,** M.B.B.S.,† **Pu Liao,** M.D.,‡ **Sharon A. Chung,** Ph.D.,§**Santhira Vairavanathan,** M.B.B.S.,_ **Sazzadul Islam,** M.Sc.,_ **Ali Khajehdehi,** M.D.,† **Colin M. Shapiro,** F.R.C.P.C.#

* Professor, Department of Anesthesia, # Professor, Department of Psychiatry, University of Toronto, Toronto Western Hospital, University Health Network. † Research Fellow, ‡ Research Analyst, _ Research Coordinator, Department of Anesthesia, § Staff Scientist, Department of Psychiatry, Toronto Western Hospital, University Health Network

BACKGROUND: Because of the high prevalence of obstructive sleep apnea (OSA) and its adverse impact on perioperative outcome, a practical screening tool for surgical patients is required. This study was conducted to validate the Berlin questionnaire and the American Society of Anesthesiologists (ASA) checklist in surgical patients and to compare them with the STOP questionnaire.

METHODS: After hospital ethics approval, preoperative patients aged 18 yr or older and without previously diagnosed OSA were recruited. The scores from the Berlin questionnaire, ASA checklist, and STOP questionnaire were evaluated *versus* the apnea–hypopnea index from in-laboratory polysomnography. The perioperative data were collected through chart review.

RESULTS: Of 2,467 screened patients, 33, 27, and 28% were respectively classified as being at high risk of OSA by the Berlin questionnaire, ASA checklist, and STOP questionnaire. The performance of the screening tools was evaluated in 177 patients who underwent polysomnography. The sensitivities of the Berlin questionnaire, ASA checklist, and STOP questionnaire were 68.9–87.2, 72.1–87.2, and 65.6–79.5% at different apnea–hypopnea index cutoffs. There was no significant difference between the three screening tools in the predictive parameters. The patients with an apnea–hypopnea index greater than 5 and the patients identified as being at high risk of OSA by the STOP questionnaire or ASA checklist had a significantly increased incidence of postoperative complications.

CONCLUSIONS: Similar to the STOP questionnaire, the Berlin questionnaire and ASA checklist demonstrated a moderately high level of sensitivity for OSA screening. The STOP questionnaire and the ASA checklist were able to identify the patients who were likely to develop postoperative complications.

Anesthesiology 2008; 108:812–21

STOP Questionnaire

A Tool to Screen Patients for Obstructive Sleep Apnea

Frances Chung, F.R.C.P.C.,* **Balaji Yegneswaran,** M.B.B.S.,† **Pu Liao,** M.D.,‡ **Sharon A. Chung,** Ph.D.,§ **Santhira Vairavanathan,** M.B.B.S.,_ **Sazzadul Islam,** M.Sc.,_ **Ali Khajehdehi,** M.D.,† **Colin M. Shapiro,** F.R.C.P.C.#

* Professor, Department of Anesthesia, # Professor, Department of Psychiatry, University of Toronto, Toronto Western Hospital, University Health Network. † Research Fellow, ‡ Research Analyst, _ Research Coordinator, Department of Anesthesia, § Staff Scientist, Department of Psychiatry, Toronto Western Hospital, University Health Network

BACKGROUND: Obstructive sleep apnea (OSA) is a major risk factor for perioperative adverse events. However, no screening tool for OSA has been validated in surgical patients. This study was conducted to develop and validate a concise and easy-to-use questionnaire for OSA screening in surgical patients.

METHODS: After hospital ethics approval, preoperative patients aged 18 yr or older and without previously

diagnosed OSA were recruited. After a factor analysis, reliability check, and pilot study; four yes/no questions were used to develop this screening tool. The four questions were respectively related to *s*noring, *t*iredness during daytime, observed apnea, and high blood *p*ressure (STOP). For validation, the score from the STOP questionnaire was evaluated *versus* the apnea–hypopnea index from monitored polysomnography.

RESULTS: The STOP questionnaire was given to 2,467 patients, 27.5% classified as being at high risk of OSA. Two hundred eleven patients underwent polysomnography, 34 for the pilot test and 177 for validation. In the validation group, the apnea–hypopnea index was 20 _ 6. The sensitivities of the STOP questionnaire with apnea–hypopnea index greater than 5, greater than 15, and greater than 30 as cutoffs were 65.6, 74.3, and 79.5%, respectively. When incorporating body mass index,age, neck circumference, and gender into the STOP questionnaire, sensitivities were increased to 83.6, 92.9, and 100% with the same apnea–hypopnea index cutoffs.

CONCLUSIONS: The STOP questionnaire is a concise and easyto- use screening tool for OSA. It has been developed and validated in surgical patients at preoperative clinics. Combined with body mass index, age, neck size, and gender, it had a high sensitivity, especially for patients with moderate to severe OSA.

Anesth Analg - 01-SEP-2008; 107(3): 915-20

Patients with difficult intubation may need referral to sleep clinics

Chung F

PURPOSE: Upper airway abnormalities carry the risk of obstructive sleep apnea (OSA) and difficult tracheal intubations. Both conditions contribute to significant clinical problems and have increased perioperative morbidity and mortality. We hypothesized that patients who presented with difficult intubation would have a very high prevalence of OSA and that those with unexpected difficult intubation may require referral to sleep clinics for polysomnography (PSG).

METHODS: Patients classified as a grade 4 Cormack and Lehane on direct laryngoscopic view, and who required more than two attempts for successful endotracheal intubation, were referred to the study by consultant anesthesiologists at four hospitals. Apnea-hypopnea index (AHI) data and postoperative events were collected. Patients with AHI >5/h were considered positive for OSA. Clinical and PSG variables were compared using t-tests and chi(2) test.

RESULTS: Over a 20-mo period, 84 patients with a difficult intubation were referred into the study. Thirty-three patients agreed to participate. Sixty-six percent (22 of 33) had OSA (AHI >5/h). Of the 22 OSA patients, 10 patients (64%) had mild OSA (AHI 5-15), 6 (18%) had moderate OSA (AHI >15/h), and 6 (18%) had severe OSA (AHI >30/h). Of the 33 patients, 11 patients (33%) were recommended for continuous positive airway pressure treatment. Between the OSA group and the non-OSA group, there were significant differences in gender, neck size, and the quality of sleep, but there were no significant differences in age and body mass index.

CONCLUSIONS: Sixty-six percent of patients with unexpected difficult intubation who consented to undergo a sleep study were diagnosed with OSA by PSG. Patients with difficult intubation are at high risk for OSA and should be screened for signs and symptoms of sleep apnea. Screening for OSA should be considered by referral to a sleep clinic for PSG.