UDC 61

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PERIOPERATIVE MANAGMENT OF THE PATIENTS WITH OBSTRUCTIVE SLEEP APNEA. SYSTEMATIC REVIEW OF THE LITERATURE

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УДК 61

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ПЕРИОПЕРАЦИОННОЕ ЛЕЧЕНИЕ БОЛЬНЫХ С ОБСТРУКТИВНЫМ АПНОЭ СНА. СИСТЕМАТИЧЕСКИЙ ОБЗОР ЛИТЕРАТУРЫ

Синдром обструктивного апноэ сна (СОАС) является самым распространенным респираторным расстройством, связанным со сном, все возрастающей в мире склонностью к ожирению и увеличением продолжительности жизни человека. Пациенты с СОАС находятся в группе повышенного риска из-за осложнений послеоперационного периода. Послеоперационные осложнения влияют на риски, связанные с хирургическим вмешательством и анестезией, а следовательно — на выписку и финансовые последствия для системы здравоохранения.

У пациентов с СОАС могут отмечаться значительные осложнения в послеоперационном периоде, в том числе со стороны дыхательных путей, повышенная чувствительность к анестетикам и прочие послеоперационные побочные эффекты.

В статье представлен краткий обзор практических решений и стратегий периоперационного лечения пациентов с СОАС, а также рассмотрены послеоперационные риски и стратегии, в целях их снижения.

Ключевые слова: обструктивное апноэ сна, периоперационное лечение обструктивного апноэ сна.

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PERIOPERATIVE MANAGMENT OF THE PATIENTS WITH OBSTRUCTIVE SLEEP APNEA. SYSTEMATIC REVIEW OF THE LITERATURE

Obstructive sleep apnea (OSA) is the most frequent sleep disorder in the adult population and its prevalence has increased throughout the world because of obesity and increasing age of the general population. Patients with obstructive sleep apnea have high risk of postoperative complications. Postoperative complications contribute significantly to the risks of surgery and anesthesia, with impact on discharge and financial repercussions on the health system.

Patients with OSA may present significant problems in the perioperative period, including difficult airways, sensitivity to anesthetic agents, and postoperative adverse events. This article is a synthesis of the material and have purpose to provide practical solutions and strategies for perioperative care of patients with OSA. Also about the undergoing perioperative risks of patients with OSA and strategies applied to reduce these risks.

Key words: obstructive sleep apnea, perioperative management of obstructive sleep apnea.

OSA is an extremely common sleep related breathing disorder, and its prevalence has been increasing throughout the world because of obesity and increasing age of the general population. Its prevalence is between 2 % and 25 % in the general population, depending upon how sleep apnea is defined. In an epidemiological study, Young et al. noted that the prevalence of sleep apnea, defined as apnea-hypopnea index (AHI) ≥ 5/h was 9 % for women and 24 % for men [1]. The National Sleep Foundation (NSF) *Sleep in America* 2005 Poll found that 1 in 4 Americans are at high risk of having sleep apnea based on the Berlin Questionnaire [2].

Risk factors of sleep apnea include obesity, gender, age, menopause, familial factors [3], craniofacial abnormalities, alcohol and alterations in craniofacial morphology contributing to obstructive sleep apnea — such as macroglossia, retrognathia, a narrow hypopharynx because of fat deposition in the lateral walls of the pharynx, or an anteriorly displaced larynx — also have an impact on anesthetic management.

Recently, several studies have shown that surgical patients, suffering from obstructive sleep apnea, are included in the category of high risk for various perioperative complications: hypoxemia, pneumonia, difficult orotracheal intubation, myocardial infarction, pulmonary embolism, obstructive pulmonary disease, cardiac arrhythmias, hypertension and unplanned transfer in the Intensive Care Unit. Cardiovascular events are the most feared possible and intensively investigated postoperative complications that meet from the 2.5 to 6.5 % of patients undergoing non-cardiac surgery [4]. However postoperative pulmonary complications meet as frequently as the cardiovascular from 2.5 % [5] to 5 % [6]. Postoperative pulmonary complications are: decreased peripheral oxygen saturation, pneumonia and / or respiratory infection, pleurisy, atelectasis, pneumothorax, bronchospasm, need for noninvasive ventilation or endotracheal intubation and ARDS.

Obesity is a very important risk factor, 60–90 % of people with obstructive sleep apnea are obese (BMI>29 kg/m^2) with the presence of all obesity indices, including body mass index (BMI), abdominal, hip and neck circumference, also thickness of the skin that directly relates the severity of obstructive sleep apnea [7]. The risk increase more with the presence of the following factors as smoking, increased alcohol consumption, craniofacial abnormalities, family history and genetic predisposition.

Snoring is the primary symptom, with a diagnostic sensitivity close to 100 %, however, taken in isolation, have a specificity and positive predictive value reduced. To increase the specificity of the diagnosis of OSA, we developed a series of screening questionnaires, three of which have been validated for perioperative use: Berlin questionnaire, STOP-BANG and ASA checklist. However, their diagnostic usefulness in the perioperative period, and their predictive ability of postoperative complications remains yet, controversially reported in the literature.

The American Society of Anesthesiologists published practice guidelines in 2006 on the perioperative management of patients with obstructive sleep apnea [8]. Based on these guidelines, perioperative care can be subdivided in 3 parts: preoperative evaluation, intraoperative management, and postoperative management (Table 1).

Preoperative Evaluation. Patients should undergo thorough history and physical examination preoperatively with the special emphasis on the evaluation of sleep apnea. One should obtain history pertinent to sleep apnea including snoring, excessive daytime sleepiness, witnessed apneas, frequent awakenings at night, and morning headaches. A focused physical examination should be conducted to evaluate neck circumference, body mass index, modified Mallampati score, tongue volume, tonsillar size, and nasopharyngeal characteristics. It is important to administer screening questionnaires like the Berlin, ASA, or STOP-BANG to identify patients at high risk for OSA. These questionnaires are simple and easy to administer preoperatively and have been validated in the surgical population. There should be an action plan for the management of high-risk patients during the perioperative period.

Tabel 1

Perioperative management of patients at high risk of obstructive sleep apnea syndrome

Preoperative Evaluation	Intraoperative Management	Postoperative Management
1. History 2. Physical Examination 3. Screening Questionnaires like Berlin, ASA, or STOP BANG to identify high-risk patients 4. Consider a formal sleep evaluation in very high-risk group	1. Minimize the surgical stress 2. Reduce the duration of surgery 3. Consider regional or local anesthesia instead of general anesthesia 4. Anticipate difficult intubation 5. Consider awake extubation preferably in semi-upright position	1. Minimize the use of opioids and sedation after the surgery 2. Consider using acetaminophen, NSAIDs, or regional analgesia for the pain control 3. Continuously monitor oxygenation in the postoperative period 4. Patients with a known diagnosis of sleep apnea should use their CPAP after the surgery 5. High-risk patients for sleep apnea should use Auto CPAP during the postoperative period 6. Follow-up at the sleep center for the management of sleep apnea upon discharge from the hospital

Intraoperative Management usually focuses on surgical measures and the type of anesthesia. One should minimize the surgical stress and the duration of surgery as these factors have been shown to increase the perioperative complications. Whenever possible, consider using regional or local anesthesia instead of general anesthesia. A recent retrospective cohort study on 18,000 adult patients, who suffered fracture of the femoral neck, showed that those anesthetized with neuro-axial block, compared with those with general anesthesia, have decreased rate of pulmonary and cardiovascular postoperative complications and decreased mortality by 25–29 % [9].

The main goal in all patients is to avoid inadequate ventilation and oxygenation resulting in hypoxaemia or hypercapnia and any associated haemodynamic changes (such as tachycardia, arrhythmia, and hypertension) leading to increased morbidity and mortality. Death, brain injury, cardiopulmonary arrest, airway trauma, and damage to teeth are among the adverse events associated with difficult airway management. The purpose of the American Society of Anesthesiologists' guidelines is to reduce the likelihood of adverse outcomes by providing basic recommendations [10]. The equipment for management of a difficult airway should be in place before induction of general anaesthesia. Orotracheal tubes in various sizes, as well as a McCoy laryngoscope and a fastrach laryngeal mask, are necessary. Fibreoptic devices may be helpful but have no impact in acute emergency situations. Oxygen must be administered for three or more minutes before intubation and, whenever possible, during the process of establishing a secure airway and also after extubation. Patients with extreme anatomical anomalies should be intubated in alert condition with optimal local anaesthesia. In the case of a ventilation emergency, surgical tracheostomy or needle cricothyrotomy should be considered early. Extubation is preferably to perform in the non-supine posture [11].

May be also related opioid respiratory depression and excessive sedation. Table 2 provides an overview of potential anesthetic concerns with the OSA patient, including management strategies to lower these potential risks [12]. Use of opioids increases this risk, and intravenous administration may cause delayed (4–12 hours after administration) respiratory depression [13]. Opioids should only be used when non-steroid anti-inflamma-

Table 2

Intraoperative managment

Anesthetic concern	Principles of managment
Sedative premedication	Avoid sedating premedication Alpha-2 adrenergic agonist (clonidine, dexmedetomidine) may reduce intraoperative anesthetic requirements and have an opioid-sparing effect
Possible difficult airway	Adequate preoxygenation ASA Difficult Airway Algorithm
Gastroesophageal reflux disease	Consider proton pump inhibitors, antacids, rapid sequence induction with cricoid pressure
Opioid-related respiratory depression	Minimize use of opioids for analgesia Use of short-acting agents (remifentanil) Regional and multimodal analgesia (NSAIDs, acetoaminophen, tramadol, ketamine, gabapentin, dexmedetomidine, dexamethasone)
Sedation	Use of propofol/remifentanil for maintenance of anesthesia Use of insoluble potent anesthetic agents (desfluran, sevofluran) Use of regional blocks as a sole anesthetic technique
Excessive sedation in monitored anesthetic care	Use of intraoperative capnography for monitoring of respiration
Post-extubation airway obstruction	Verification of full reversal of neuromuscular blockade Ensure patient fully conscious and cooperative prior to extubation Non-supine posture for extubation and recovery Resume use of positive airway pressure device

tory drugs or regional anaesthesia cannot be administered or is insufficient. Patients at increased perioperative risk from OSA should be very closely monitored in the post anesthesia care unit (PACU).

Postoperative Management. Patients at increased perioperative risk from OSA should be very closely monitored in the post anesthesia care unit (PACU) for hypoxemia or other complications. They should have continuous monitoring of oxygenation with the help of pulse oximetry. Whenever possible, these patients should be placed in the non-supine position after the surgery to decrease the severity of apnea. These patients are very susceptible to opioids and benzodiazepines and one should minimize the use of these medicines in the perioperative period. Consider using NSAIDs, acetaminophen, tramadol, and regional analgesia for pain control. Dexmedetomidine can be very useful for sedation because of its opioid sparing effect and the lack of respiratory depression. Patients with the known diagnosis of sleep apnea should use their CPAP after surgery.

CPAP acts as a pneumatic splint and helps in opening the collapsed upper airway at night. The application of CPAP also improves functional residual capacity (FRC) and oxygenation with reduction in work of breathing. CPAP has been shown to improve excessive daytime sleepiness in patients with OSAS. There is some evidence that the perioperative use of CPAP may help in reducing postoperative complications. In a case control study, Gupta et al. noted that OSA patients who were compliant with their

CPAP had reduced rate of complications and also decreased hospital length of stay [14]. Similarly, Liao et al. noted that OSA patients who were not compliant with their CPAP were at the greatest risk of having postoperative complications [15]. Squadron et al. demonstrated that the use of CPAP leads to reduction in the incidence of endotracheal intubation and other severe complications in patients who develop hypoxemia after elective major abdominal surgery [16]. A recent meta-analysis of nine randomized controlled trials in the abdominal surgical population reported reduction in the rate of atelectasis, postoperative pulmonary compications, and pneumonia with the perioperative use of CPAP [17].

Unfortunately, practice guidelines developed by the American Society of Anesthesiologists, also used by the European Society of Anesthesiology, are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by a synthesis and analysis of the current literature, expert and practitioner opinion, open-forum commentary, and clinical feasibility data.

Conclusions

Obstructive sleep apnea is a common type of sleep disordered breathing, with a high prevalence in the surgical population. The majority of patients with sleep apnea are undiagnosed and are therefore unaware of their OSAS at the time of the surgery. These patients are at increased risk for perioperative complications.

Sedation, anesthesia, opioids have been shown to cause worsening of sleep apnea in the perioperative period that may lead to increase in the rate of perioperative complications.

It is important to identify these patients preoperatively so that appropriate actions can be taken during their perioperative care.

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Надійшла 7.10.2016

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UDC 615.212.7.03:617-089.168.1

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БЛОКАДЫ НЕРВОВ ГРУДНОЙ СТЕНКИ

Блокады грудной клетки являются простым и эффективным методом лечения боли, характеризуются низким риском развития побочных эффектов и осложнений. Они требуют несколько точек размещения иглы и частой ориентации иглы для просмотра необходимой локализации. При этих типах блокад местный анестетик достигает нервов из интерфасциального пространства. Благодаря поверхностному расположению данных пространств мы можем использовать высокочастотные ультразвуковые датчики с высоким разрешением. Число точек приложения местных анестетиков постоянно увеличивается, что является шагом к открытию нового поколения блокад основанных на ультразвуковом контроле. Предстоящие проспективное рандомизированное и контролируемые клинические испытания могут клинически доказать их эффективность в торакальной хирургии.

Блокады грудной клетки: PECS I, PECS II и межлестничная блокада выполняются с помощью ультразвукового исследования при операциях на груди, множественных переломах ребер и других процедурах на грудной клетке. В данной работе описаны методы и блок анатомии. Кроме того, обсуждаются показания, осложнения и будущие перспективы блоков.

Ключевые слова: торакальная хирургия, региональная анестезия, PECS I, PECS II блокада, послеоперационное лечение болевого синдрома.