Jean Mantz, M.D., Ph.D., Editor

Perioperative Medicine

Electroencephalogram signatures of loss and recovery of consciousness from propofol. Proc Natl Acad Sci USA 2013; 110:E1142–51

The lack of reliable markers of consciousness during general anesthesia has limited the use of brain-state monitoring of surgical patients. This elegant study identified specific behavioral and electrophysiological signatures associated with transition from consciousness to unconsciousness induced by propofol. Loss of consciousness is marked by an increase in low-frequency power, loss of coherent occipital α-oscillations, and appearance of coherent frontal α-oscillations. Opposite changes are observed by recovery from unconsciousness to consciousness from propofol anesthesia (table 1). These important findings may provide a neurobiological substrate to accurately monitor consciousness in anesthetized patients.

Table 1. Observed Changes from Unconsciousness to Consciousness from Propofol Anesthesia

EEG and Behavioral Signature	Change from Consciousness to Propofol-induced Loss of Consciousness	Recovery from Unconsciousness to Consciousness
Low-frequency power	Increase	Decrease
Coherent α-oscillations	Loss of occipital, appearance in frontal cortex	Loss of frontal, appearance in occipital cortex

Complications following colonoscopy with anesthesia assistance: A population-based study. JAMA Intern Med 2013; 173:551–6

Anesthesia for colonoscopy: Too much of a good thing? Comment on "complications after colonoscopy with anesthesia assistance." JAMA Intern Med 2013; 173:556–8

Despite its increased use, the safety of sedation during colonoscopy has not been fully examined. This nonrandomized population-based study examined data from the Surveillance, Epidemiology, and End Result (SEER) database, including more than 100,000 U.S. patients undergoing colonoscopy without polypectomy, with and without deep sedation. Male sex, older patients, a high comorbidity score, and the use of anesthesia were independent predictors of complications (mainly aspiration and colonic perforation) in comparison with the absence of anesthesia (fig. 1). Although these somewhat provocative results may be accounted for by methodological limitations, primary bias in patient selection, and control of confounding factors, they draw our attention to the occurrence of very rare, but dramatic complications associated with colonoscopy under general anesthesia, particularly in older patients with severe comorbidities.

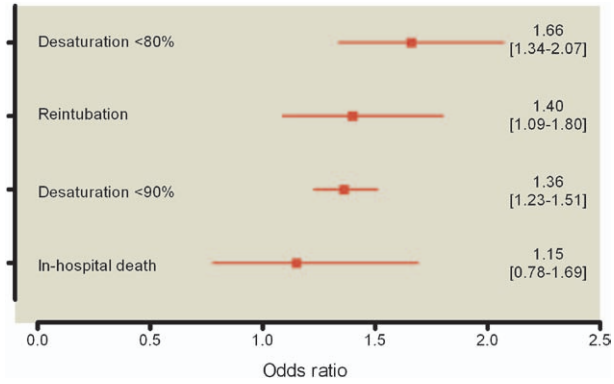

Fig. 1. Predictors of procedural complications in univariate and multivariate analysis.

The transfusion alternatives preoperatively in sickle cell disease (TAPS) study: A randomized, controlled multicentre clinical trial. Lancet 2013; 381:930–8

It is common for patients with sickle cell disease to undergo surgical procedures, and the potential benefits of preoperative blood transfusion in this patient population are still unknown. In this prospective, randomized controlled trial, 70 patients with sickle cell disease (97% with hemoglobin SS subtype) undergoing minor to moderate risk surgery were enrolled, and the proportion of clinically important complications within 30 days of surgery were measured. Transfused patients had greater preoperative hemoglobin levels compared with nontransfused patients (median IQR, 97 [91–105] *vs.* 77 [71–82]). Thirteen patients (39%) in the no preoperative transfusion arm developed clinically relevant complications, in comparison with five (15%) in the preoperative transfusion arm (P = 0.023; table 2). Acute chest syndrome was the main complication observed. These results support the use of preoperative transfusion to a hemoglobin level of approximately 100 g/l in the routine management of patients with SS hemoglobin.

Table 2. Clinically Relevant Complications

	Preoperative Transfusion (n = 34)	No Preoperative Transfusion (n = 34)	*P* Value
Patients (%)	5 (15)	13 (39)	0.023

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Effects of off-pump and on-pump coronary artery bypass grafting at 1 year. N Engl J Med 2013; 368:1179–88

Previous studies showed no difference between on-pump and off-pump coronary bypass grafting 30 days after surgery in a prospective, multicenter randomized trial. Now, the authors report data from the same study on quality of life and cognitive function at discharge, at 30 days, and at 1 yr, along with clinical outcomes in 4,752 patients. At 1 yr, there was no significant difference between groups in the primary composite outcome (death, nonfatal stroke, nonfatal myocardial infarction, nonfatal new renal failure requiring dialysis, and rate of subsequent revascularization procedures). Quality of life and cognitive function were also similar between groups. The greater power of this trial in comparison with two previous ones (ROOBY and DOORS trials) allows robust confidence in the present findings.

Critical Care Medicine

Family presence during cardiopulmonary resuscitation. N Engl J Med 2013; 368:1008–18

This randomized, controlled multicenter study evaluated the impact of the systematic offer to relatives to observe cardiopulmonary resuscitation (CPR) in the prehospital setting *versus* standard practices in 570 relatives of patients undergoing CPR. Emergency medical units were randomized to either systematically offer the relative the opportunity to observe (intervention group, n = 266), or follow standard practice (control group, n = 304), and they calculated the proportion of relatives with posttraumatic stress disorders at day 90. In the intervention group 79% of relatives witnessed CPR *versus* 43% in the control group. The incidence of posttraumatic stress–disorders-related symptoms was higher in the control group *versus* intervention group ($P = 0.004$), and among family members who did not witness CPR than among those who did ($P = 0.02$; fig. 2). No difference in resuscitation characteristics, patient survival, level of emotional stress in the medical team, or number of claims was found between the intervention and control group. These findings support that CPR witnessed by relatives has positive psychological results among relatives and does not impair quality of care. This strategy might apply to other stressful life-threatening situations of the routine practice of anesthesia and critical care.

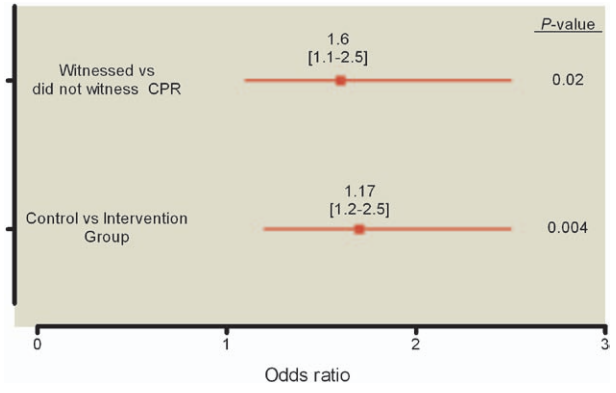

Fig. 2. Risk of developing posttraumatic stress disorder in relatives of patients undergoing cardiopulmonary resuscitation (CPR).

Single-dosage etomidate is not associated with increased mortality in ICU patients with sepsis: Analysis of a large electronic ICU database. Crit Care Med 2013; 41:774–83

Etomidate is a commonly used intubation agent in emergency departments and intensive care units because of its rapid onset of sedation, its limited hemodynamic effect, and good amnesic properties. However, multiple studies have reported an inhibitory effect of etomidate (even after a single-dosage administration) on the adrenal function that results in a decrease in the cortisol secretion by this gland, and increased mortality. However, corticoid replacement therapy in septic patients, who were intubated with etomidate, has not reduced mortality in this patient group. Thus, it remains unclear whether the increased mortality attributed to the administration of etomidate to facilitate endotracheal intubation in septic patients is really caused by this medication. More than 2,000 septic patients were included retrospectively in the current study, using an extensive dataset of critically ill patients remotely monitored in tele-intensive care units in the United States. Slightly more than half of the patients were intubated with a single-dosage etomidate, whereas the rest of the patients received other induction agents. The results show that in this mixed-diagnosis group of patients with sepsis, severe sepsis, or septic shock, single-dosage etomidate administration in the intensive care unit was not associated with higher mortality or other adverse outcomes (fig. 3). Although the results of this study do not fully resolve the controversy about the potential detrimental role of single-dosage etomidate as an intubation agent for septic patients with acute respiratory failure, it

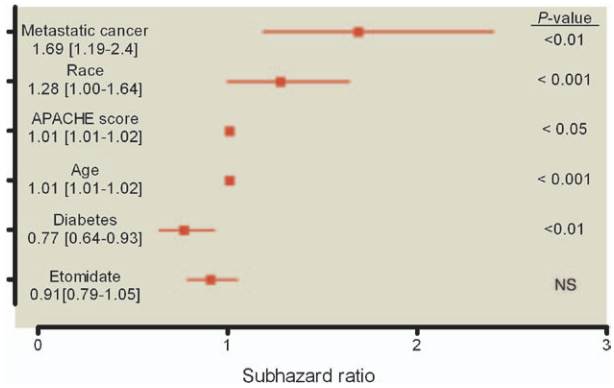

Fig. 3. Regression model for in-hospital mortality in patients with sepsis, severe sepsis, and septic shock. APACHE = Acute Physiology and Chronic Health Evaluation IV. NS = nonsignificant.

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certainly calls for a robust, adequately powered prospective study, comparing etomidate with other induction agents. At this time, no clear-cut recommendation can be made about which induction agent should be used to facilitate endotracheal intubation in septic patients. However, this study also brings a word of caution for some strong opinions published in recent editorials stating that etomidate should be avoided as an induction agent for emergent intubation in septic patients.

(*This article was suggested by Jean-François Pittet.*)

Pain Medicine

Magnetic resonance imaging in follow-up assessment of sciatica. N Engl J Med 2013; 368:999–1007

Sciatica is a common cause of low back and leg pain, and the most common cause is herniated disc. Although magnetic resonance imaging (MRI) is now the most common tool used to detect disc herniation, and to direct surgical intervention as well as less invasive treatments, such as epidural injections, several studies have demonstrated the suboptimal sensitivity and specificity of MRI scans in identifying the cause of a patient's symptoms. This randomized trial compared MRI scans obtained from 283 patients participating in the Sciatica Trial, a study designed primarily to compare surgery *versus* prolonged conservative care. After randomization in the parent trial for 1 year, patients underwent MRI scanning using gadolinium contrast, which were evaluated by blinded readers. The investigators observed that disc herniations were present in a similar percentage of patients with favorable outcomes (35%) *versus* those with unfavorable outcomes (33%), and favorable outcomes at 1 yr were also similar, as reported by 85% of patients with a disc herniation, and 83% of those without a disc herniation. Likewise, the severity of the disc herniations and scar formation near nerve roots were not linked to clinical outcome. This study calls into question the value of postsurgical MRI scanning in patients with persistent sciatica. Although low risk, these studies incur significant costs, and the value of the information provided may be overestimated by clinicians in advising patients regarding their conditions and treatment options.

(*This article was suggested by David Clark.*)

Education

You can't fix by analysis what you've spoiled by design: Developing survey instruments and collecting validity evidence. J Grad Med Educ 2012; 4:407–10

Tracing the steps of survey design: A graduate medical education research example. J Grad Med Educ 2013; 5:1–5

When rigorous experimental design of surveys is employed there is a greater chance that investigators will collect valid data from which meaningful conclusions may result, than when surveys are developed by "conjuring up" interesting questions. Surveys are often employed as an investigative tool, especially applicable and by no means limited to educational research. Rickards, Magee, Artino, and Byars have authored two articles in *The Journal of Graduate Medical Education* that offer readers and researchers a framework for designing effective surveys. They recommend a six-question systematic analysis of what the research survey questionnaire should be, who the survey audience will be, and how the questions will be framed for these individuals in order to gather answers that are enlightening (table 3). In the most recent publication, these authors provide an example of the implementation of this protocol to entice readers to do create survey designs.

Table 3. Survey Design Process: Six-Question Protocol

Question 1:	Is a survey an appropriate tool to help answer my research question?
Question 2:	How have others addressed this construct in the past?
Question 3:	How do I develop my survey items?
Question 4:	Are the survey items clearly written and relevant to the construct of interest?
Question 5:	Will respondents interpret my items in the manner that I intended?
Question 6:	Are the scores obtained from my survey items reliable, and do they relate to other measures as hypothesized?

(*This article was suggested by Alan Jay Schwartz.*)

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