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#### In Reply:

We thank Drs. Woehlck and El-Orbany for their interest in our recently published article that examined lipid emulsion using a porcine model of bupivacaine-induced cardiac arrest.<sup>1</sup> Their letter raises several important issues. In the Discussion section of our article, we explained some of the major differences between the various animal models that have been used to evaluate lipid treatment for local anesthetic toxicity.

We recognize the potential drug interactions between the anesthetics agents and the experimental protocol. The anesthetic agents, such as xylazine, ketamine, and  $\alpha$ -chloralose, were chosen to preserve hemodynamic and electrophysiologic stability at the doses used in our study. Propofol was avoided because of the confounding effect of lipid pretreatment, as found in other animal studies of this nature. Despite this limitation, we were able to achieve a stable hemodynamic profile in all animals before the induction of cardiac arrest with the bupivacaine injection. After examining the electrocardiographic data (mean  $\pm$  SD), we did not observe any occurrences of prolonged PR ( $120.6 \pm 13.7$ ), QRS ( $59.1 \pm 14.6$ ), or QTc intervals ( $347.4 \pm 26.4$ ), during the baseline period before the induction of cardiac arrest.<sup>2</sup> Our electrophysiologic data are perhaps different from the results mentioned in the letter of Woehlck and El-Orbany because much higher doses of  $\alpha$ -chloralose were used in other studies (75 mg/kg in one study<sup>3</sup> and 100 mg/kg in another<sup>4</sup>) in contrast to a moderate dose of 40 mg/kg used in our study.

We agree with Drs. Woehlck and El-Orbany that it would be useful to consider further experiments that expand our understanding of the potential therapeutic benefits of lipid emulsion in the setting of cardiac arrest induced by

toxic doses of local anesthetic, especially at a time when various national and international organizations are in the process of developing recommendations incorporating lipid treatment.

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## Insertion of the i-gel™ Airway Obstructed by the Tongue

#### To the Editor:

In the July 2009 issue of *ANESTHESIOLOGY*, Theiler *et al.*<sup>1</sup> published an article in which they compared the *Laryngeal Mask Supreme™* (Laryngeal Mask Company, Henley-on-Thames, United Kingdom) with the i-gel™ (Intersurgical Ltd., Wokingham, Berkshire, United Kingdom) airway. The authors commented that the bulky design of the i-gel™ made insertion time longer, and that tongue size may have an influence on insertion. We noticed a similar problem during the insertion of i-gel™ a few times. During insertion, the cuff carried the tongue along with it posteriorly, making further motion of the i-gel™ impossible. All the patients were in "sniffing the morning air" position as advised by the manufacturer.<sup>2</sup> The device was adequately lubricated. Jaw thrust and insertion with deep rotation were tried<sup>2</sup> when difficulty occurred, but these maneuvers did not solve the problem. Hence, we had to remove and then reinsert the i-gel™ after pulling out and stabilizing the tongue.

The i-gel™ has a noninflatable cuff made of styrene ethylene butadiene styrene. This cuff fits snugly onto the perilaryngeal framework.<sup>2</sup> Unfortunately, the texture and design of the cuff entraps the tongue during insertion. The manufacturers recommend insertion of the device without introducing the fingers,<sup>2</sup> but we feel, in difficult circumstances

similar to ours, insertion after stabilizing the tongue may be necessary.

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2. Intersurgical. I-gel User Guide. Wokingham Berks, Intersurgical, 2005

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## In Reply:

We thank Drs. Taxak and Gopinath for their valuable contribution in response to our article.<sup>1</sup> Failure of supraglottic airway devices occurs because of either failed insertion or failed ventilation, despite successful insertion. In case of the i-gel™ (Intersurgical Ltd., Wokingham, Berkshire, United Kingdom), insertion may fail because of the inability to pass the device between the front teeth, the tongue, or the pharyngeal curvature. Overall, the inability to insert the i-gel™ is quite a rare event (1.3%).<sup>†</sup> As Drs. Taxak and Gopinath point out correctly that the bulky design of the i-gel™ with its large airway opening may cause entrapment of the tongue. We agree that digitally pushing the tongue out of the way may solve the problem. However, many anesthesiologists would be reluctant to put their finger into the mouth of a patient who has not

received muscle relaxation. A simple tongue retractor might be used too.

In addition, clinicians need to be aware of the fact that the i-gel™ may not only push the tongue down, impeding successful insertion, but also displace the base of the tongue after insertion. That may lead to protrusion of the tongue from the mouth, trapping its tip between the lower teeth and the integral bite block of the i-gel™ (see fig. 1). In fact, in a large prospective evaluation of nearly 2,000 cases, we documented a patient who suffered from prolonged bilateral numbness at the tip of the tongue because of that entrapment in an otherwise short and uneventful anesthesia.<sup>†</sup> That might have happened with the use of other supraglottic airway devices too. We thus strongly recommend checking the tongue position in every patient after successful i-gel™ insertion.

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## What about the Surgery?

### To the Editor:

I enjoyed reading Prof. Sessler's<sup>1</sup> editorial view regarding the long-term consequences of anesthetic management. Prof. Sessler reviewed the changes in anesthetic practice that have occurred in the past few decades, which have led to significant improvement in patient care and reduction in perioperative morbidity and mortality.

I was surprised, however, that there was no mention of the changes that have occurred in surgical practice during this period. The trend toward minimal invasive surgery in many surgical subspecialties has profoundly changed the stress that the patient undergoes during surgery and afterward. Laparoscopy has replaced laparotomy, and video-assisted thoracoscopy has replaced thoracotomy. Procedures such as angiographic-guided stent insertion for management of aortic disease and endovascular obliteration for cerebral arteriovenous malformation have reduced the number of large open operations that are performed in the operating rooms. In cardiac surgery, we now have off pump coronary artery bypass and minimal invasive valve replacements. Many operations have become ambulatory procedures, such as arthroscopies or extracorporeal shock wave lithotripsy. Minimal invasive procedures cause less bleeding, less tissue injury, less stress to the body, and are less painful. Thus, less blood and



Fig. 1. Tongue is trapped between lower teeth and i-gel™ (Intersurgical Ltd., Wokingham, Berkshire, United Kingdom) (simulated photo).

<sup>†</sup> Gutzmann M, Roemer J, Theiler L, Urwyler N, Greif R: Prospective multicenter clinical evaluation of the cuffless Supraglottic Airway Device i-gel™ (abstract). Presented at the American Society of Anesthesiologists 2009: A473.