

CORRESPONDENCE

it can be started with local anesthetic infiltration, allowing extra time to gain intravenous access and apply the necessary monitors. If mask anesthesia is used in the obstetric population, it is commonly taught to maintain cricoid pressure until the airway is secured to reduce the risk of regurgitation of gastric contents. Finally, when intravenous access was finally secured in this case, the use of succinylcholine would have assured the most rapid onset of intubating conditions.

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To the Editor:—Schaut *et al.* should be congratulated on their use of inhalation induction with sevoflurane for immediate delivery of a parturient with no accessible veins (ANESTHESIOLOGY 1997; 86:1392-4). Their quick thinking and quick action resulted in a live, apparently healthy, infant being delivered within 5 min of the patient's arrival in the operating room. Rapid sequence intravenous induction with cricoid pressure followed by endotracheal intubation is the usual standard of care, but in this case, the delay in pursuing this "standard" might have resulted in a brain-damaged infant for which the anesthesiologist could have been blamed.

The authors correctly state that there is a serious risk of maternal morbidity and mortality *if aspiration occurs* (italics added). The perception among some anesthesiologists is that one would be foolhardy to use a face mask for any obstetric anesthetic and very fortunate if pulmonary aspiration did not occur. But how frequently did aspiration occur before the introduction of rapid sequence induction, cricoid pressure, tracheal intubation, and H₂ receptor antagonists?

Ether and chloroform, and later cyclopropane, were commonly administered without tracheal intubation for more than 100 yr after Simpson introduced pain relief in childbirth in 1847.¹ Opponents initially criticized the use of anesthesia on medical and moral and religious grounds.² One medical opponent went so far as to state that, "In the lying-in chamber . . . pain is the mother's safety, its absence her destruction."³ In response, Simpson collected 800 cases of ether or chloroform administration in childbirth without a death from his own practice and those of colleagues in the British Isles and Europe.³ His report may have been biased in some aspects, but it seems unlikely that an anesthesia-related death could have escaped publicity.

Almost a century later, in 1946, Mendelson reported 66 cases of pulmonary aspiration of stomach contents in 44,016 pregnancies.⁴ Five deaths occurred from aspiration of solid material, but there were no deaths among the 40 parturients who were known to have inhaled liquid and who developed the chest radiograph findings of Mendelson's syndrome. Between 1942 and 1952 in one large English city, there were no anesthetic deaths in 3,048 domiciliary open-drop obstetric anesthetics.⁵ At the Women's Hospital in Kathmandu, Nepal in 1982-1983, there was one material death, a result of uncontrollable hemorrhage, among 420 open-drop ether anesthetics given by junior obstetric residents for cesarean section.⁶

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The safety record of the mask or open-drop method may be a result of the fact that vomiting is most likely to occur in light anesthesia during induction or emergence when warning signs of swallowing, breath holding, and salivation allow time for the patient to be turned onto her side. Vomiting does not occur during maintenance of deep inhalational anesthesia (Guedel stage III, plane i or ii).⁷ Pulmonary aspiration as an important cause of anesthesia-related maternal death was not emphasized until the 1940s and 1950s by Mendelson⁴ and others,⁸ but the policy of "mandatory" tracheal intubation, especially when it fails, may actually do harm.^{7,9}

When general anesthesia is essential, there are advantages to mother and fetus in the use of tracheal intubation, neuromuscular blockade, and light anesthesia with controlled ventilation. On the other hand, aspiration is sufficiently rare during inhalational anesthesia *via* face mask that this may be a rational and defensible choice in difficult circumstances. We may do our patients a disservice if we are afraid to use an "obsolete technique" because of exaggeration about its dangers.

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In Reply:—An oft-quoted restatement of Russell's paradox states that "all generalizations are untrue—even this one!" The generalizations made by Drs. Gambling and Reisner and Dr. Sitzman regarding the "unreasonableness" of inhalation induction of anesthesia for emergency cesarean section are equally invalid. Although we recognize that under almost all circumstances, rapid-sequence intravenous induction of anesthesia with endotracheal intubation is preferred for STAT cesarean section, real-life circumstances may countervene. As eloquently stated by Dr. Maltby, not every parturient (or even many parturients) anesthetized *via* mask before the clinical introduction of rapidly acting intravenous anesthetics and relaxants succumbed to acid aspiration. Even now, most parturients do not regurgitate when cricoid pressure is released after rapid sequence intubation. The use of cricoid pressure in an *unparalyzed* patient, as suggested by Drs. Gambling and Reisner, is potentially detrimental: It may cause coughing or "bucking" during induction of anesthesia and may result in an esophageal tear if active vomiting occurs. Further, rapid sequence induction is not a panacea: There may be failed intubations (inadvertent gastric inflation with positive pressure ventilation markedly increases the risk of regurgitation) and balky intravenous lines (which occlude or infiltrate before the muscle relaxant has reached the circulation—especially when rocuronium follows thiopental too closely).

These correspondents also expressed concern regarding the delay in establishment of cardiovascular monitoring in our case. It is important to note that the pulse oximeter serves as an indicator of circulatory integrity (an electronic "finger on the pulse"), while the patient's spontaneous ventilation serves as an indicator of cerebral perfusion. Anesthesia is frequently induced *via* mask in pediatric patients before any monitoring (except, perhaps, a pulse oximeter) or intravenous access is established.

Drs. Shankar and Carnann emphasize the importance of having

intravenous access to allow for volume replacement should the need arise. The venodilation accompanying induction of general anesthesia typically makes it much easier to insert an intravenous catheter; in fact, this occurred in the present case. With regard to the medicolegal issues, the notion of a "standard of care" is relative: Appropriate management strategies for "routine" circumstances may not represent optimum management in an atypical case such as ours. In response to the dictums suggested by these authors, I must add one of my own: "It is *best* to give a healthy baby to a living mother."

Awake oral or nasal intubation is a viable option for cesarean section, provided time permits adequate preparation of the parturient. Topical anesthesia and vasoconstriction (if a nasal approach is planned) are critical to obtaining a successful outcome in an unseated patient. Administration of spinal anesthesia in the absence of intravascular access, although certainly well described in the 1920s and 1930s, results in an irreversible decrease in sympathetic tone, without offering the advantage of venodilation in the upper extremities and improved chances of obtaining venous access.

Anesthesiologists sometimes face difficult choices with unknown and unknowable risk-to-benefit ratios. Armed with clinical experience, scientific knowledge, technical skill, and bit of luck, we are able to provide a desirable outcome almost all the time. In cases like ours, informed flexibility may be more important than blind adherence to "dictums" and "standards."

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