Removal of retained ventricular shunt catheters without craniotomy

Technical note

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A technique is described in which insulated suction is used to extract infected retained ventricular catheters in cases of shunt infection. This procedure allows safe removal without craniotomy. Retained catheters are pulled through an insulated No. 11F or 13F suction tube attached to an electrocoagulation unit used for resection and coagulation of adhesions. The technique has been successful in two cases with retained catheters.

KEY WORDS □9 hydrocephalus □9 shunt infection □9 shunt complication □9 retained ventricular catheter

The best management of ventricular shunt infection continues to be its prevention; however, in all large series, a significant incidence of shunt infection persists. The incidence in the various reported series has ranged from 2.7% to 31%.1,2 Opinions vary as to the means of detection, the necessity for removal of hardware, and the timing of such procedures. It is generally agreed that removal of infected hardware is essential for successful treatment of persistent shunt infections.1,3 In most circumstances, the hardware can be removed without difficulty. Nevertheless, in some cases the ventricular catheter is firmly embedded in a mass of scar tissue that is attached to the choroid plexus, and forcible removal of the catheter may result in severe intraventricular hemorrhage.

A suction cautery technique has been devised for safe removal of such retained catheters without resorting to craniotomy.

Technique

The patient is prepared and the operating room is arranged so that if significant intraventricular bleeding were to occur during the procedure, immediate craniotomy could be carried out. Following removal of the extracranial shunt hardware, a 36-in. braided synthetic 0 suture on a tapered needle is sewed into the exposed distal end of the ventricular catheter (Fig. 1). A No. 30 wire suture is threaded through the regulating aperture of a No. 11 French insulated neurosurgical suction tube and brought out through the tip. Finned ventricular catheters will require a No. 13 French suction tube. The traction suture is tied onto the wire guide and is pulled through the regulating aperture of the suction tube. Clear tubing from a controlled suction device set a low suction is connected to the suction tube and provides for close monitoring of any bleeding. The suction tube is attached to an electrocautery unit and is gently advanced along the ventricular catheter while pulling tightly on the traction suture. Bleeding, if any, is seen immediately through the clear tubing and is controlled by the coagulation current.

Since the exposed tip of the suction tube is often immersed in cerebrospinal fluid, rather high dial settings are required for effective cautery and coagulation. A C-arm fluoroscopic unit is most useful for following the progress of the procedure as more of the catheter is released from the scar and pulled into the suction tube.

Comment

This technique allows for safe extraction of the retained catheters that would otherwise require craniotomy. It has the advantage of providing immediate detection and control of any bleeding. Fluoroscopic...
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control allows for safe and smooth removal of the ventricular catheter into the suction tube without excessive displacement of the scar-encased tip of the catheter. The procedure provides for rapid and complete removal of the shunt hardware and possible reshunting under the same anesthetic. The need for additional operative procedures is avoided. We have not noted any long-term sequelae with this technique, which has been performed in two cases.

References

Manuscript received June 22, 1981.
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