Office-Based Anesthesia: Dispelling Common Myths

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BACKGROUND: Running parallel with—and perhaps driven by—the huge increase in demand for cosmetic surgery, office-based anesthesia (OBA) is the fastest growing segment of anesthesia practice. Despite this, only 2% of anesthesiology residencies provide exposure to OBA, and many practicing anesthesiologists are not convinced that OBA techniques provide safe, reliable, and effective anesthesia care.

OBJECTIVE: To examine OBA techniques and safety records while addressing some of the commonly held beliefs among anesthesiologists regarding OBA.

METHODS: A review of 4800 patients undergoing 5264 cosmetic surgical procedures performed between 1997 and 2007 at Dudley Street Operatory (licensed in Rhode Island as a Physician Office Setting Providing Surgical Treatment and certified by the American Association for Accreditation of Ambulatory Surgery Facilities) was conducted. The primary anesthetic technique was deep sedation with a propofol ketamine infusion, combined with local anesthetic injection. Intercostal nerve blocks were performed before surgery in patients who had breast surgery and/or abdominoplasty. Endotracheal or laryngeal mask airway techniques were not used, nor were paralyzing agents, anesthetic gases, or vapors.

RESULTS: There were 16 unanticipated postoperative admissions in 10 years, all but 3 from surgical complications (hematoma, infection, and pneumothorax during dissection for breast implants). One patient had an acute reaction to a small volume of local anesthetic injected into the nasal septum, one patient with a history of panic attacks had an acute anxiety attack manifested as chest pain, and one patient refused discharge from the operatory to home after a face lift, despite meeting postanesthesia care unit discharge criteria, and was admitted overnight to the hospital. There were no hospital admissions because of pain, nausea, or excessive sedation.

CONCLUSIONS: In experienced hands, OBA techniques deliver an anesthetic for office-based cosmetic surgery superior to the usual general anesthesia performed in hospitals and ambulatory surgical centers. These techniques are safe, do not require expensive equipment other than an infusion pump and vital signs monitor, avoid sore throats and nausea, provide postoperative analgesia, and are well received by patients and surgeons. OBA presents an opportunity for anesthesiologists and aesthetic surgeons to partner for greater patient satisfaction. (Aesthetic Surg J 2008;28:564–570.)
rience superior to that resulting from typical hospital/ASC general anesthesia.

METHODS

Between 1997 and 2007, 5264 cosmetic surgical procedures were performed on 4800 patients at the Dudley Street Operatory, which is licensed in the state of Rhode Island and certified by the American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF) for office-based surgery under local anesthesia and deep sedation (Table 1).

The anesthetic technique used was local anesthesia with propofol ketamine (PK) infusion. For rhinoplasty and rhytidectomy, surgeons selected and injected local anesthesia directly into the surgical field (usually lidocaine and/or bupivicaine with epinephrine 1:100-200,000). For abdominoplasty, bilateral posterior intercostal nerve blocks (ICNB) from T-5 or T-6 through T-12 were performed, using 3 mL/block of a local anesthetic mixture of lidocaine 0.5%/bupivicaine 0.125%/epinephrine 1:200,000. Similarly, breast surgery was performed after bilateral anterior intercostal nerve blocks from T-3 through T-10. For both abdominoplasty and breast augmentation, additional local anesthetic mixture was diluted with Ringer’s lactate and injected as a “field block.” The total dose of local anesthetic mixture was 100 mL for either abdominoplasty or breast augmentation, and 120 to 150 mL when these procedures were combined. Lipoplasty was performed with the tumescent technique using no more than 6 L of Klein’s solution.

After appropriate monitoring, an infusion of propofol 10 mg/mL plus ketamine 1 mg/mL was begun at a rate of 50 μg/kg/min, following an anxiolytic dose of midazolam 2 mg (Versed; Roche Laboratories, Nutley, NJ) and fentanyl 25 to 50 μg. Bolus administration of PK and ketamine 20 to 30 mg was given just before local anesthetic injection so that the patient remained calm and unaware. The basal rate of 50 μg/kg/min was rarely exceeded; supplemental boluses of PK and small doses of midazolam, fentanyl, or ketamine were given as indicated (patient movement, local anesthetic injection). Most patients received prophylactic antiemetics—combinations of dexamethasone, metaclopromide, droperidol, ondansetron, and dolasetron. Intraoperative blood pressure was controlled when necessary with labetalol, metoprolol, propranolol, and hydralazine. Oxygen supplementation was provided with nasal prongs when feasible; a standard Levin stomach tube threaded through a nasal trumpet or oral airway and securely attached to a source of oxygen was used in facial surgery. The flow rate was no greater than necessary to maintain adequate saturation.

Total operating room time was frequently 6 to 7.5 hours for extensive body contouring and facial rejuvenation surgeries. All patients were cooperative and adequately awake after bandaging to assist themselves into a recovery lounge chair. Recovery in the postanesthesia care unit (PACU) continued until the patient was awake, alert, and sufficiently stable to leave in a wheelchair accompanied by a responsible adult; no minimum time of stay was established. No parenteral narcotics were administered in the PACU; pain was treated as needed with oxycodone and acetaminophen, 1 to 2 tablets before discharge.

RESULTS

All patients save for 16 had uneventful surgical and anesthetic courses. Of those 16 unanticipated hospital admissions, 3 patients were admitted for antibiotic treatment of surgical infections and 5 had hematomas or bleeding that required intervention. Five patients had pneumothorax; in 4 of these patients, this was immediately apparent during surgical dissection of the chest wall musculature for breast augmentation, and in 1 patient this was diagnosed 24 hours postoperatively. One patient had an acute reaction, manifested by hypotension, apnea, and bradycardia, to a small volume of local anesthetic (lidocaine with epinephrine) injected into the nasal septum during rhinoplasty. Rescue endotracheal intubation and resuscitation was immediately per-
formed, and the patient was transferred to the hospital where recovery was quick; the patient left the hospital the next day without sequelae. One patient with a history of panic attacks complained of chest pain in PACU and was admitted to rule out myocardial ischemia; the episode was later attributed by the patient to “anxiety.” One patient who was expected to go home with a caretaker after a face lift insisted instead on admission to a hospital, which was arranged. No patients were admitted for treatment of pain, nausea/vomiting, or excessive sedation. Nausea of any magnitude was rare (<1%) and vomiting even rarer (<0.5%).

DISCUSSION

To develop a plan for anesthesia care in the office-based surgical facility, the anesthesiologist should consider all available sources of information. As previously noted, training in OBA techniques during residency is rare. However, review articles specific to OBA and directed to particular techniques useful for cosmetic surgery (PK and propofol dexmedetomidine infusion) are available, and the recent publication of the first textbook devoted to anesthesia for cosmetic surgery is a welcome addition. Yet it appears that even in an environment of evidence-based medicine, the experience and eyewitness accounts of office-based anesthesiologists are valuable; notably, such experience often may challenge the conventional wisdom of anesthesiology training and hospital practice. What follows is a discussion of commonly held beliefs among anesthesiologists proven to be invalid by those experienced in OBA.

Myth: Office-Based Anesthesia is Unsafe

Although office-based surgery has been called the “wild, wild west” of health care, numerous studies attest to the safety of surgery and anesthesia performed in accredited facilities by specialists practicing within their area of credentialed expertise. In 1997, Morello et al reviewed 400,000 cases (over 5 years) performed by surgeons certified by the American Board of Plastic Surgery in 250 facilities accredited by the AAAASF. There was a 0.47% complication rate, which is comparable to free-standing or hospital-based ASCs. In 2001, Hoeflin et al reported on adverse incidents in offices and ASCs in Florida during 2000 to 2006; there were 46 deaths, 20 related to plastic surgery. Nine were delayed deaths, of which 7 were caused by thromboembolism. Of the 11 deaths occurring in the OBPSF, the causes were anaphylaxis, bronchospasm, fat embolism (1 each); oversedation with inadequate monitoring or illicit drug use interaction (6 cases); 2 causes of death were unknown. The authors concluded that the location in which the procedures were performed was not as much a contributing factor as the regulators had suggested. To these data, I add the experience reported at DSO of 16 unanticipated admissions in 4800 patients over 10 years, an incidence of 0.3% without a death.

OBA is not unsafe if it is performed in an accredited facility by board-certified specialists who are credentialed for the same procedures in a hospital, and who wisely select patients appropriate for office-based care. In 1999, the American Society of Anesthesiologists (ASA) House of Delegates adopted “Guidelines for OBA” and a related “Statement on Qualifications of Anesthesia Care Providers in the Office-Based Setting,” which made clear that ASA standards applicable to care in hospitals and ASCs also applied to OBA.

Myth: Monitored Anesthesia Care Means “Awake” Patient

To state the obvious, monitored anesthesia care (MAC) is the only kind of care anesthesiologists provide. MAC is a specific anesthesia service, not a description of a level of consciousness or sedation. MAC often includes the administration of medications that cause the loss of appreciation for noxious stimuli in a continuum of degrees of sedation. However, if protective reflexes are lost for an extended period of time (especially airway reflexes), the line blurs between MAC, deep sedation, and general anesthesia. The level of sedation may vary during a single case, and from case to case. Infusion techniques using propofol, ketamine, and other adjuvants are clearly different from “conscious sedation” and their use should be restricted to qualified anesthesia personnel. Skill in achieving variable levels of sedation with infusion anesthesia, essential to success in OBA, is not
easily attained in anesthesia residency because of the universal availability of anesthesia machines and invasive airway devices in hospitals and ASCs; “put the patient to sleep” means “put in a tube and turn on the vaporizer.”

The ideal anesthetic for OBA has several essential features. It should be short-acting and fast-emerging (SAFE), its delivery not dependent on an anesthesia machine and scavenging system, associated with pleasant recovery rather than PONV, applicable and effective for a wide variety of surgeries, and economical. In Friedberg’s words, “The ideal anesthetic technique would be one that is simple and safe and gives the illusion of general anesthesia, ie, the patient neither feels nor hears the surgery.”

Perhaps it is unfamiliarity with the advantages of infusion anesthesia combined with local anesthesia in the office setting that causes surgeons to conclude that “intravenous sedation is now suboptimal for most longer and complex surgical procedures under most circumstances” and “general endotracheal anesthesia provides superior conditions for the surgeon, patient, and anesthesiologist.” despite 1 in 20 patients suffering PONV and sore throat in the reported study. Likewise, there is little to recommend “conscious sedation” as described by Kryger et al in office-based abdominoplasty, in which patients first received up to 50 mg of diazepam followed by incremental doses of midazolam and fentanyl, administered by a nurse with “no specialized anesthesia training” in response to the surgeon’s “own assessment of arousal to verbal stimulation.” The experience of DSO is that patients want to be asleep, and surgeons want their patients to be asleep, but do not want them to have significant pain, sedation, or postoperative nausea. They want only qualified anesthesia care providers involved in the administration of anesthesia. For OBA, anesthesiologists must “think outside the box”—in this case, the anesthesia machine—and be able to tell the patient preoperatively, “You won’t be getting conventional general anesthesia: no breathing tubes, paralyzing drugs, or vapors or gases to breathe. You’ll receive intravenous sedation continuously, and after that begins, you’ll get local anesthesia injections to numb the surgical field. You won’t feel or be aware of those injections, and it is extremely unlikely that you’ll remember anything at all—certainly nothing unpleasant. The anesthesiologist will be with you the entire time, and the level of sedation can be adjusted at any minute to ensure that you’ll receive just the right amount: not too much and not too little. After surgery, in recovery, you should have very little discomfort, and the chances of any stomach upset are very remote.” The ability of the anesthesiologist to deliver on these promises to the patient is the standard by which OBA should be judged.

**Myth: Airways Need “Control”**

Some anesthesiologists definitively refer to the deep sedation technique described above as “general anesthesia without an airway.” In reply, I would remind them that all mammals do, in fact, have a natural airway. The OBA concept of the natural airway is that it is not “out of control.” Because of its anatomy and physiology, the airway in most patients works well even with patients under deep sedation, prone or lateral, and without invasive airway devices (endotracheal tubes/laryngeal mask airways [LMAs]). Intubation of the trachea is not mandatory to avoid aspiration or improve oxygenation, nor are LMAs needed except in the rare case of soft tissue upper airway obstruction that cannot be remedied by simpler means (2 LMA insertions in 4800 patients at DSO). Eliminating tracheal intubation—except, of course, in an emergency rescue situation—avoids the following problems: certain malignant hyperthermia triggers, difficult intubations, sore throats, accidental disconnects of components of the breathing system, anesthesia depth necessary to maintain the endotracheal tube, increased risk of aspiration during intubation and extubation, postextubation coughing and laryngospasm leading to ecchymosis in fresh incisions, and increased incidence of PONV associated with general anesthesia.

Spontaneous ventilation with room air is frequently adequate to maintain oxygenation during sedation. Although brief periods of oxygen desaturation are tolerated without negative consequences in healthy patients, hypoxemia and cerebral ischemia may rapidly cause catastrophic problems. At DSO, oxygen supplementation of inspired air is administered whenever needed, and the need is always anticipated. Nasal prongs are used whenever possible, sometimes aided with oropharyngeal or nasopharyngeal airways (OPA/NPA.) Creative solutions to airway patency and oxygen supplementation are needed for facial surgery.

Two inexpensive and effective solutions during rhinoplasty and rhytidectomy are presented (Figures 1 and 2). A 16 Fr. Levin stomach tube threaded through a Berman OPA or a No. 7 NPA is attached with a universal adaptor to an oxygen source. The secure connection should be at a distance from the operative field, not covered by drapes, and available for inspection at any time. The flow of oxygen is the only factor necessary to maintain adequate saturation and may be interrupted during electrocautery.

End-tidal carbon dioxide (ET CO₂) monitoring equipment is available, but expensive, for spontaneous breathing in an open system if nasal prongs are used; however, mouth breathing defeats this capability. Commercial devices to measure ET CO₂ in the above described applications are not available. Adequacy of ventilation during MAC by visual and clinical assessment meets the ASA standard.

An important caveat is offered: spontaneous ventilation is the essential requirement for the success of this sedation technique. Narcotics are the supplemental drugs most likely to suppress ventilation, and should therefore be used sparingly if at all. An additional benefit to limiting narcotics is the reduced risk of PONV.
Myth: Ketamine is a Poor Drug for Office-Based Anesthesia

Ketamine is an anesthetic with multiple advantages that has a reputation for negative side effects, particularly emergence hallucinations. Delirium and excitation were frequent reactions when ketamine was introduced to practice in the early 1970s as a complete intravenous anesthetic agent and used without other hypnotics or sedatives. Friedberg\textsuperscript{18} has long been an advocate of using ketamine as an adjuvant to propofol sedation for cosmetic surgery, stressing the crucial need to first provide hypnosis with another drug before administering ketamine as a dissociative anesthetic. The experience of DSO patients demonstrates that the delirium-sparing effect is present when propofol and ketamine are delivered simultaneously. Once the likelihood of poor emergence from anesthesia has been eliminated the advantages of ketamine are apparent. The dissociative effect provides analgesia (particularly for skin [ie, injection of local anesthetic]), while maintaining respiratory drive; it blocks the N-methyl D-aspartate receptors in the central nervous system which may produce preemptive analgesia. Ketamine is not associated with PONV, has an excellent safety profile, and is inexpensive. As used at DSO, 50 mg ketamine are added to 50 mL propofol; the PK infusion is started at 50 $\mu$g/kg/min and runs continuously until an estimated 10 minutes of surgery remains. Patients are informed preoperatively that they will awaken in the operating room when the surgery is almost done. After bandaging, all but a few patients have been able to stand with assistance and sit in a recovery chair; the occurrence of excitation or hallucinations has not been observed in our 10 years of experience. In fact, anesthesiologists see emergence excitation frequently after general anesthesia in hospitals and ASCs, but not as a feature of PK deep sedation for OBA. Another advantage of adding ketamine to the propofol for infusion is the reduction, by approximately 50% (20 vs 40 mL/hr), in propofol use for the typical case.\textsuperscript{19}

Myth: Intercostal Nerve Blocks Are Difficult, Dangerous, and Poorly Tolerated

The intercostal nerves enervate the skin and musculature of the chest and abdominal wall; a diagram of the dermatomal distribution of the intercostal nerves clarifies that blocking these nerves can provide anesthesia from the infraclavicular region to the pubis, making intercostal nerve blocks (ICNB) attractive for mammoplasty/abdominoplasty (Figure 3). No central neuraxial blockade (ie, epidural or spinal) is produced, and the technique of (ICNB) can be mastered rapidly. The reluctance to apply this regional anesthesia is based on fears of causing pneumothorax and/or local anesthetic toxicity. The likelihood of producing pneumothorax when the block is properly done—contacting the rib with the needle first, then walking the needle off the inferior edge, advancing only 2 to 3 mm to aspirate, and then injecting—is minimal. The literature is very vague about the incidence of pneumothorax, but suggests that radiographic evidence without signs or symptoms is “well below 1%.”\textsuperscript{20} In almost 2800 cases involving ICNB for breast and/or abdominal wall surgery at DSO, most patients received bilateral blocks of 7 to 8 intercostal nerves per side without evidence of pneumothorax. Of the 5 cases of pneumothorax during breast surgery, 4 were apparent during dissection, and 1 was diagnosed by symptoms and radiograph 24 hours postoperatively (cause undetermined, but presumed similar to the others.)

With regard to local anesthetic toxicity concerns, there is a difference between “rapid absorption” and “toxic levels.” Moore et al\textsuperscript{21} demonstrated in almost 800 patients that blood levels of bupivicaine were highest...
following bilateral ICNB compared with epidural block, yet toxicity did not occur. Rothstein et al. measured bupivacaine levels in children and adolescents following ICNB with bupivacaine 2, 3, and 4 mg/kg and found that despite supramaximal recommended doses, no cardiovascular or central nervous system toxicity was observed. Johnson et al. demonstrated the risk-reducing effect of adding epinephrine 1:200,000 to the local for ICNB. The DSO data also support the lack of toxicity when performing bilateral ICNB with 100 to 150 mL lidocaine 0.5%/bupivacaine 0.125%/epinephrine 1:200,000.

Because there is no need to seek paresthesias, patients can be sedated with PK after positioning and before block; patient acceptance has not been a problem (Figure 4). Because the anesthesia also provides relaxation of the abdominal musculature, operating conditions for abdominoplasty are excellent (Figure 5). The duration of analgesia is 6 to 12 hours, allowing early and comfortable discharge from the PACU without parenteral narcotics, even after extensive truncal modification.

CONCLUSIONS

There is nothing proprietary about the formulas or algorithms for the anesthesia techniques used at DSO, summarized as follows: “SAFE” (short-acting, fast emergence); “TIVA” (total intravenous anesthesia); “PAKI” (propofol and ketamine infusion); “LOPA” (low opioid, prophylactic antiemetics); “SVOS” (spontaneous ventilation, oxygen supplementation); and “ICNB.” In my opinion, they deliver, in experienced hands, an aesthetic for office-based cosmetic surgery superior to the usual general anesthesia performed in hospitals and ASCs. These techniques are safe, do not require expensive equipment (other than an infusion pump and vital signs monitor), avoid sore throats and nausea, provide postoperative analgesia, and are well received by patients and surgeons.

For aesthetic surgeons who want patients to have the best possible experience, anesthetic care that is “better than in the hospital” is an asset. Aesthetic surgeons, there-
fore, have a real stake in the promotion and practice of OBA. I would recommend welcoming anesthesia residents, under appropriate supervision, into their operators and encourage the publication of data regarding the types of procedures and anesthetic techniques performed. It is imperative, too, that the ASA takes measures to provide resident training in OBA, understanding that an extensive skill set is necessary to be successful at OBA.

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DISCLOSURES

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