use of a 20% lipid emulsion to resuscitate a patient after a presumed bupivacaine-related cardiac arrest. Anesthesiology 2006;105:217–18
8. Litz RJ, Popp M, Stehr SN, Koch T. Successful resuscitation of a patient with ropivacaine-induced asystole after axillary plexus block using lipid infusion. Anaesthesia 2006;61:800–1
9. Groban L, Butterworth J. Lipid reversal of bupivacaine toxicity: has the silver bullet been identified? Reg Anesth Pain Med 2003;28:167–9
10. Weinberg G, Ripper R, Feinstein DL, Hoffman W. Lipid emulsion infusion rescues dogs from bupivacaine-induced cardiac toxicity. Reg Anesth Pain Med 2003;28:198–202

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Thinking Like A Pancreas: A Look Ahead at Diabetes Technology in the Perioperative Setting

To the Editor:

Our preliminary data (1) support the comments in the recent editorial (2) that the anesthesiologist's management of blood glucose has not changed over the last 5 years. What must be pointed out is the deficiency in current blood glucose monitoring technology when trying to achieve normoglycemia (3–6) with occasional blood glucose measurements during cardiac surgery, especially in diabetics. To "think like a pancreas" requires continuous glucose data much like pulse oximetry and capnography emerged from the need to "think like a lung." The future of "tight" blood glucose control will be with continuous glucose sensors, or other forms of automated blood sampling systems. Those systems will eventually feedback to a controller with algorithms programmed to deliver insulin in a semi-closed or closed-loop technique. The two currently approved glucose monitors measure interstitial glucose but these needle type subcutaneous sensors require equilibration and calibration procedures that make their use less practical in the acute care setting. It is unknown how sensors will perform in surgical patients experiencing rapid fluctuations in blood glucose, changes in blood flow distribution, temperature (7), or various pathologies (i.e., morbid obesity, edema, sepsis). Issues such as calibration drifts from membrane fouling, measurement delays (blood to interstitial fluid), statistical handling of continuous data, and prediction of future glucose information, have not received the needed consideration in the evaluation and approval of these systems. Other technologies classified as intermittent type glucose monitors, specifically designed for the surgical and ICU patient, are currently being developed and tested in the United States. The development of an artificial pancreas is on the horizon with anesthesiology and acute care environments appearing as good testing grounds for early systems with controlled insulin and glucose infusions. Significant progress in this technology will make it possible to "think like a pancreas" as more evidence of hyperglycemia associated adverse outcomes presses for a reduction in the sweetness of blood.

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REFERENCES

1. Torjman MC, Goldberg ME, Safaryn J, Hirsh R, Littman J, Burden A. Does Availability of glucose meters yield acceptable glycemic control in diabetic surgical patients? (Abstract). Anesthesiology 2006; 105:A940
2. Martinez EA, Williams KA, Pronovost PJ. Thinking like a pancreas: perioperative glycemic control. Anesth Analg 2007; 104:4–6
3. Carvalho G, Moore A, Qizilbash B, Lachapelle K, Schricker T. Maintenance of normoglycemia during cardiac surgery. Anesth Analg 2004;99:319–24
4. Chaney MA, Nikolov MP, Blakeman BP, Bakhos M. Attempting to maintain normoglycemia during cardiopulmonary bypass with insulin may initiate postoperative hypoglycemia. Anesth Analg 1999;89:1091–5
5. Ouattara A, Lecomte P, Le Manach Y, Landi M, Jacqueminet S, Platonov I, Bonnet N, Riou B, Coriat P. Poor intraoperative blood glucose control is associated with a worsened hospital outcome after cardiac surgery in diabetic patients. Anesthesiology 2005;103:687–94
6. Van den Berghe G, Wouters P, Weekers F, Verwaest C, Bruyninckx F, Schetz M, Vlasselaers D, Ferdinande P, Lauwers P, Bouillon R. Intensive insulin therapy in the critically ill patients. N Engl J Med 2001;345:1359–67
7. Lehot JJ, Piriz H, Villard J, Cohen R, Guidollet J. Glucose homeostasis: comparison between hypothermic and normothermic cardiopulmonary bypass. Chest 1992; 102:106–11

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In Response:

Commenting on our recent editorial (1), Torjman et al. (2) suggest the possibilities for new technologies in blood glucose monitoring. We agree that the current methodology for frequent blood glucose monitoring during tight glycemic control is burdensome, and a new system may improve our efficiency with continuous blood glucose monitoring. While we look forward to new technology and how it may improve patient care, we need to recognize that new technology introduces a new set of risks (3). We hope that the use and impact of new technologies for continuous blood glucose monitoring will be comprehensively evaluated and will result in improved patient outcomes. Of course, there are unanswered questions on the safety and efficacy of "tight" glycemic control in all perioperative settings (4). In addition, future questions addressing whether continuous monitoring and more frequent interventions improve the safety and effectiveness of glycemic control will likely arise.

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REFERENCES

1. Martinez EA, Williams KA, Pronovost PJ. Thinking like a pancreas: perioperative glycemic control. Anesth Analg 2007; 104:4–6
2. Torjman ML, Michael EG, Robert AH, Jeffrey L. Thinking like a pancreas: a look ahead at diabetes technology in the perioperative setting. Anesth Analg 2007;105:545
3. Weant KA, Cook AM, Armitstead JA. Medication-error reporting and pharmacy resident experience during implementation of computerized prescriber order entry. Am J Health Syst Pharm 2007;64:526–30
4. Gandhi GY, Nuttall GA, Abel MD, Mullany CJ, Schaff HV, O'Brien PC, Johnson MG,

Williams AR, Cutshall SM, Mundy LM, Rizza RA, McMahon MM. Intensive intraoperative insulin therapy versus conventional glucose management during cardiac surgery: a randomized trial. Ann Intern Med 2007;146:233–43

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Is the Cobra Perilaryngeal Airway (CobraPLA™) Appropriate for Use in Patients Undergoing Gynecological Laparoscopy?

To the Editor:

Recently, Galvin et al. (1) compared the Cobra perilaryngeal airway (CobraPLA™) with the laryngeal mask airway-Classic (LMA-Classic™) during controlled ventilation in patients undergoing gynecological laparoscopy. In an apparent effort to avoid regurgitation, study patients were allowed a maximum head-down Trendelenberg's position of only 15° while maximal intraabdominal pressure was limited to 15 mm Hg, and Galvin et al. are commended for this precaution.

Although both devices functioned well for these cases, using either the CobraPLA or the LMA-Classic to provide airway support for laparoscopy is not without controversy (2,3). Despite the remarkably safe clinical track record of the laryngeal mask airway, Bapat et al. noted a 1% incidence of regurgitation (with no aspiration) during gynecologic laparoscopy, although some study patients were obese or had a history of reflux (4). Statistical analysis of their 99 study patients calculated a true rate of regurgitation of <4.1%. In addition, a case of aspiration (with benign outcome) has been reported when using the CobraPLA for this type of procedure (5).

My concern, as the inventor of the CobraPLA, is that despite the best of intentions and planning to limit the amount of Trendelenberg's position and intraabdominal pressure, there are times when it is difficult to do so, as intraoperative conditions might dictate the need for changing these parameters to allow better surgical exposure. In addition, while Engineered Medical Systems (EMS, Indianapolis, IN), the manufacturer of the CobraPLA, advises against delivering airway pressures greater than 20 cm H_2O (6), a head down lithotomy position might require airway pressures greater than 20 cm H_2O to provide adequate gas exchange. Despite their precautions, Galvin et al. state that some patients briefly received airway pressures as high as 40 cm H_2O (1). Finally, the patient population for gynecologic laparoscopy often has comorbid medical conditions such as hiatal hernia, diabetes, or obesity that might not be fully appreciated preoperatively.

EMS and I have advocated "erring on the side of caution and using common sense" (3) when deciding whether or not to use the CobraPLA in any given situation, as it provides no protection against aspiration. I respect that these investigators took quite reasonable and appropriate precautions with their patients and that there are significant practice differences between clinicians residing in the United States and Europe (the Glavin study was conductered in The Netherlands). Still, one must weigh all individual patient, device, and surgical factors when deciding whether or not to use an extraglottic airway for these procedures. For my practice in the United States, given the above stated points, the answer for the CobraPLA is almost always "no" (5).

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Dr. Alfery is the inventor of the CobraPLA and receives royalties on sales.

REFERENCES

1. Galvin EM, van Doorn M, Blazquez J, Ubben JF, Zijlstra FJ, Klein J, Verbrugge SJC. A randomized prospective study comparing the Cobra perilaryngeal airway and laryngeal mask airway-Classic during controlled ventilation for gynecological laparoscopy. Anesth Analg 2007; 104:102–5
2. Sidaras G, Hunter JM. Is it safe to artificially ventilate a paralyzed patient through the laryngeal mask? The jury is still out. Br J Anaesth 2001;86:749–53
3. Cook TM, Lowe J. More on the Cobra. Anaesthesia 2005;60:1144–5. In Reply 114–17
4. Bapat PP, Verghese C. Laryngeal mask airway and the incidence of regurgitation during gynecologic laparoscopies. Anesth Analg 1997;85:139–43
5. Farrow C, Cook T. Pulmonary aspiration through a CobraPLA. Anaesthesia. 2004; 59:1140–1; discussion 1141–2
6. CobraPLA product information sheet. Available at www.engmedsys.com

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In Response:

We appreciate Dr. Alfery's (1) interest in our article (2). He highlighted the concerns which exist regarding the risk of regurgitation of gastric contents and aspiration when using supraglottic airway devices. More specifically, he questioned the use of the Cobra perilaryngeal airway (CobraPLA™) in patients undergoing gynecological laparoscopy.

As stated by Dr. Alfery, the original supraglottic airway, the laryngeal mask airway (LMA-Classic™), has an established safety record in nonlaparoscopic surgery. In more recent years, its use during laparoscopic procedures has been investigated, with positive outcomes (3,4); as already highlighted, the study group investigated by Bapat et al., (5) included known higher risk patients.

It is important to recognize that much of the research involving supraglottic airways, including our own study (2), uses strict inclusion criteria, namely fasting patients, with a body mass index (BMI) <30 and no evidence of active gastric reflux disease. Additional precautions include limiting the degree of maximal head down (Trendelenberg's) positioning and in the case of laparoscopic procedures, the maximal intra-abdominal pressure.

New supraglottic airway devices are increasingly available and differ from the original LMA-Classic in terms of specific design features, which may offer advantages in certain circumstances. It is therefore important, that the potential usefulness of such devices is investigated through controlled clinical studies, in a variety of different settings, to establish individual device risks and benefits. In our study, as with other published studies (6,7) maximal airway pressures briefly exceeded manufacturer's recommendations (8). This is not our everyday practice, but