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A Complication in Removing a Retained Ventricular Catheter Using Electrocautery

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Dear Sir,

Recently there has been discussion in the literature of a technique to remove ventricular shunt catheters [J Neurosurg 1995;83: 1101-1102 and J Neurosurg 1996;85:98O-093 (letters)]. I would like to alert your readers to an important potential complication learned to my chagrin recently.

A 2-month-old child had a meningomyel-ocle closed at birth, with placement of a ventriculoperitoneal shunt several days later. She returned with fevers, irritability, and peritoneal signs, leading to externalization of the shunt. Cultures proved positive for *My-coplasma pneumoniae* which did not clear when the shunt was externalized. She was taken to the operating room for removal of the shunt system and placement of a new external drain. She had slit-like ventricles, and the ventricular catheter was adherent to tissue of the frontal horn. As I routinely do, a metal stylet was passed down the lumen of the catheter and cautery applied in coagulation mode, applying traction (Birtcher 4400 Power plus unit, current at 25 W). I got a few of the expected bubbles of fluid, but then none further. Within a couple of seconds, a foul smell was apparent. Its source was evident when the catheter was easily removed, luckily in its entirety (fig. 1). The Codman Accu-Flo 5-cm right-angled catheter was charred at the most proximal set of holes and cracked almost to the point of complete separation. It was removed in its entirety, and the child had no untoward effects. Her infection cleared with removal of the old system, and she had an uneventful placement of a new shunt. Follow-up scans showed no residual catheter material.

Most likely, this near complication occurred because of a paucity of cerebrospinal fluid in the ventricle and the ventricular catheter. The electrocautery unit is designed to pass current through tissue or fluid of relatively low impedance. If there is a small gap with air intervening, arcing and ‘sparking’ can occur, as most surgeons have experienced in open operations. Such sparks have a high temperature. Arcing is much more likely to occur in coagulation mode than with cutting current, because of its much higher peak-to-peak voltage. In my case, the small amount of cerebrospinal fluid was not replenished when it was initially evaporated. The stylet, not intimately in contact with tissue, then acted as the source of a spark, with its high temperature contained in a small space and not buffered by an influx of cerebrospinal fluid. The temperature rose high enough to cause melting and charring of the Silastic.

I will continue to use the technique of fulgurating adherent tissue with electrocautery applied through a metal stylet in the lumen of retained catheter. It

is important to ensure, however, that the stylet is in contact with fluid or tissue, with no air intervening, to minimize the potential for arcing. I will even inject saline into the catheter if it seems prudent. The power should be low, in the 10-to 20-watt range. Cutting current is probably the more safe mode.

Fig. 1.

Fig. 1. Ventricular catheter charred after intraluminal application of electrocautery.

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