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### Wearing of Gloves by Anesthesia Personnel

*To the Editor:*—Anesthesia personnel are urged to wear rubber gloves while involved in patient care. There are at least two ways in which the wearing of rubber gloves is detrimental.

First, the skin of the hands becomes soft, macerated, and vulnerable when rubber gloves are worn continuously for many hours. It is well known that rubber gloves develop holes through which contaminants enter; therefore, the sense of security afforded by wearing gloves may be false.

Second, if anesthesia personnel are not wearing gloves and come into contact with secretions or blood, they quickly wash their hands. However, while worn, soiled gloves may come into contact with the pen, ear piece, stethoscope, papers, charts, anesthesia equipment, and other objects. Anyone, including nongloved anesthesia personnel, who touches any of these objects is therefore exposed to the contamination. Many people, for instance, put pens in their mouths.

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### Intravenous General Anesthesia Is *Not* Intravenous Sedation

*To the Editor:*—We write with concern about the article by Furman and Smith<sup>1</sup> describing "intravenous sedation" for repair of giant inguinal hernias in a ventilator-dependent premature infant. The authors conclude that by using "caudal anesthesia with iv sedation," they circumvented the use of halogenated agents and minimized pulmonary barotrauma and cardiovascular depression. At the time of the infant's preoperative evaluation, his respirations were assisted with an infant pressure-cycled ventilator set at 36 breaths per min. An additional 16 breaths per min of spontaneous ventilation gave him a total of 52 breaths per min. "Intravenous sedation" with 3.5 mg/kg ketamine plus 0.14 mg/kg midazolam was followed by caudal blockade with 1.1 ml/kg 0.25% bupivacaine containing 5 µg/ml epinephrine. Prior to incision, an additional 3.5 mg/kg iv ketamine was administered. Before completion of the hernia repair, both an additional dose of caudal bupivacaine and yet another 3.5 mg/kg iv ketamine plus 0.14 mg/kg midazolam was given. Thus, for the completion of a 3-h hernia repair, the patient received a total of 10.5 mg/kg iv ketamine, plus 0.28 mg/kg iv midazolam, in addition to continuous caudal anesthesia.

The anesthetic described above hardly constitutes iv sedation as an adjunct to caudal anesthesia, but rather suggests iv general anesthesia as an adjunct to a caudal block. No mention is made of the patient's

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Therefore, when gloves are worn, they should be removed and discarded as soon as the contact with blood or secretions has ended (after intubation). Clean gloves can be put on whenever such contacts are to recur. In the interim and for long periods, anesthesia personnel can and should be ungloved so that skin does not become macerated.

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spontaneous respiratory effort after the initiation of iv anesthesia, yet the authors conclude that by avoiding halogenated agents, opioids, and muscle relaxants, they prevented the need for controlled ventilation intraoperatively. It is likely that the patient was fully anesthetized with iv ketamine<sup>2</sup> and midazolam and that most of his muscles distal to his midthorax were relaxed due to the caudal block. In this situation, intermittent mechanical ventilation at 36 breaths per min should be more efficient and might even improve his blood gases, even in the absence of spontaneous breathing. The authors further point out that no increases in mechanical ventilation were necessary, thereby reducing the risk for pneumothorax, but offer no evidence by way of capillary or arterial blood gas analysis to support the efficacy of their choice. It is likely that the elimination of the 16 spontaneous breaths per min, with some combination of fentanyl, an inhalation agent, and a neuromuscular blocking agent with a local anesthetic block for postoperative pain relief, would not have altered this patient's ventilator course at all, and that recovery probably would have been swift and complete. Our assumption would be that decreases, and not increases, in the need for mechanical ventilation may have been the rule in this patient if he was sedated and given neuromuscular blockade.

It is our contention that this infant received an iv general anesthetic,

not iv sedation. Furthermore, the data provided do not warrant the conclusion that this technique is more efficacious or safe when used in an infant whose lungs are already being ventilated preoperatively.

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*In Reply:*—Although we cannot absolutely contend that the doses of ketamine and midazolam that our patient<sup>1</sup> received produced "sedation" rather than "anesthesia," our major objective in managing this particular anesthetic was not to lay the groundwork for an argument in semantics, but to produce as little physiologic trespass as possible in a fragile patient with an urgent underlying surgical condition. Although studies have shown that younger children require more ketamine on a per-kilogram basis than do older children or adults to prevent movement in response to surgical stimulation,<sup>2</sup> we are not sure that anyone has determined what constitutes an "anesthetizing" dose of ketamine in a 1,500-g infant. Preoperatively, this patient had been receiving intravenous diazepam 0.3 mg · kg<sup>-1</sup> every 4 h supplemented with intravenous fentanyl 2 µg · kg<sup>-1</sup> for control of episodes of intense agitation.

In selecting the doses of ketamine and midazolam used in this case, our underlying concern was to prevent this patient from experiencing intraoperative hypoxemia and hypercarbia secondary to agitation in response to both surgical and nonsurgical stimuli. This patient never ceased breathing spontaneously during the surgical procedure. Separation from mechanical ventilation, which had begun preoperatively, continued rapidly in the postoperative period.

In conclusion, we believe that in this particular case, we met our goals of providing excellent surgical anesthesia without worsening the course of our patient's underlying pulmonary disease. However, com-

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## Collecting Blood for Autologous Transfusion

*To the Editor:*—Isovolemic hemodilution—the exchange of whole blood with colloid or crystalloid to obtain autologous whole blood for retransfusion while maintaining normovolemia—has recently regained favor as a technique to minimize exposure to homologous blood products.\*† Unfamiliarity with the technique may be a barrier to its use.

Inserting a 14- or 16-G venous catheter, connected to a collecting bag, and waiting for the blood to collect can be a frustrating experience. Collecting blood from a 20-G arterial or central venous catheter is an

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parisons of safety and efficacy of different anesthetic techniques require more than one case report to demonstrate the universal superiority of any particular anesthetic technique.

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† Kaplan JK: Summary. *Journal of Cardiothoracic Anesthesia*. 11:50-51, 1988

alternate method but requires invasive cannulation. All of these methods can lead to a costly error, since slowly collected blood can clot in the collecting tubing and bag.

We use the Fenwall autologous blood collection kit (two 500-ml bags with 63 ml anticoagulant, citrate-phosphate-dextrose) and place an automatic blood pressure cuff on the same arm in which a venous catheter has been inserted into a vein in the forearm or antecubital area. By cycling the cuff at 3-min intervals, pressure is generated in the vein, and blood collection is facilitated. This technique may be analogous to the squeezing and releasing of the hand around a sponge ball that is used in awake blood donation. It is necessary to frequently shake the collection bag to ensure adequate mixing with the citrate-phosphate-dextrose. This further prevents clotting.

We use the method described by Bourke and Smith<sup>1</sup> to estimate allowable hemodilution. This volume is replaced with a crystalloid or