We are reporting a simple alternative technique in the event of unintended dural puncture. As recommended by Moore for continuous spinal anesthesia,[2] when dural puncture occurs, we aseptically insert a 20-gauge, 90-cm nylon epidural (Encapsulon, Tract Medical, Jaffrey, New Jersey) catheter with the wire stylet withdrawn 5 cm through the existing 17-gauge Touhy needle. The epidural catheter is directed caudally and advanced 2–3 cm. Five milliliters of preservative-free lidocaine 1% (5 ml ampule ASTRA Pharmaceutical Products, Westborough, Massachusetts) is diluted with 15 ml of preservative-free saline (10 ml vial, ABBOTT Laboratories, North Chicago, Illinois). The resultant solution of lidocaine 0.25% has a specific gravity of 1.025. In order to avoid unilateral block and aortocaval compression, the block is established in the following manner: 3 ml of lidocaine 0.25% was administered with the patient in lateral decubitus position. Five minutes following the initial injection, the patient is turned to the other side (lateral decubitus) and is kept on that side for an additional 5 min. At this time, the level is assessed. Following injection of 3 ml of 0.25% lidocaine, effective analgesia to a level of T9–T10 to S5 was obtained within 60 s in seven of ten patients. In three out of ten patients, the sensory level was lower than T10 bilaterally, necessitating an additional 1 ml of lidocaine 0.25% that resulted in analgesia from T7 to S5. Once analgesia was satisfactory, patients were kept in the lateral decubitus side of their choice. The spinal analgesia is reinforced approximately every 2 h, with the same solution and regimen as with the initial administration. All patients had received intravenous hydration with 1000 ml of Lactated Ringer's solution before epidural analgesia. There were no episodes of significant hypotension. Supplemental doses prior to delivery for perineal anesthesia were not required, because the sensory block extended to all sacral segments. No motor block or instrumental delivery occurred in any of the ten patients.

Of our ten parturients with dural punctures from 17-gauge Tuohy needles, two developed postdural puncture headache. In one parturient, the headache was severe, necessitating an epidural blood patch. In two of the ten patients, lidocaine 0.25% did not provide adequate analgesia after an infusion of pitocin was initiated. However, satisfactory analgesia was obtained when fentanyl 6.25 μg was added to 3 ml of lidocaine 0.25% diluted with saline.

We believe this method is a simple and safe alternative for the management of unintended dural puncture. When used with low concentrations of lidocaine, this method results in effective labor analgesia and eliminates the need for a repeat epidural block with its complications. Furthermore, should such patients subsequently need anesthesia for a cesarean section, this can be accomplished by titrating additional small doses of a higher concentration of local anesthetic.

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REFERENCES

1. Hodgkinson R: Total spinal after epidural injection into an interspace adjacent to an inadvertent dural perforation. ANESTHESIOLOGY 55:593–595, 1981
2. Moore DC: Regional block, 4th edition. Springfield, Charles C. Thomas, 1965, pp 388–406

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High-pressure Uterine Displacement

To the Editor:—In obstetrical patients, prevention of the supine hypotension syndrome or aortocaval compression is essential especially during conduction anesthesia. In our obstetrical suite, we have used a device similar to that described by Redick;[1] an empty 3-l plastic bag used for urologic irrigation is connected to a short piece of plastic tubing that has a standard sphygmomanometer type of inflation bulb attached to its other end. The bag is placed beneath the operating table's mattress so that it is directly under the patient's right hip and is inflated to achieve uterine displacement.

In addition, we have available in all of our obstetrical operating rooms a device for emergency transtracheal jet ventilation. This device, as described by Millar,[2] is capable of delivering 50-psi hospital-piped oxygen via a luer lock fitting through an intravenous cannula placed percutaneously into the trachea. Control of the jetted oxygen is effected by a thumb operated valve. The effectiveness of this ventilation technique has recently been shown by Thomas *et al.*[3]

Recently, we have mated these two devices giving rise to a high pressure uterine displacer (fig. 1). The inflation bulb is replaced by a three-way luer stopcock that allows the high pressure oxygen to inflate the bag.

Placed beneath the operating table's mattress, the inflatable wedge is continuously ready for use. Unlike a fixed device, such as a foam rubber wedge, it is fully adjustable at all times during an anesthetic. After delivery of the fetus, the stopcock valve is opened to air and the patient returns to a neutral position, facilitating surgical closure. Using 50-psi oxygen, the device is capable of producing effective uterine displacement in 2–3 s *versus* 20–30 s required with a standard sphygmomanometer type of squeeze bulb. The patient should be warned before inflation since displacement is quite rapid. Endler and Donath[4] have previously described an inflatable wedge using high-pressure gas, but his device requires elaborate and dedicated equipment not routinely found in an obstetrical operating suite.

The advantages of this technique are speed, convenience, low cost, and controllability. In addition, because it requires a functioning jet ventilator, the technique also obligates the anesthetist to regularly check out a seldom used but potentially life-saving device. Our only untoward experience with the device involved an inexperienced operator who inadvertently overdistended the bag causing a rather unsettling noise when the bag exploded.

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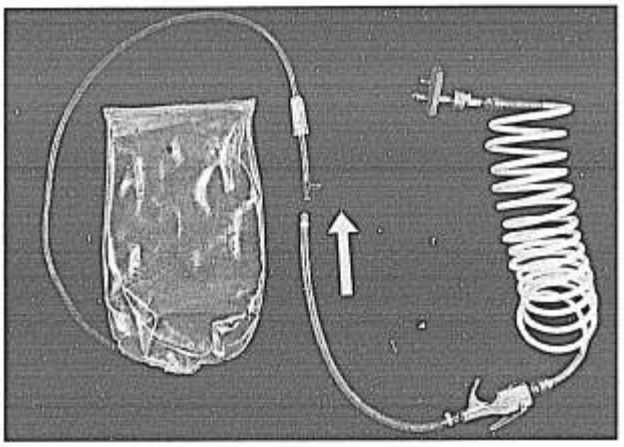

FIG. 1. The high pressure uterine dispacer. The arrow indicates attachment of the jet ventilator to the inflatable bag.

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REFERENCES

1. Redick LF: An inflatable wedge for prevention of aortocaval compression during pregnancy. Am J Obstet Gynecol 133:458–459, 1979
2. Millar WL: Management of a difficult airway in obstetrics. ANESTHESIOLOGY 52:523–524, 1980
3. Thomas TC, Zornow MH, Scheller MS, Unger RJ: The efficacy of three different modes of percutaneous trans-tracheal ventilation in hypoxic, hypercarbic swine. Can J Anaesth 35:S61–S63, 1988
4. Endler GC, Donath RW: Inflation device to prevent aortocaval compression during pregnancy. Anesth Analg 64:1015–1016, 1985

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Calculating the Potency of Mivacurium

To the Editor:—I am confused by some of the results reported by Savarese *et al.*[1] in their recent paper on the pharmacology of mivacurium. Specifically, using the data supplied in table 1, I cannot reproduce the ED_{95} value of 0.081 mg/kg that they calculate. If one performs a log dose-probit transformation and linear regression analysis on only the first four groups (0.03–0.10 mg/kg), the resulting ED_{50} and ED_{95} values are 0.052 and 0.10 mg/kg, respectively (table 1). In fact, this estimate of potency is substantiated by the group of patients receiving 0.10 mg/kg that showed 95.7% twitch depression. If the ED_{95} was, in reality, 0.081 mg/kg, then a dose of 0.10 mg/kg should produce greater than 99% twitch depression; this was not the case.

The authors do not actually state in their paper which groups were employed in calculating the ED_{50} and ED_{95} values. However, since 100% twitch suppression cannot be plotted on a log-probit graph, it appears that only the first four groups (n = 36) could have been used. It would be helpful if the authors could explain in greater detail how they estimated drug potency.

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TABLE 1. Log-probit Transformation of Data from Table 1 of Savarese *et al.*[1]

Dose (mg/kg)	% Effect	Log-dose	Probit
0.03	9.4	−1.5228	−1.3106
0.05	43.7	−1.3010	−0.1637
0.07	75.3	−1.1549	0.6280
0.10	95.7	−1.0000	1.6955

Equation for the dose-response relationship as determined by linear regression (least squares) analysis of the above log-probit data: y = 5.8598x + 7.513, r = 0.998.

REFERENCE

1. Savarese JJ, Ali HH, Basta SJ, Embree PB, Scott RPF, Sunder N, Weakly JN, Wastila WB, El-Sayad HA: The clinical neuromuscular pharmacology of mivacurium chloride (BW B1090U): A short-acting nondepolarizing ester neuromuscular blocking drug. ANESTHESIOLOGY 68:723–732, 1988

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In Reply:—We appreciate the comments offered by Dr. Kopman. His letter reflects the need for a solution to a debatable question: How does one handle 100% or 0% twitch inhibition during construction of a dose-response curve for a neuromuscular blocking drug?

In our publication on mivacurium,[1] we estimated potency of mivacurium during nitrous oxide-narcotic-barbiturate anesthesia using single-twitch stimulation of the ulnar nerve to evoke thumb adduction at 0.15 Hz. This stimulus parameter was used so that the characteristics of mivacurium block might be easily compared with past literature on other relaxants. The methodology is fairly extensively presented and debated in Donlon *et al.*[2] where both single-bolus and cumulative dose-response curves for pancuronium were constructed.

Although we *calculated* an ED_{95} of 0.081 mg/kg in our paper, when we administered 0.10 mg/kg to nine consecutive patients, we *observed*