

## CORRESPONDENCE

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## Security System for Transducer Holders

*To the Editor:*—Loss of transducer holders for invasive pressure monitoring to the postanesthesia care unit or intensive care unit is a frequent occurrence in our institution. We have developed the following solution to this problem. With the transducer holder attached to an intravenous pole, the small black screws securing the transducer holder to its mounting clamp are removed and replaced with set screws (size and thread: #10-32,  $\frac{3}{8}$  in long), thus preventing separation of the transducer holder from its support bracket. A hexagonal (Allen) wrench ( $\frac{3}{32}$  in) is used to tighten the set screws.

Nylon-coated cable ( $\frac{3}{16}$ -in diameter) is threaded circumferentially around the intravenous pole and through the transducer support (fig. 1), and is crimped using a loop/sleeve connector and Vise-Grips (Pedersen Manufacturing Co., De Witt, NE), or a crimping tool. (All items are available through the catalog from Small Parts, Inc., Miami Lakes, FL)

The arrangement described prevents removal of the transducer holder from the intravenous pole while allowing vertical movement of the transducer to accommodate different operating room table heights.

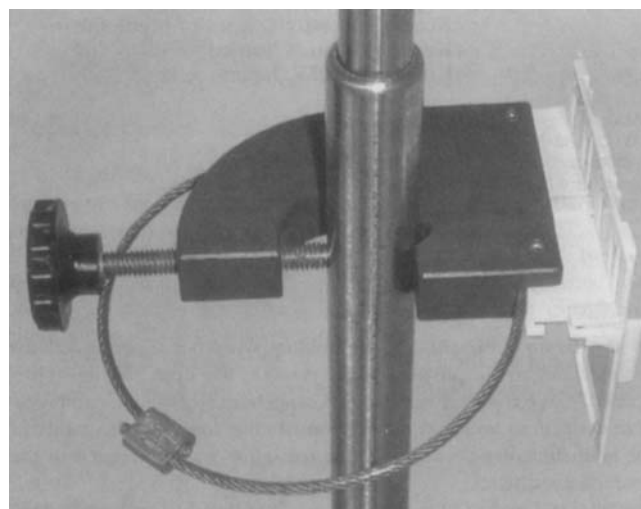
**Janet E. Pittman, M.D.**

Clinical Assistant Professor  
Department of Anesthesiology  
Mount Sinai Medical Center  
One Gustave L. Levy Place  
New York, New York 10029-6574

Janet\_Pittman\_at\_anesthet\_post@smtlink.mssm.edu

**Lilia Voevidko, M.Sc., C.C.P.**  
Clinical Perfusionist  
Regional Health Care Center

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**Fig. 1.** Lateral view showing loop-sleeve connector and cable assembly securing transducer holder and mounting clamp to intravenous pole.

11th Street Surgical Center  
Wichita Falls, Texas

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## An Easy Formula to Remember the Laryngeal Mask Airway Size–Patient Weight Relationship

*To the Editor:*—A laryngeal mask airway (LMA) is selected based on patient weight, especially for pediatric patients. However, the LMA size–patient weight relation is difficult to memorize because there are many sizes of LMA (table 1). We developed an easy single formula to determine LMA size based on patient weight as follows:

$$\text{LMA size} \geq (\text{patient weight (kg)/5})^{0.5}$$

With this formula, it is easy to calculate a suitable LMA size for a patient of known weight. In addition, there is little difference between the calculated LMA size–patient weight relation between this formula and the recommended formula.<sup>1</sup> For example, if the patient weighs 15 kg, the calculation would be as follows: LMA size  $\geq (15/5)^{0.5} = (3)^{0.5} = 1.7$ . In this case, a No. 2 LMA would be used.

Although some suggest that adult sizes of LMA (No. 4 and No. 5) can

**Table 1.** Laryngeal Mask Airway Size and Patient Weight

Size	Recommended Patient Weight in Textbook (kg) <sup>1</sup>	Range of Patient Weight Based on Our Formula (kg)
1	<5	–5
1.5	5–10	5–11.25
2	10–20	11.25–20
2.5	20–30	20–31.25
3	30–50	31.25–45
4	50–70	45–80
5	>70	80–125

be selected based on sex,<sup>2</sup> this formula may also be applicable to these adult sizes. This formula is easy to remember and, we hope, helpful in clinical situations.

**Tetsuro Kagawa, M.D.**

Instructor in Anesthesiology  
kagawa@med.kobe-u.ac.jp

**Hidefumi Obara, M.D.**

Professor and Chairman of Anesthesiology  
Department of Anesthesiology  
Kobe University School of Medicine  
Kusunoki-cho, Chuo-ku  
Kobe 650-0017, Japan

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## Paraplegia after Cystectomy and Epidural Anesthesia

*To the Editor:*—Paraplegia after epidural anesthesia performed for urologic surgery in a hyperlordotic position has been previously described.<sup>1,2</sup> We report two additional cases of postoperative paraplegia after cystectomy and ileal bladder construction in which the nature of the neurologic deficits suggests that the injury was not related to the epidural anesthetic.

A 50-yr-old man (172 cm, 90 kg) was scheduled to undergo radical cystectomy. Epidural puncture was performed at the L3-L4 interspace, using a 17-gauge Tuohy needle. A catheter was then inserted 4 or 5 cm cephalad into the epidural space. No paresthesia was elicited at any time, and there was no return of blood or fluid through the catheter. After a test dose of 3 ml lidocaine, 1%, with epinephrine 1:200,000, 14 ml of a 1:1 mixture of lidocaine, 2%, and ropivacaine, 1%, was injected. After achieving a sensory anesthesia level at T8, general anesthesia was induced with etomidate and sufentanil. Paralysis was achieved with cisatracurium.

After induction, the patient was placed in a hyperlordotic position on the operating table, with a folded sheet used as a wedge under the sacrum. The surgical procedure was uneventful. Preoperative blood pressure was 100/70 mmHg. During the procedure, pressure ranged from 90/60 to 120/90 mmHg and was less than 100/70 mmHg for a total of only 10 min. Central venous pressure was maintained between 7 and 10 mmHg. Estimated blood loss was 1,000 ml. At admission to the recovery room, the patient was extubated and an extradural infusion of ropivacaine, 0.2%, at a rate of 4 ml/h was administered. Seven hours later he first complained of a loss of sensation in the left and right lower limbs. This was thought to be caused by the action of ropivacaine and hence the rate was reduced to 2 ml/h.

In the early morning on the day after surgery, the patient continued to complain of a loss of sensation in the left and right lower limbs. Epidural analgesia was discontinued. Neurologic evaluation, performed 5 h after discontinuation of the epidural analgesia, revealed flaccid paralysis for hip flexion, and 3/5 weakness for hip, knee, and ankle extension and for ankle and knee flexion bilaterally. Babinski sign was absent bilaterally. Perception of pinprick and cold on the medial and posterior aspect of his legs was also decreased. There was no impairment of perianal sensation and no incontinence. A lumbar plexus lesion was suspected, and subsequent electromyograph studies showed small compound muscle action

## Reference

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potentials and slow motor nerve conduction velocities in the ankle to knee and sciatic to knee. Magnetic resonance imaging of the spine on the third day failed to reveal any spinal cord abnormalities. After 3 months, the patient had an increase in strength in most of the muscles around his hips, knees, and ankles. He was able to walk with a walker.

A 72-yr-old woman (160 cm, 67 kg) underwent radical resection of the bladder. Epidural and general anesthesia were performed as the first case. Twelve milliliters of a 1:1 mixture of lidocaine, 2%, and ropivacaine, 1%, was injected through the epidural catheter. The patient was placed in a hyperlordotic position. The surgical procedure was uneventful and blood pressure, heart rate, central venous pressure, and oxygen saturation were maintained within normal limits. Twenty minutes after the end of surgery the patient was conscious and extubated without difficulty, and postoperative analgesia was maintained with 5 ml/h ropivacaine, 0.2%. Eight hours after extubation she was still unable to move her legs. Ropivacaine infusion was reduced to 3 ml/h.

On the first postoperative day the patient continued to complain of inability to move her legs. Epidural analgesia was discontinued. Neurologic evaluation performed 5 h after discontinuation of the epidural analgesia showed significant motor dysfunction in the hip flexors and quadriceps bilaterally. There was no hypalgesia or hypesthesia, and reflexes were normal. The Babinski sign was absent. There were no impairment of perianal sensation and no incontinence. A femoral nerve lesion was suspected and electromyograph studies showed small compound muscle action potentials and slow motor nerve conduction velocities in femoral nerve bilaterally. Magnetic resonance imaging of the lumbar and thoracic spine on the third day was normal. After 5 months of rehabilitation, some motor improvement was noted.

## Discussion

Neurologic deficits after epidural anesthesia are usually attributed to needle- catheter-induced trauma, spinal stenosis (perhaps combined with hypotension) leading to cord ischemia, or direct spinal cord drug toxicity. These factors seem unlikely to be relevant in these two cases. No paresthesia was elicited during needle or catheter placement, and there was no evidence that either the needle or the catheter entered the subarachnoid