duration of dog Purkinje fibers[3] as well as of human atrial tissue.[1] The underlying mechanism is a block by tetrodotoxin of the steady state Na^+ current.[4] Because in the present experiments the fibers were partially depolarized and therefore the residual available fast Na^+ channels were fewer, halothane may have decreased the fast Na^+ current, as suggested by the decrease in $\dot{V}_{max}$ and a_{Na}^i. The reduction of $\dot{V}_{max}$ and of the upstroke amplitude was greater in the fiber depolarized in 8 mM $[K]_0$ than in the fiber perfused in normal $[K]_0$ (fig. 1). Since Ca^{2+} current may contribute to the upstroke, especially in the presence of β-adrenergic agonists, the depression of Ca^{2+} current by halothane might contribute to the observed effect. Still, the present demonstration that halothane decreases a_{Na}^i in partially depolarized fibers suggests that halothane might decrease the fast Na^+ current more when the cells are depolarized (and therefore with fewer available Na^+ channels[5]). A diminished fast Na^+ current might contribute to electrical uncoupling in cardiac cells treated with halothane.[6] Thus, the present findings may be significant in relation to the arrhythmogenic actions of halothane in patients with ischemic heart disease.

An alternative explanation is that halothane decreases a_{Na}^i by reducing Ca^{2+} influx and a_{Ca}^i: the consequent increase in the transmembrane Ca^{2+} electrochemical gradient in turn would decrease a_{Na}^i through the Na^+–Ca^{2+} exchange. The determination of the mechanism of a_{Na}^i decrease requires further experimentation. However, the present results indicate that a decrease in a_{Na}^i in human cardiac tissues is to be added to the effects of halothane and should contribute to the decrease in contractile force.

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Failed Spinal Anesthesia with the Sprotte Needle

To the Editor:—Recent reports[1,2] have compared Quincke point spinal needles to the 24-G Sprotte (pencil-point) needle with respect to the incidence of post-dural puncture headache in various patient subgroups. These reports and a review of the literature comparing various spinal needles have not mentioned failure of the technique as a complication of needle design.

Since the introduction of the Sprotte needle to our hospital, a perceived increase in the failure rate of spinal anesthetics using the Sprotte needle was suggested by anesthesia staff and residents. We therefore undertook a retrospective analysis of the anesthetic charts from September, 1990 to March, 1991 to address this specific issue. This period was chosen to eliminate the "learning period" of new residents in the program and, it was hoped, to account for lack of experience with regional anesthesia techniques. A "failed technique" was defined as the lack of acceptable anesthesia for the proposed surgical procedure, following the injection of local anesthetic after free-flow cerebrospinal fluid (CSF) was identified with any spinal needle.

The failure rate of spinal anesthesia using the Sprotte needle (22- and 24-G) was compared to the failure rate with all other spinal needles (22-, 25-, and 27-G Quincke point needles) used during the same time period. Of 394 spinal anesthetics performed at our institution there were 20 (5.1%) failures. Charts with incomplete data totaled 49 of 394 (12%) and were excluded from analysis. Sprotte needles were used in 87 cases, with 9 (10.3%) failures, as compared to 11 of 258 (4.3%) with all other needle types. Within the failure group of 20 there were 4 unknown needles used that were included in the non-Sprotte group. There was a significant difference ($P = 0.02$) (chi-squared analysis) between the groups. The type of local anesthetic used included lidocaine (6), bupivacaine (2), and tetracaine (1) in the Sprotte group and lidocaine (3), bupivacaine (4), tetracaine (1), and 3 unreported local anesthetics in the non-Sprotte group. Free-flow CSF was documented on 16 of 20 anesthetic records. Although difficult to evaluate, the experience of the anesthetists in the two groups was considered similar.

Possible explanations for this difference may include inexperience with the new needle type, experience of the operator, or the local anesthetic used. A more plausible reason could relate to the design of the needle, specifically the dimensions and placement of the sideport, allowing for free flow of CSF and deposition of local anesthetic solution into both the CSF and the epidural space, resulting in an inadequate spinal block. The length from the needle tip to the opening of the sideport is 1.2 mm (22- and 24-G). The length of the sideport opening is 1.75 mm on the 24-G and 2.0 mm on the 22-G Sprotte needle. From cadaveric studies[3] and our own unpublished observations of fresh cadaveric dural specimens, dural thickness can vary from 0.5 to almost

2.0 mm, with the thickest area at the cervical region and the thinnest in the thoracic region. The average thickness in the lumbar area is 1.0 mm. These dimensions would certainly support our suggestion that free CSF could be identified with part of the side opening still occupying the epidural space.

One of the advantages of the Sprotte needle used in the obstetric population is the documented decrease in the incidence of post-dural puncture headache.[1] However, the risk of a possible failed technique (particularly if the spinal is administered for an urgent or emergent cesarean section) may outweigh its benefit. Advancing the needle an additional 2 or 3 mm has been suggested as a solution to this problem but may increase the incidence of paresthesia. The distinct endpoint of CSF identification with the Sprotte needle now introduces an aspect of unpredictability.

Further controlled prospective studies are warranted to test this hypothesis and to assess possible neurogolgic sequelae if one chooses to use an "advancement" technique to eliminate the possibility of incomplete blocks. If these future studies support our hypothesis, we suggest that the manufacturers alter the needle design by changing the dimensions of the sideport opening to eliminate this potential complication.

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