

## **Titration of Delivery and Recovery from Propofol, Alfentanil, and Nitrous Oxide Anesthesia.**

Drover D.R., Lemmens H.J., Pierce E.T., Plourde G., Loyd G., Ornstein E., Prichep L.S., Chabot R.J., Gugino L. *Anesthesiology* 2002; 97:82–9.

### **Background**

The Patient State Index (PSI) uses derived quantitative electroencephalogram features in a multivariate algorithm that varies as a function of hypnotic state. Data are recorded from two anterior, one midline central, and one midline posterior scalp locations. PSI has been demonstrated to have a significant relation to level of hypnosis during intravenous propofol, inhalation, and nitrous oxide–narcotic anesthesia. This multisite study evaluated the utility of PSI monitoring as an adjunct to standard anesthetic practice for guiding the delivery of propofol and alfentanil to accelerate emergence from anesthesia.

### **Methods**

Three hundred six patients were enrolled in this multicenter prospective randomized clinical study. Using continuous monitoring throughout the period of propofol–alfentanil–nitrous oxide anesthesia delivery, PSI guidance was compared with use of standard practice guidelines (both before [historic controls] and after exposure to the PSA 4000 monitor [Physiometrix, Inc., N. Billerica, MA; standard practice controls]). Anesthesia was always administered with the aim of providing hemodynamic stability, with rapid recovery.

### **Results**

No significant differences were found for demographic variables or for site. The PSI group received significantly less propofol than the standard practice control group ( $11.9 \mu\text{g kg}^{-1} \text{min}^{-1}$ ;  $P < 0.01$ ) and historic control group ( $18.2 \mu\text{g kg}^{-1} \text{min}^{-1}$ ;  $P < 0.001$ ). Verbal response time, emergence time, extubation time, and eligibility for operating room discharge time were all significantly shorter for the PSI group compared with the historic control (3.3–3.8 min;  $P < 0.001$ ) and standard practice control (1.4–1.5 min;  $P < 0.05$  or  $P < 0.01$ ) groups. No significant differences in the number of unwanted somatic events or hemodynamic instability and no incidences of reported awareness were found.

### **Conclusions**

Patient State Index–directed titration of propofol delivery resulted in faster emergence and recovery from propofol–alfentanil–nitrous oxide anesthesia, with modest decrease in the amount of propofol delivered, without increasing the number of unwanted events.