

Plastic and Reconstructive Surgery:  
May 2010 - Volume 125 - Issue 5 - pp 222e-223e  
doi: 10.1097/PRS.0b013e3181d51767  
Viewpoints

## What Is General Anesthesia?

**Friedberg, Barry L. M.D.**

### Author Information

Department of Anesthesia and Perioperative Care (Volunteer Clinical Faculty); University of California, Irvine; Irvine, Calif.

Correspondence to Dr. Friedberg; Cosmetic Surgery Anesthesia; P.O. Box 8222, Newport Beach, Calif. 92658; [drfriedberg@drfriedberg.com](mailto:drfriedberg@drfriedberg.com)

**Sir:**

On the surface, this would appear to be a simple, straightforward question, but the evolution of anesthetic agents and newer brain activity monitors have made this question somewhat more challenging. Local anesthesia provides analgesia only in a localized area. General anesthesia, in contradistinction, provides generalized analgesia in addition to generalized hypnosis. A simplified, working equation for general anesthesia may be hypnosis plus analgesia.

Implicit in hypnosis is amnesia. Implicit in (adequate) analgesia is enough relaxation to perform cosmetic procedures. In this author's experience with hundreds of subpectoral breast augmentations and rectus imbrication for abdominoplasties, adequate analgesia has obviated the need for muscle relaxants.<sup>1</sup> The patient safety benefits of propofol-ketamine anesthesia demand not perfection with local anesthesia but merely persistence.<sup>2</sup>

Conscious patients tend to say "ouch" with inadequate local anesthesia. Currently, no monitors exist with which to measure analgesia levels in patients receiving general anesthesia who are unconscious.

In 1996, the U.S. Food and Drug Administration approved the bispectral index brain monitor for measuring levels of *hypnosis* in patients receiving anesthetic agents. Over the years, bispectral index monitoring has been validated by over 3000 peer-reviewed, scientific articles.<sup>3</sup> Other brain activity monitors have been marketed by Baxter (PSA), GE Healthcare (Entropy), (Everest Biomedical Instruments (Snap), Cerebral State Monitor (Danmeter), and Schiller Medical (Narcotrend). No monitor maker has produced any literature demonstrating validation or outcomes superior to the bispectral index monitoring device.

Decades-long established science has established the hypnotic portion of general anesthesia, as measured by bispectral index monitoring, occurring below 60 on a 0- to 100-point scale.<sup>4</sup> When a bispectral index monitoring value in this range is obtained with inhalational agents such as sevoflurane, it is obvious that general anesthesia is being administered (i.e., both generalized hypnosis and

generalized analgesia are being administered).

Propofol titrated with bispectral index monitoring can produce all three levels of sedation (minimal, moderate, or deep) when combined with local analgesia only.<sup>5</sup> Coadministration of intravenous opioids (or narcotics) adds systemic analgesia that transforms an intravenous sedation technique into an intravenous general anesthesia.<sup>5</sup> Intravenous sedation without opioids does not require end-tidal carbon dioxide monitoring; however, intravenous general anesthesia with opioids does.

How does ketamine fit into the definition of general anesthesia? Although the *Physician's Desk Reference* classifies the agent as a “general anesthetic,” the American Association for Accreditation of Ambulatory Surgery Facilities, since its inception (and in deference to one of its founding member's technique<sup>6</sup>) has recognized this dissociative agent as an intravenous sedation drug appropriate for class B facilities. Neither diazepam nor ketamine is a triggering agent for malignant hyperthermia. Diazepam-ketamine does not require an anesthesia machine for its administration. Accordingly, class B facilities do not need anesthesia machines, scavenging, or dantrolene for patient safety.

Bispectral index/propofol-ketamine monitored anesthesia care has been clearly, and repeatedly, published as propofol titrated to a bispectral index monitoring value of 60 to 75, followed by 50 mg of ketamine and local anesthesia only.<sup>7-9</sup> No opioids, nitrous oxide, or inhalational agents are given.<sup>7-9</sup>

Absent the administration of systemic analgesia and relying solely on local analgesia abetted with only a dissociative agent, bispectral index/propofol-ketamine monitored anesthesia is clearly intravenous sedation, appropriate for class B facilities, and is not general anesthesia requiring class C equipment. Not only is the interest of patient safety best served by a class B classification for bispectral index/propofol-ketamine monitored anesthesia care, it is also in the interest of an economically viable office operator.

## DISCLOSURE

The author has no conflicts of interest or financial disclosures to declare.

## REFERENCES

1. Friedberg BL. Propofol ketamine anesthesia for cosmetic surgery in the office suite. In: Osborne I, ed. *International Anesthesiology Clinics: Anesthesia for Outside the Operating Room*. Baltimore, Md.: Lippincott, Williams & Wilkins; 2003: 39–50.

[Cited Here...](#)

2. Friedberg BL. Lethal pulmonary embolisms are avoidable. *Plast Reconstr Surg*. 2009;124:768.

[Cited Here...](#)

3. Aspect Medical Systems. Bibliographies 1991-2004. Available at: <http://www.aspectmedical.com/company/about/default.aspx>.

[Cited Here...](#)

4. <http://www.aspectmedical.com/professionals/surgeons/default.aspx>.

[Cited Here...](#)

5. Friedberg BL. Propofol ketamine with bispectral (BIS) index monitoring. In: Friedberg BL, ed.

*Anesthesia in Cosmetic Surgery*. New York: Cambridge University Press; 2007:13.

[Cited Here...](#)

6.Vinnik CA. An intravenous dissociation technique for outpatient plastic surgery: Tranquility in the office surgical facility. *Plast Reconstr Surg*. 1981;67:799–805.

[Cited Here...](#)

7.Friedberg BL. Propofol-ketamine technique. *Aesthetic Plast Surg*. 1993;17:297–300.

[Cited Here...](#)

8.Friedberg BL. Propofol-ketamine technique: Dissociative anesthesia for office surgery (a five year review of 1264 cases). *Aesthetic Plast Surg*. 1999;23:70–75.

[Cited Here...](#)

9.Friedberg BL. The effect of a dissociative dose of ketamine on the bispectral (BIS) index during propofol hypnosis. *J Clin Anesth*. 1999;11:4–7.

[Cited Here...](#)