sitting, spinal anesthesia was established with 1.5 ml 0.75% bupivacaine in 8.25% glucose (11.25 mg bupivacaine) through a 25-G Quincke spinal needle. Injection was performed over 15 s and between uterine contractions. Free flow of cerebrospinal fluid (CSF) was observed. The patient was gently placed supine in a left-lit position using a folded blanket under the right hip. The operating table was kept in a horizontal position.

Within 2 min, she began to develop upper extremity analgesia. This rapidly progressed over the next 30 s to motor weakness of both hands and respiratory distress. Hypotension was not noted. Because of the obvious respiratory distress, mechanical ventilation of the lungs was instituted with 100% \( O_2 \) via mask. The trachea was subsequently intubated without the use of hypnotics or muscle relaxants. Anesthesia was maintained for the cesarean section with 60% \( N_2O \) and 0.3% isoflurane in oxygen. A healthy male infant was delivered with Apgar scores of 7 and 9.

The patient fully recovered from the effects of the spinal anesthetic in 2 h, and the trachea was extubated without complications. Post-operatively, she developed a severe post-dural puncture headache, which was treated with two epidural blood patches and resolved in 1 week.

It was surprising to me that 11.25 mg subarachnoid bupivacaine produced a total spinal anesthetic in this patient. Indeed, Norris found that 15 mg hyperbaric subarachnoid bupivacaine provided adequate anesthesia in parturients presenting within wide ranges of age, height, weight, body mass index, and vertebral column length. Nevertheless, my patient displayed the effects of a massive subarachnoid overdose of local anesthetic, despite use of a hyperbaric mixture that was administered while the patient was in the sitting position. Dose, positioning, and baricity alone would make a total spinal anesthetic unlikely in this patient.

In this instance, I believe our dose was injected into a relatively much smaller volume of CSF, leading to a much higher than expected level. This smaller volume of CSF occurred secondary to the two unintentional dural punctures produced during attempted epidural analgesia. The decreased volume of subarachnoid spinal CSF was potentially due to direct loss of CSF through the dura. Additionally, a collection of CSF in the epidural space could compress the now deformable dural sac, resulting in a smaller volume of subarachnoid spinal CSF and unexpected total spinal anesthesia.6

Dennis L. Wagner, M.D.
Clinical Associate Professor of Anesthesiology
Indiana University School of Medicine
1120 South Drive, Ph 204
Indianapolis, Indiana 46202

References

(Accepted for publication March 28, 1994.)

The Bullard Laryngoscope and Size of the Endotracheal Tube

To the Editor—The development of an introducing stylet for the Bullard laryngoscope (BLS) has simplified the procedure of tracheal intubation. The introducing stylet duplicates the shape of the BLS blade, and it bends to the left at an approximate angle of 20° near the distal end of the fiberoptic housing, providing guidance of the endotracheal tube (ETT) into the trachea. Before attempting intubation, the ETT is "loaded" onto the stylet, which is fastened to the BLS in its respective slot, bringing the vertical part of the stylet behind and on the right side of the laryngoscope in the groove formed by the blade anteriorly and by the lens housing medially. The depth of the groove is only 5 mm, permitting the use of ETTS in sizes ranging up to 7.5 mm ID without displacing the introducing stylet posteriorly. This allows the endoscopist to visualize the distal 8 mm of the stylet through the eyepiece of the BLS and determine whether the stylet's tip faces the middle third of the left vocal cord, which is an ideal position for successful passage of the ETT (fig 1).

A size-8.0 mm ID ETT will displace the stylet posteriorly because of its larger diameter. This displacement occurs in such a way that only 1–2 mm of the distal end of the stylet can be viewed through the eyepiece and the tip of the stylet is usually facing the interarytenoid fold (fig 2). Intubation of the trachea is still possible if care is taken not to allow the stylet's tip to drift posteriorly during advancement of the ETT, which would result in an esophageal intubation.

Larger ETTS (8.5 and 9.0 mm ID) displace the stylet even more posteriorly, thus losing the benefit of being able to view the tip of...

Anesthesiology, V 81, No 1, Jul 1994
the guiding stylet. Tracheal intubation is still possible and somewhat similar to the "freehand" technique but retains the advantage of having the stylet fastened to the BLS.

We recommend examining the fiberoptic field of view before attempting a BLS-guided oral tracheal intubation. One can hold the BLS loaded with the ETT in the right hand while placing the slightly spread second and third fingers of the left hand near the image bundle. If the stylet is now viewed through the eye piece, one can appreciate how much of the stylet's tip can be seen. The image should be similar to either figure 1 for a 7.5-mm ETT or to figure 2 for an 8.0-mm ETT. With larger-size ETTs, the tip of the stylet will not be visualized. Therefore, the presence or absence of the stylet in the field of view as well as visible length of the stylet has to be appreciated before attempting laryngoscopy because it greatly affects the technique of the ETT placement into the trachea.

Fig. 1. BLS loaded with a 7.5 mm ID endotracheal tube. The inset demonstrates the corresponding fiberoptic field of view. The position shown is ideal for intubation, with the stylet's tip facing the middle third of the left vocal cord.

Fig. 2. Posterior displacement of the introducing stylet by an 8.0 mm ID endotracheal tube. Only a small portion of the stylet can be seen in the fiberoptic field of view.

Tatyana Katsnelson, M.D.  
Assistant Professor of Anesthesiology  
Erlina Farcon, M.D.  
Assistant Professor of Anesthesiology  
Margaret Cosio, M.D.  
Instructor in Anesthesiology  
Steven S. Schwalbe, M.D.  
Assistant Professor of Anesthesiology  
Department of Anesthesiology  
Albert Einstein College of Medicine/  
Montefiore Medical Center  
1300 Morris Park Avenue, J-1226  
Bronx, New York 10461  
(Accepted for publication April 1, 1994.)

A Low-cost Alternative for More Efficient Quality Assurance

To the Editor—With the advent of more sophisticated monitoring systems and better quality improvement (QI) in anesthesiology, several new and expensive automated data management systems that provide comprehensive, legible anesthesia records have become available. These systems, however, are still undergoing developmental changes and are at times prohibitively expensive for many anesthe-