Globally 1.7 billion adults are overweight, and about 300 million are obese. A majority of these people live in this country. Not only do excess pounds burden these patients but they also contribute to hypertension, diabetes, sleep apnea, congestive heart failure, dyslipidemia, osteoarthritis, cholelithiasis and gout. Weight loss decreases the risks associated with these conditions. The medical approach to weight loss involves changes in lifestyle, dietary habits, drugs and, finally, surgery. Medical options for weight loss are limited, at best. Surgery is the definitive treatment for weight loss.

Bariatric surgery, presents a unique set of intraoperative challenges to the anesthesiologist. Challenges in starting intravenous (I.V.) lines (difficult to visualize or palpate veins), positioning supine (which predisposes to hypoxemia), ventilation by mask (difficult) and using highly lipophilic drugs (prolonged effects) are just some of the issues.

In the management of these patients, preoperative evaluation, other than the routine, should focus on an assessment of cardiopulmonary status and the airway, including systemic and pulmonary hypertension, right and left heart failure, ischemic heart disease and diabetes. Assessing common signs of heart failure — such as raised jugular venous pressure, added heart sounds, pulmonary crackles, hepatomegaly and peripheral edema in the super morbidly obese — is complex. Symptoms of pulmonary hypertension such as exertional dyspnea, fatigue and syncope are similarly difficult to assess in patients who are probably not very active and possibly bed- or wheelchair-bound.

One may suspect tricuspid regurgitation (TR), implying pulmonary hypertension, by an electrocardiogram showing tall R waves, right axis deviation and right ventricular strain. The diagnosis of TR can then be confirmed by echocardiography. Prominent pulmonary artery markings, on chest radiographs, are further evidence of pulmonary disease.

The problem of obstructive sleep apnea (OSA) is another common comorbid factor in this patient population. Most patients will have been tested preoperatively and should be advised to bring their continuous positive airway pressure (CPAP) mask and/or machine to the hospital for use.

Even a small-gauge I.V. access to get the case started is acceptable. After induction and intubation, vasodilatation from volatile agents help with placement of a second, larger I.V. Titration of benzodiazepines in small doses for anxiolysis is preferable in these cases. Aspiration prophylaxis is probably best achieved by a pre-induction administration of a 5HT3 antagonist along with a prokinetic agent. Similarly, deep venous thrombosis (DVT) prophylaxis should be addressed preoperatively.

For patients having open gastric bypass, even though technically difficult, a functioning epidural goes a long way in advancing rapid recovery by promoting ambulation, decreasing DVT, decreasing O2 consumption, decreasing left ventricular stroke work and promoting intestinal recovery.

In the operating room, positioning of the patient on a ramp versus the sniffing position, after placement of standard monitors, allows better conditions for intubation. The patient is positioned such that the external auditory meatus is at about the level as the sternal notch, which is achieved by either commercial sponge devices, a pile of blankets or by tilting the bed.

*****Prior to induction, preoxygenation is accentuated by pressure support ventilation (PSV). Having an anesthesia machine capable of delivering PSV with 100 percent oxygen facilitates preoxygenation significantly. A few minutes of PSV achieves an improved reserve (PaO2) and allows a few critical extra moments during apnea before the predictable and rapid desaturation with apnea.

Based on the analysis of the airway classification, the common induction option is rapid sequence with a small dose of an opioid and short-acting drugs (unless contraindicated) such as propofol and succinylcholine. Due to relaxation of oropharyngeal soft tissue after induction, these
patients are frequently more difficult to ventilate than to intubate. Placement of a nasal airway (or trumpet) immediately after induction may allow better oxygen delivery if mask ventilation is attempted or needed\(^2\).

Whether a difficult airway is expected or not prior to induction, a plan for managing a difficult intubation should be in place. Fiberoptic intubation is one such option. Spontaneously breathing the patient down with sevoflurane is another option. It is advisable to have multiple tools for a difficult intubation in place, including different sizes and styles of blades (GlideScope®, Fastrack®, Airtraq®) and other airway devices. The laryngeal mask airway (LMA) is one commonly used, good temporizing measure with which most anesthesia practitioners are familiar. Should direct laryngoscopy fail initially, by placing a functioning LMA, it is relatively easy to exchange the LMA for the endotracheal tube (ETT) via either a Cook Exchange Airway Catheter® or an Aintree®.

Given the nature of surgery and the physiology of the patient, a combination of desflurane in oxygen and air is probably preferable to using nitrous oxide. Superiority of desflurane has been established in the last few years. Some recent data suggest that the difference between desflurane and sevoflurane may not be significant. Moderate positive end-expiratory pressure of 7 cms to 10 cms, tidal volume of 10-12 cc/kg and a respiratory rate of 12-14 per minute are probably appropriate\(^4\).

Once the airway is secured with an inflated ETT, we start another I.V., apply warming devices, place a Foley catheter and position the patient for surgery. The Foley helps in assessing intraoperative hydration, since these patients also are at increased risk of acute tubular necrosis if allowed to run on the dry side.

Intraoperative drug dosing should recognize that the patient’s fat stores will significantly affect metabolism of lipophilic drugs. Lipophilic drugs such as barbiturates and benzodiazepines have an increased volume of distribution; the relevant exceptions to this are remifentanil, digoxin and procainamide. Conversely, lipophobic drugs should be dosed for ideal body weight or lean body mass.

Toward the end of the case, an appropriate amount of I.V. morphine may be administered (0.1 mg/kg, up to 10 mgs). To facilitate analgesia in the absence of respiratory depression, adjunctive nonsteroidal anti-inflammatory drugs should be considered. Extubation after complete reversal of paralysis in the semirecumbent position is ideal. Patients with a history of CPAP usage at home are placed on the CPAP or a bi-level positive airway pressure machine as soon as possible. After meeting all appropriate criteria, these patients should be discharged from the postanesthesia care unit to a monitored bed in the hospital\(^5\).

The anesthetic challenges of morbid obesity are many, but the corresponding satisfaction achieved after a successful case is large.

REFERENCES