Lesson 243: PreAnesthetic Assessment of the Patient for Weight Reduction Surgery

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Lesson 243 was reviewed by Michel Gagner, MD,
Director, Cornell Weight Loss Center,
Chief, Division of Laparoscopic and Bariatric Surgery,
Weill Medical College of Cornell University,
New York-Presbyterian Hospital, New York, New York

TARGET AUDIENCE
This activity is intended for anesthesiologists.

NEEDS STATEMENT
In the United States, obesity is responsible for approximately 300,000 premature deaths per year, generating healthcare costs of approximately $100 billion; 127 million adults (65%) are obese. In fact, obesity is a greater health hazard worldwide than is malnutrition. Identification and description of this common problem has been identified by questionnaire and committee as necessary information for practicing anesthesiologists.

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LEARNING OBJECTIVES
Upon completion of this activity, the participant should be able to:
1. List the indications for weight reduction surgery.
2. Define morbid obesity.
3. Identify comorbidities associated with obesity.
4. Describe the pathophysiology of obstructive sleep apnea.
5. Recognize patients with the pickwickian syndrome.
7. Differentiate between surgical procedures utilized for weight reduction surgery.
8. Tabulate perioperative medical and surgical complications.
10. List the effects of anesthetic agents on the morbidity obese patient.

CASE HISTORY
A 46-year-old woman was scheduled for elective laparoscopic sleeve gastrectomy. She had a medical history of morbid obesity (height, 5 ft, 4 in; weight, 176 kg; body mass index [BMI], 66.6), pickwickian habits, mild rheumatoid arthritis, osteoarthritis, asthma, hypertension, type 1 diabetes, peptic ulcer disease with severe gastroesophageal reflux, and obstructive sleep apnea (OSA). She experienced daytime somnolence, heavy nighttime snoring, and had slept in a seated position for the past 2 years. She was able to walk around the house with the help of a cane, but was not able to climb stairs. A diagnostic polysomnogram determined an apnea-hypopnea index of 17. Oxygen therapy with bilevel positive airway pressure (BIPAP) settings was initiated at home as follows: FiO2, 0.35, rate 10/min, inspiratory positive airway pressure (IPAP) of +11 cm H2O, expiratory positive airway pressure (EPAP) of +4 cm H2O, spontaneous mode. The patient improved. Still, after an essentially normal echocardiogram, she was determined by a cardiologist to be a high-risk surgical candidate. Her internist, who felt that as a pickwickian she was not an optimal patient, agreed. The patient’s blood pressure was 155/82 mm Hg, and heart rate was 70 bpm. Chemistry results and the coagulation profile were within normal limits.

Introduction
The prevalence of severe obesity in 1999 to 2000 based upon US population data was 3.1% in men and 6.7% in women.1 Obesity has reached epidemic levels and is still increasing in frequency, particularly in the younger age group.1 It is a multifactorial chronic disease involving social, cultural, physiologic, metabolic, endocrine, genetic, behavioral, and psychologic components. There is a predisposition between obesity and dyslipidemia, hypertension, pulmonary hypertension, coronary artery disease, left- and right-sided heart failure, and peripheral vascular disease, thromboembolic disease including pulmonary embolus, diabetes mellitus, hepatobiliary disease, degenerative joint disease, and OSA, as well as psychosocial and sociocoeconomic impairment.2 OSA, in particular, more common in the severely obese patient, is implicated in the initiation and progression of hypertension, stroke, myocardial ischemia, congestive heart failure, cor pulmonale, and various forms of cardiac arrhythmias, such as atrioventricular block, atrial fibrillation, ventricular ectopy, and sinus bradycardia.2 A small proportion of these patients suffer from pickwickian or obesity-hyperventilation syndrome.2

Surgical Options
One of the fastest growing surgical subspecialties is bariatric surgery.3 Several sources of information are available for prospective patients and the public at large.14 Bariatric surgery, derived from the Greek baros for pressure, is the surgical discipline dedicated to the invasive therapy of morbid obesity.3 The vast majority of these operations are performed laparoscopically. Bariatric surgical procedures are to be distinguished from plastic surgical procedures designed to enhance one’s appearance or to directly reduce weight. Bariatric surgical procedures cause permanent gastrointestinal physiologic consequences to the patient, indirectly effecting weight loss, often dramatically. Surgical procedures to treat obesity are classified as intestinal bypass procedures—the so-called malabsorptive procedures, such as the biliopancreatic diversion/divulcual switch procedure—or restrictive procedures, which reduce gastric lumen.2 There are 3 types of restrictive procedures: stapled or sleeve gastoplasty, adjustable gastric banding, and the Roux-en-Y gastric bypass.2 The latter is the most commonly performed bariatric procedure in the United States. In some cases, bariatric surgery is staged. Bariatric patients may present electively at a later date for associated operations, such as closure of an abdominal wall defect or an internal hernia; they may also present emergently due to complications. The exobariatric patient may also require extensive repair of the parietal adiposus or a plastic surgeon. The optimal conduct of anesthesia for bariatric surgery requires an in-depth knowledge of the attendant gastrointestinal pathophysiology, the particular surgical procedure and its consequences, the pharmacokinetic and pharmacodynamic changes of anesthetic agents in the morbidly obese, and expertise in advanced airway management. The majority of morbidly obese patients are relatively healthy, and may be appropriate candidates for surgery at most larger community hospitals, but a significant percentage have advanced comorbidities, suffering from diseases such as severe obstructive apnea, pulmonary hypertension, cor pulmonale, venous thrombosis, and recurrent venous thrombosis. These patients should be triaged to high-risk centers, and cared for by a

PREANESTHETIC ASSESSMENT
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Authorized by:
Mount Sinai School of Medicine

Elizabeth A.M. Frost, MD
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The CME lesson is available online at www.mssm.procampus.net.
Patients presenting for weight reduction surgery often give a history of heavy snoring. Abnormal airway closing is a frequent complication (Table 3). Suspected OSA and obstructive sleep hypopnea (OSH) require preoperative sleep studies (Table 4). The most definitive of these is the polysomnogram (PSG), which differentiates between OSA and OSH, and rules out other conditions, both associated, such as upper airway resistance syndrome, and not, such as narcolepsy, insomnia, and parasomnias (eg, night terrors, sleepwalking) (Table 5). OSA is defined as a complete cessation of airflow for more than 10 seconds with persistent respiratory effort, accompanied by a reduction in oxygen saturation of at least 3% to 4% and/or an arousal from sleep. OSA is diagnosed if the apnea index is >1/hour, or >5 apneic episodes per hour, or a respiratory disturbance index, the combination of apneas and hypopneas, is >10 per hour (Table 4). A PSG is an involved and expensive test, performed at major medical centers, and is carried out by measuring a number of physiologic parameters on sleeping patients (Table 5).

The rare patient presenting with extreme obesity, hyper-somnia, alveolar hypoventilation, hypercapnia, hypoxemia, loss of hypercarbic drive, polycythemia, pulmonary hyperten-sion, and biventricular failure is often referred to as Pickwickian. This descriptive term was coined from a character in the Posthumous Papers of the Pickwick Club, written by Charles Dickens in 1837. These patients should be medically managed and optimized before proceeding to an elective weight reduction procedure.

**Diagnosis**

Ideal body weight (IBW) is determined by height, and is tabulated in the Metropolitan Life Insurance Company tables (Tables 1, 2). Originally introduced in 1943, and later modified in 1983, these tables list sex-specific desirable weights for people of various heights with small, medium, and large frames. The phrase “ideal weight” gradually became associated with these tables, although they were never defined as such. Obesity is defined as a body weight of 20% above the IBW. Patients who are >100 lb heavier than the IBW are usually unable to effectuate permanent weight loss by dietary or medical means. In the past, morbid obesity (MO) was defined as a weight of twice the IBW, or >100 lb above the IBW, but today a more exact definition has emerged, based on the BMI. BMI is defined as the weight in pounds, multiplied by a constant (703), divided by the height in inches squared; or, the weight in kilograms divided by the square of the height in meters. Healthy weight is defined as a BMI of 18.6 to 24.9; overweight, a BMI of 25 to 29.9; obesity, a BMI of 30 to 34.9; severe obesity, a BMI of 35 to 39.9; and, morbid obesity a BMI of >40.5.

**Obstructive Sleep Apnea**

Patients presenting for weight reduction surgery often give a history of heavy snoring. Abnormal airway closing is a frequent complication (Table 3). Suspected OSA and obstructive sleep hypopnea (OSH) require preoperative sleep studies (Table 4). The most definitive of these is the polysomnogram (PSG), which differentiates between OSA and OSH, and rules out other conditions, both associated, such as upper airway resistance syndrome, and not, such as narcolepsy, insomnia, and parasomnias (eg, night terrors, sleepwalking) (Table 5). OSA is defined as a partial (30%-50%) reduction in airflow with persistent respiratory effort. OSH is defined as a partial (30%-50%) reduction in airflow with persistent respiratory effort, accompanied by a reduction in oxygen saturation of at least 3% to 4% and/or an arousal from sleep. OSA is diagnosed if the apnea index is >1/hour, or >5 apneic episodes per hour, or a respiratory disturbance index, the combination of apneas and hypopneas, is >10 per hour (Table 4). A PSG is an involved and expensive test, performed at major medical centers, and is carried out by measuring a number of physiologic parameters on sleeping patients (Table 5).

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**Patient Selection**

In 1991, the National Institutes of Health Consensus Development Panel recommended that surgical treatment be considered for a patient with a BMI of 40, or >35 with the presence of severe coexisting disease. Prior to considering surgery, the following should be documented: failure of nonsurgical methods (diet, lifestyle modification, exercise, absence of endocrine disorders, abstinence from alcohol

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**Table 1. Metropolitan Life Insurance Company Height and Weight Table for Women**

<table>
<thead>
<tr>
<th>Height (ft, in)</th>
<th>Small Frame (lb)</th>
<th>Medium Frame (lb)</th>
<th>Large Frame (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'10&quot;</td>
<td>102-111</td>
<td>109-121</td>
<td>118-131</td>
</tr>
<tr>
<td>4'11&quot;</td>
<td>103-113</td>
<td>111-123</td>
<td>120-134</td>
</tr>
<tr>
<td>5'0&quot;</td>
<td>104-115</td>
<td>113-126</td>
<td>122-137</td>
</tr>
<tr>
<td>5'1&quot;</td>
<td>106-118</td>
<td>115-129</td>
<td>125-140</td>
</tr>
<tr>
<td>5'2&quot;</td>
<td>108-121</td>
<td>118-132</td>
<td>128-143</td>
</tr>
<tr>
<td>5'3&quot;</td>
<td>111-124</td>
<td>121-135</td>
<td>131-147</td>
</tr>
<tr>
<td>5'4&quot;</td>
<td>114-127</td>
<td>124-138</td>
<td>134-151</td>
</tr>
<tr>
<td>5'5&quot;</td>
<td>117-130</td>
<td>127-141</td>
<td>137-155</td>
</tr>
<tr>
<td>5'6&quot;</td>
<td>120-133</td>
<td>130-144</td>
<td>140-159</td>
</tr>
<tr>
<td>5'7&quot;</td>
<td>123-136</td>
<td>133-147</td>
<td>143-163</td>
</tr>
<tr>
<td>5'8&quot;</td>
<td>126-139</td>
<td>136-150</td>
<td>146-167</td>
</tr>
<tr>
<td>5'9&quot;</td>
<td>129-142</td>
<td>139-153</td>
<td>149-170</td>
</tr>
<tr>
<td>5'10&quot;</td>
<td>132-145</td>
<td>142-156</td>
<td>152-173</td>
</tr>
<tr>
<td>5'11&quot;</td>
<td>135-148</td>
<td>145-159</td>
<td>155-176</td>
</tr>
<tr>
<td>6'0&quot;</td>
<td>138-151</td>
<td>148-162</td>
<td>158-179</td>
</tr>
</tbody>
</table>


**Table 2. Metropolitan Life Insurance Company Height and Weight Table for Men**

<table>
<thead>
<tr>
<th>Height (ft, in)</th>
<th>Small Frame (lb)</th>
<th>Medium Frame (lb)</th>
<th>Large Frame (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'2&quot;</td>
<td>128-134</td>
<td>131-141</td>
<td>138-150</td>
</tr>
<tr>
<td>5'3&quot;</td>
<td>130-136</td>
<td>133-143</td>
<td>140-153</td>
</tr>
<tr>
<td>5'4&quot;</td>
<td>132-138</td>
<td>135-145</td>
<td>142-156</td>
</tr>
<tr>
<td>5'5&quot;</td>
<td>134-140</td>
<td>137-148</td>
<td>144-160</td>
</tr>
<tr>
<td>5'6&quot;</td>
<td>136-142</td>
<td>139-151</td>
<td>146-164</td>
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<tr>
<td>5'7&quot;</td>
<td>138-145</td>
<td>142-154</td>
<td>149-168</td>
</tr>
<tr>
<td>5'8&quot;</td>
<td>140-148</td>
<td>145-157</td>
<td>152-172</td>
</tr>
<tr>
<td>5'9&quot;</td>
<td>142-151</td>
<td>148-160</td>
<td>155-176</td>
</tr>
<tr>
<td>5'10&quot;</td>
<td>144-154</td>
<td>151-165</td>
<td>158-179</td>
</tr>
<tr>
<td>5'11&quot;</td>
<td>146-157</td>
<td>154-166</td>
<td>161-184</td>
</tr>
<tr>
<td>6'0&quot;</td>
<td>149-160</td>
<td>157-170</td>
<td>164-188</td>
</tr>
<tr>
<td>6'1&quot;</td>
<td>152-164</td>
<td>160-174</td>
<td>168-192</td>
</tr>
<tr>
<td>6'2&quot;</td>
<td>155-168</td>
<td>163-178</td>
<td>172-196</td>
</tr>
<tr>
<td>6'3&quot;</td>
<td>158-172</td>
<td>167-182</td>
<td>176-202</td>
</tr>
<tr>
<td>6'4&quot;</td>
<td>162-176</td>
<td>171-187</td>
<td>181-207</td>
</tr>
</tbody>
</table>


**Table 3. Anatomic Sites of Airway Closure in the Patient With MO and OSA.**

<table>
<thead>
<tr>
<th>Anatomic Site</th>
<th>NR/PR</th>
<th>Therapeutic Maneuver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongue</td>
<td>CN IX/genioglossus muscle tone</td>
<td>Oral airway</td>
</tr>
<tr>
<td>Soft palate</td>
<td>CN IX/tensor palate Prolapse against retropalatal space (nasopharynx)</td>
<td>Nasal airway</td>
</tr>
<tr>
<td>Hyoid bone</td>
<td>CN X/hyoid muscles Prolapse against retroepiglottic space (laryngopharynx)</td>
<td>Jaw thrust</td>
</tr>
</tbody>
</table>

Therapeutic maneuver maintains patency during spontaneous respiration of the respective anatomic air space. Hyoid muscles (geniohyoid, sternohyoid, thyrohyoid) move the hyoid bone anteriorly with a phasic response, in response to an increase in upper airway resistance, occurring during sleep, or after sedation or anesthesia, by tensing the hypopharyngeal ligament. Suboptimal function in MO with OSA, due to anterior adiopose.©

MO, morbid obesity; NR, normal physiologic response maintaining airway patency; OSA, obstructive sleep apnea; PR, pathophysiologic response resulting in airway closure.
and drug use, and a psychological evaluation). Antidiobesity or satiety medications such as sibutramine or orlistat promote safely early after onset of eating, primarily by reuptake of nor-ephinephrine, serotonin, and dopamine. They are occasionally utilized in the setting of a multidisciplinary weight loss pro-
gram, both for attempted conservative treatment, and for pre-
operative “tune up” of confirmed surgical candidates. When conser-
tative therapy fails, patients are evaluated for surgical therapy. At the time that they present for surgery, many patients will have achieved a 20- to 50-lb weight loss (person-
al communication, M. Gagner, MD). Objective criteria exist for postoperative outcome measurement, such as the Bariatric Analysis and Reporting Outcome System (BAROS), which evaluates excess weight loss, medical comorbidity, and qual-
ity of life, and gives 5 categories of postoperative result (failure, fair, good, very good, and excellent). It is important that the patient has realistic expectations regarding the proposed sur-
gical outcome. An optimal result is only reached when the patient is educated and fully compliant.

Preanesthetic Evaluation

A detailed review of the MO patient is essential. Medical conditions need to be identified and optimized, preferably with the assistance of the primary physician. Physical examination consists of the airway, as well as the respiratory and cardio-
vascular systems. A full airway assessment is conducted, con-
sisting of the 5 routine clinical criteria (Mallampali class, atlanto-occipital joint extension, temporomandibular joint func-
tion and interincisor distance, mento-hyoid distance, and dentiti-
on), and 3 clinical criteria specific for the MO patient (neck circumference <45.6 cm, pretracheal fat <2.5 cm, and lack of hypertrophic tonsils and adenoids). Neck circumference >15 in women and >17 in men and pretracheal fat >1 in correlate with difficult laryngoscopy.2 Anterior neck soft tissue is quanti-
fi ed via ultrasonography at the level of the vocal cords; values >25 mm correlate with difficult laryngoscopy.4 According to some authorities, weight >400 lb (181.8 kg) is an indication for dif-
ficult airway situation in MO driven by excessive tongue and pharyngeal soft tissue, which can complicate tracheal intubation, and predis-
pose to massive pharyngeal collapse.7 These patients may also be at increased risk of respiratory arrest in the immediate postoperative period, from residual anesthetic effect. A history of snoring in MO patients mandates a preoperative sleep study.11 Respiratory and cardiovascular examination focuses on the presence of comorbidities and decompensation from obesity (eg, signs and symptoms of right heart failure). The patient with cardiac disease, whether primary or secondary to OSA (eg, cor pulmonale), requires evaluation by the internist or cardiologist, typically starting with an echocardiogram.

Anesthetic Care

The goals of anesthetic management are to smoothly intu-
bate the trachea; protect the airway; optimize surgical condi-
tions; and provide a consistent, expeditious, and pain-free op-
terative strategy. During transport to the postanesthesia care

Table 4. Differential Diagnosis,2,6

<table>
<thead>
<tr>
<th>Disorder</th>
<th>NS</th>
<th>DS</th>
<th>AF</th>
<th>PO</th>
<th>AIH</th>
<th>RDI</th>
<th>DP</th>
<th>CVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>&gt;15</td>
<td>&gt;4%</td>
<td>5-10</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>OSA</td>
<td>+</td>
<td>++++</td>
<td>100</td>
<td>&gt;5</td>
<td>&gt;10</td>
<td>&gt;30</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>PS</td>
<td>+++</td>
<td>++</td>
<td>100</td>
<td>&gt;5</td>
<td>&gt;10</td>
<td>&gt;30</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 5. Polysomnographic Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-6 EEG channels</td>
<td>Measures electrical activity of the brain, documents sleep cycles</td>
</tr>
<tr>
<td>2 channels of EOG</td>
<td>Distinguishes REM from non-REM sleep</td>
</tr>
<tr>
<td>OMS, EMG</td>
<td>EMG monitors arousal and activity of upper airway muscles</td>
</tr>
<tr>
<td>Airway microphone</td>
<td>Monitors respiratory effort</td>
</tr>
<tr>
<td>Elastic belts</td>
<td>Placed on chest and abdomen, monitors respiratory effort</td>
</tr>
<tr>
<td>Video camera</td>
<td>Monitors excitation, cardiac activity</td>
</tr>
<tr>
<td>Pulse oximetry</td>
<td>Monitors oxygen saturation</td>
</tr>
<tr>
<td>2-8 EMG channels</td>
<td>Monitors leg movements</td>
</tr>
</tbody>
</table>

Figure 1. The effect of change in position on various lung volumes in nonobese and morbidly obese patients.

Table 4. Differential Diagnosis

- OSH: airflow (HR reduction for >10 sec); AHIC, apnea-hypopnea index (apneic or hypopneic episodes/h); CVC, cardiovascular complications ( + possible, ++ likely, +++ definite);
- DP, disease progression; NS, nasal stridor; OSA, obstructive sleep apnea; OSH, obstructive sleep hypopnea; PO, proportion; S, severe (at least 10% reduction in time of apneas); PS, Pickwickian syndrome; RDI, respiratory disturbance index (no. apneic plus hypopneic episodes/h); Times/h, apneic or hypopneic episodes measured hourly.

Data must be combined with clinical findings.


The patient should be recovered in a section of the PACU with constant nursing presence, and the pertinent his-
tory should be conveyed both to the registered nurse and to the physician covering the PACU. PCA should be utilized in the demand mode without constant infusion.

The patient with severe obstructive sleep apnea-hypopnea syndrome (OSAHs) requires the same or higher continuous positive airway pressure (CPAP), or BIPAP, settings used at home, on arrival to the PACU. Patients typically return post-
operatively to the same type of mask with which they are famil-
 iar. It is important to know the settings, and type of mask, that were recommended in the preoperative PSG. Three types of masks are available: nasal, oral, and oral/nasal. Mouth breathers require either an oral or oronasal mask. OSAHs is primarily a disease of upper airway pressure receptor dysfunc-
tion, causing periodic, partial, or complete collapse.2 Once the upper airways are tented open, oxygenation and ventilation are relatively easily maintained. Bronchospasm is typically absent and addition of oxygen is often a minor component of therapy. Mild to moderate disease is treated by CPAP (IPAP)

Continuing Medical Education

Anesthesiology News
1. Assess the likelihood and clinical impact of basic management problems:
   a. Difficult ventilation
   b. Difficult intubation
   c. Difficulty with patient cooperation or consent
   d. Difficult tracheostomy

2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.

3. Consider the relative merits and feasibility of basic management choices:
   a. Awake intubation vs intubation attempts after induction of general anesthesia
   b. Noninvasive technique for initial approach to intubation vs invasive technique for initial approach to intubation
   c. Preservation of spontaneous ventilation vs ablation of spontaneous ventilation

4. Develop primary and alternative strategies:

   A. AWAKE INTUBATION

   - Airway approached by noninvasive intubation
   - Airway secured by surgical access
   - Initial intubation attempts successful
   - Initial intubation attempts unsuccessful
   - Face mask ventilation adequate
   - Face mask ventilation not adequate
   - Consider/Attempt LMA
   - Emergency noninvasive airway ventilation
   - LMA adequate
   - LMA not adequate or not feasible
   - Emergency invasive airway access

   B. INTUBATION ATTEMPTS AFTER INDUCTION OF GENERAL ANESTHESIA

   - From this point onward, repeatedly consider:
     1. Calling for help
     2. Returning to spontaneous ventilation
     3. Awakening the patient

   Nonemergency Pathway
   - Ventilation adequate, intubation unsuccessful
   - Alternative approaches to intubation

   Emergency Pathway
   - Ventilation not adequate, intubation unsuccessful
   - Call for help

   - Successful intubation
   - Invasive airway access
   - Consider feasibility of other options
   - Awaken patient
   - Emergency invasive airway access

   - Fail after multiple attempts
   - Invasive airway access
   - Consider feasibility of other options
   - Awaken patient
   - Emergency invasive airway access

   - Fail
   - Emergency invasive airway access

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Figure 2. Difficult airway algorithm.

*Confirm ventilation, tracheal intubation, or LMA placement with exhaled CO₂.

†Other options include (but are not limited to): surgery utilizing face mask or LMA anesthesia, local anesthesia infiltration, or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the emergency pathway.

‡Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.

§Alternative noninvasive approaches to difficult intubation include (but are not limited to): use of different laryngoscope blades, LMA as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, retrograde intubation, and blind oral or nasal intubation.

Cost-Preparation of the patient for awake intubation or cancellation of surgery.

¶Options for emergency noninvasive airway ventilation include (but are not limited to): rigid bronchoscope, esophageal-tracheal Combitube ventilation, or transtracheal jet ventilation.

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only in the lowest settings that allow a patent airway in a patient, who is sleeping and comfortable. Severe disease is treated by the addition of BIPAP (IPPV plus EPAP). Bariatric patients with OSAHS receiving CPAP or BIPAP in the PACU should be closely monitored for approximately 6 hours, and observed for level of consciousness, airway obstruction, ventilatory insufficiency or collapse, and apneic episodes. Once they have been determined to be clinically stable, they may be returned to the ward, with a respirator. The equiocal, or clinically unstable, patient requires a monitored bed setting.

Management of the Case Presented

The anesthetic plan was discussed with the patient and the healthcare team. She was transported to the operative suite, and standard monitors were applied. She was positioned in a ramped, as opposed to a sniff position. After administration of an antiallogogue (glycopyrrolate) and a propulsive agent (metoclopramide), a nebulized treatment of 5% lidocaine was given. Oxygen was administered via nasal cannulae. Dexamethomidine sedation was given by bolus (1 mcg/kg over 10 min), followed by infusion (7 mcg/kg per hour), based on actual body weight, to produce sedation for airway management. After the patient was moderately sedated, topical oral local anesthetic was administered, as well as airway nerve blocks, consisting of lidocaine (2% lidocaine, 60 mg bilaterally), translaryngeal (4% lidocaine, 160 mg), and nasal (4% cocaine, 160 mg). The nasal route for fiber-optic intubation was deemed optimal, because of relative macroglottis. The nares were dilated with a nasal airway. A nasal fiber-optic intubation was performed, and the patient was intubated easily. Maintenance anesthetic consisted of a 40% mixture of air/O₂, desflurane, and infusions of remifentanil and cisatracurium. Mechanical ventilation settings consisted of pressure control ventilation, optimized inspiratory-expiratory (I:E) ratios (1:1), and PEEP. One hour before the conclusion of the procedure, the muscle relaxant was discontinued, morphine sulfate was given, a 50% mixture of nitrous oxide/oxygen was started 5 minutes before the end, and the infusion of remifentanil was discontinued. The muscle relaxant effect was reversed, and the patient’s trachea was extubated when she was fully awake. Nasal cannula oxygen was administered for transport. On arrival in the PACU, nasal BIPAP was administered at identical settings to those that the patient used at home. In addition to an assessment by the nursing staff, she was assessed by respiratory care personnel for BIPAP efficacy and patient comfort. Three hours later, the patient was transferred to the ward, and she was discharged home on day 4.

Conclusion

Bariatric surgery is useful for definitive treatment of MO (BMI >40) unreponsive to medical management, or severe obesity with serious coexisting medical problems (BMI, 35-39.9). The number and complexity of bariatric surgical procedures performed annually in the United States has been growing steadily; this trend should continue well into the future. With careful patient selection, excellent long-term outcome is reached by current surgical practice. Anesthesiologists caring for these patients have both ample risks and rewards. It is important that the specialty of anesthesiology adapts to the development of this new and interesting field.

References


PreAnesthetic Assessment of the Patient For Weight Reduction Surgery

Lesson 243: Post-test

Select the single-letter response that most correctly answers the question or completes the sentence.

1. All of the following are true of morbid obesity except:

   a. higher prevalence in females
   b. increasing frequency particularly in the younger age groups
   c. a body mass index of 39
   d. according to the World Health Organization, morbid obesity has reached epidemic proportions in industrialized countries

2. Comorbidities associated with morbid obesity are least likely to include:

   a. thromboembolic disease
   b. cerebrovascular disease
   c. obstructive sleep apnea
   d. primary bronchospastic disease

3. The most suitable potent inhalation anesthetic for the maintenance phase of bariatric surgery is:

   a. isoflurane
   b. nitrous oxide
   c. sevoflurane
   d. desflurane

4. Based on pharmacokinetic considerations, the most suitable opioid for the maintenance phase of bariatric surgery is:

   a. fentanyl
   b. sufentanil
   c. remifentanil
   d. alfentanil

5. Criteria for alternative airway management in morbidly obese patients are likely to include all of the following except:

   a. neck circumference of 51 cm
   b. pretracheal fat of 3 cm
   c. history of pulmonary hypertension
   d. beckian condition requiring semirecumbent posture

6. The most commonly performed bariatric surgical procedure in the United States is:

   a. sleeve gastrectomy
   b. biliopancreatic diversion/duodenal switch
   c. adjustable band gastroplasty
   d. Roux-en-y

7. All of the following statements about BAROS (Bariatric Analysis and Reporting Outcome System) are true except:

   a. It is an objective scoring system for surgical outcome measurement.
   b. It evaluates excess weight loss, medical comorbidity, and quality of life.
   c. Its scores are failure, good, and excellent.
   d. It requires patient education.

8. Postoperative ventilatory failure in the patient with obstructive sleep apnea is least commonly caused by:

   a. redundant hypopharyngeal tissue
   b. acute cor pulmonale
   c. loss of tensor palatini muscle tone on the velopharynx (nasopharynx)
   d. macroglottis

9. Postoperative pain management after bariatric surgery is best achieved with:

   a. neuraaxial block
   b. local instillation of lidocaine to the wound
   c. bolus morphine 10 mg at 15-minute intervals
   d. patient-controlled analgesia on demand without continuous baseline setting

10. The most severe case of obstructive sleep apnea is that treated in the postanesthesia care unit with:

    a. BIPAP of 15/10 cm H₂O, FiO₂ of 0.3
    b. CPAP of 15 cm H₂O, FiO₂ of 0.4
    c. albuterol nebulizer
    d. CPAP of 12 cm H₂O, FiO₂ of 0.5

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