Minimally Invasive Anesthesia for Minimally Invasive Surgery

Just as surgery has become less invasive, it's time to lighten up on our approach to outpatient anesthesia.

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MINIMAL TRESPASS Plastic surgeon Nicanor G. Isse, MD, (left) and anesthesiologist Barry L. Friedberg, MD, advocate a minimally invasive anesthetic approach for minimally invasive cases.

As facility managers and anesthesia providers move beyond the rhetoric and search for real answers to eliminating post-operative nausea and vomiting (PONV) and pain, growing numbers have moved to a minimally invasive anesthetic (MIA) approach for minimally invasive procedures. Rather than using benzodiazepines, muscle relaxants, inhalational agents and opioids, an MIA approach takes advantage of the surgeon's use of local anesthesia for the analgesia portion of the hypnosis + analgesia = anesthesia equation.

Minimal trespass to the patient

Having met the patient's requirement for pain relief with adequate local analgesia, the anesthesiologist employing the MIA approach must now consider how to create the illusion of general anesthesia — the patient neither hears nor feels nor recalls the surgery — with the least pharmacologic trespass to the patient. A lesser trespass typically translates into faster recovery times and faster street readiness times for the patient, resulting in increased facility efficiency and throughput. This means you can do more cases in the same time frame or finish the facility day earlier.

While MIA requires a slightly slower pace during the procedure, proponents say the benefits are well worth the meticulous technique that's required. "Since most plastic surgery procedures are superficial without trespassing the superficial planes into the deep cavities of the human body, these procedures could be done with local anesthesia, using differing concentrations of Xylocaine (lidocaine) with epinephrine," says Newport Beach, Calif., plastic surgeon Nicanor G. Isse, MD, developer of the minimally invasive endoscopic brow and face lift. "The advantage of local analgesia accompanied with MIA is faster patient recovery, minimal-to-moderate post-op pain, minimal complications and less intraoperative bleeding."

The Benefits of Minimally Invasive Anesthesia

What you gain	What you can eliminate
• less trespass	• benzodiazepines
• greater safety	• opioids
• fewer outliers	• anti-emetics
• increased facility efficiency	• anesthesia machines
• simplicity	• vapors
• satisfaction	• muscle relaxants
	• PONV, pain management
	• reversal agents

Many anesthesia providers prefer inhalational agents because of the ease and convenience. Especially as an anesthesiologist who works mostly in the office environment, though, I prefer propofol to sevo- or desflurane for several reasons. The vapors provide both hypnosis and analgesia, duplicating the surgeon's local analgesia, and are known triggers for malignant hyperthermia (MH) syndrome, requiring the availability of dantrolene, an expensive drug with only a three-year shelf life. Dantrolene is a difficult drug to get into solution for injection. Simply having this drug does not guarantee it can be given in a timely fashion to avoid patient death. Propofol is not an MH trigger.

Safely administering vapors also requires an anesthesia machine, quarterly maintenance and adequate scavenging. Do office suites generate a sufficient caseload to warrant a dedicated anesthesia machine? If you choose to supply a portable anesthesia machine, be sure you have the capacity to properly scavenge the exhaled waste vapors. The inhalational agents are known emetogenic factors compared to propofol's anti-emetic qualities. PONV is a source of decreased patient satisfaction and unexpected hospital admission after day surgery. Propofol-based anesthetics are associated with higher patient satisfaction than are vapor-based anesthetics.

Embracing Minimally Invasive Anesthesia

• **Unneeded pre-op tests.** Are chest X-rays, EKGs, hemoglobin testing and urinalysis relevant to perioperative management? “Eliminating most of these tests spares unnecessary effort and expense and results in many fewer needless case cancellations due to spurious lab results,” says Paul Ting, MD, co-medical director of the Virginia Ambulatory Surgery Center.

• **Block room.** Blocks take too long to place accurately and take effect — as a result, cases don’t start on time. Sound familiar? One solution: Place the block (the patient typically receives a low dose of propofol or midazolam with the regional injection) 15-to-30 minutes pre-operatively in an exam room or a pre-op station. “This has been a major surgery center trend. It reduces anesthesia-controlled OR time and promotes extensive phase I PACU bypass,” says Franklin Dexter, MD, PhD, associate professor of anesthesiology at the University of Iowa.

• **Local anesthesia delivery.** Choosing general when IV-plus-local is an option raises costs, increases risk and leaves the patient with less post-op pain control. “Herein lies the secret of why so many outpatients still receive general — it’s technically easier for the [anesthesia] provider,” says Barry Friedberg, MD, of Corona del Mar, Calif.

• **Prevent PONV.** Whether you avoid inhalational general anesthesia, screen high-risk patients and reduce the risks accordingly or administer prophylaxis (you don’t need prophylaxis if you avoid PONV-causing anesthetics [nitrous oxide in particular] and opioids), the provider must proactively prevent PONV.

• **Pre-emptive analgesia.** Giving an NSAID and having the surgeon inject local anesthetic before the surgeon makes an incision greatly reduces general-anesthetic requirements, hastens discharge and decreases post-op pain and narcotic use for days afterward.

• **Use consciousness monitors.** This technology helps titrate anesthetics with pinpoint precision so you can provide sedation, hypnosis/amnesia and analgesia without overmedicating the patient. As a result, patients have easy emergences with no PONV and good post-op pain control. “Without a tool to differentiate patient movement originating from the brain and that originating from the spinal cord, it’s virtually impossible to differentiate the patient’s need for a little more lidocaine from the surgeon’s demand for more sedation or the need for more heavy-duty general anesthetics. Consciousness monitors make it possible,” says Dr. Friedberg.

• **Airway management tools.** Airway management devices such as the laryngeal mask airway (LMA) or cuffed oropharyngeal airways (COPAs) in lieu of traditional endotracheal tube intubation techniques for general anesthesia make for outpatient-friendly anesthesia. LMAs lead to quicker wake-ups (no muscle relaxants mean patients breathe spontaneously primarily on the inhalational agent used throughout the case), lower drug costs and happier surgeons, says Adam Dorin, MD, MBA, medical director of Grossmont Plaza Surgery Center in La Mesa, Calif.

• **Apply PACU-bypass criteria.** One widely used scale specifically designed for fast tracking outpatient cases assigns points on a 0-to-2 scale for seven categories: level of consciousness, physical activity, hemodynamic stability, oxygen saturation, post-op pain control, PONV symptoms and respiratory stability. If the patient has a score of at least 12 points without a 0 in any category, he can bypass the PACU once he leaves the OR.

— Bill Meltzer

Role of consciousness monitoring

While it doesn’t replace EKG, non-invasive blood pressure and pulse oximetry, demonstrating a BIS of 60-70 during patient movement assures the surgical team that the movement likely originates from spinal cord levels and is best treated by additional local analgesia infiltration. Eliminating patient movement with additional local analgesia eliminates the need for muscle relaxants and systemic opioids. Eliminating opioids eliminates the need for supplemental oxygen (a fire hazard) measurement of end-tidal CO2 and anti-emetics, as well as most PONV. Uncontrolled post-op pain is the other source of unexpected hospital admission after day surgery. Supplying adequate intraoperative local analgesia is the most efficient way to eliminate or minimize post-op pain management issues. You can manage those pain issues that persist with either 1,000 mg po acetaminophen or 30-60 mg IV ketorolac.

Titrating propofol to a BIS of 60-75 provides adequate amnesia that eliminates the perceived need for benzodiazepines. Not only do benzodiazepines like midazolam not save any propofol but, according to a 1997 level I study by Oxorn, they contribute to having three times the number of patients requesting pain medication in recovery. Eliminating benzodiazepines obviates the occasional need for flumazenil.

As opposed to the standard general endotracheal anesthetic, the MIA approach lets patient need dictate the level of trespass required for airway maintenance. After a gradual propofol induction (150 ug/kg/20 seconds on a Harvard Clinical pump times one-to-six boluses, for example), you both extend and laterally rotate the head to maintain the airway. A greater force of extension can be had by inserting a 1,000 cc IV bag under the patient's shoulders. If this is still insufficient for an adequate airway, you could insert a lubricated #28 French red-rubber nasal airway. If the patient's airway is still inadequate or the respiration is rocky, you'd then place a #4 laryngeal mask airway. Following this airway algorithm, I haven't had to intubate a patient in a series exceeding 3,000 over 12 years. Supplemental oxygen is only administered if the patient's SpO2 is 95 percent or less, which has happened in about 5 percent of cases.

Less is more

Just as surgeons have evolved less-invasive surgical procedures, the anesthesia community needs to consider lightening up on its approach to anesthesia. Less is more is as true for the 1920s Bauhaus architecture movement as it is for 21st-century anesthesia. How difficult do we want to make simple cases? Let us not persist with the shotgun when a fly swatter will suffice, especially if better outcomes are our goal.

What's Minimally Invasive Surgery?

- all cosmetic procedures (including abdominoplasty)
- GYN laparoscopy
- arthroscopy
- lithotripsy
- breast biopsy
- mastectomy, simple
- herniorraphy, inguinal or umbilical
- microdiscectomy, microlaminectomy
- sedation for morbidly obese