Retrieval of a Ventriculoatrial Shunt Catheter from the Heart by a Venous Catheterization Technique

Technical Note

TETSUO TATSUMI, M.D., AND WILLARD J. HOWLAND, M.D.
Departments of Surgery and Radiology, Aultman Hospital, Canton, Ohio

Although disruption of the ventriculoatrial shunt has been frequently recognized, migration of the disrupted catheter into the heart is a rather rare complication. Holden and Crow reported such a case in 1963, where the venous catheter became disconnected in the neck and the distal end was found in the right ventricle; the catheter was recovered from the heart by thoracotomy. Since then, Long, et al., Conforti, et al., Dooley, et al., Faivre and Guilhou, and Becker and Nulsen have reported similar cases. The migrated intracardiac catheters in all of these cases were removed from the heart by either arteriotomy or pulmonary arteriotomy after a thoracotomy.

When we encountered a similar complication in a 4-month-old infant, a special percutaneous catheterization technique was used to retrieve an intravascular broken catheter. The detached intracardiac catheter was recovered from the heart through the right internal jugular vein, and a ventriculoatrial shunt was reestablished at the same time. We are not aware of any previous report of the use of this retrieval technique.

Case Report

This 4-month-old baby girl had had a myelomeningocele repaired immediately after birth. There was an increasingly tense anterior fontanel and spinal fluid leakage, and a ventriculogram revealed generalized ventricular dilatation. A ventriculoatrial shunt, using a low-pressure Holter valve, was performed 2 weeks after birth. The spinal fluid leakage from the repaired wound in her back immediately ceased, and her postoperative course was uneventful.

Examination. At a routine follow-up examination when the child was 4 months 3 weeks old, the anterior fontanel was noted to be tense. A chest radiograph revealed that the distal portion of the cardiac catheter was disconnected in the neck and apparently had migrated down into the right atrium (Fig. 1).

Operation. The detached catheter was retrieved by a catheterization technique, and the ventriculoatrial shunt was reestablished (Fig. 2). The technique of retrieval was as follows.

A 0.018 in. guide wire was folded over itself in its central portion and inserted into a 5F Teflon catheter. This was sterilized with the guide wire in place. With the patient under general anesthesia, the right internal jugular vein was exposed by blunt and sharp dissection. The proximal connecting
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end of the Holter valve catheter, with a connector at the distal end, was then exteriorized. The jugular vein was thrombotic, but by careful exploration, a central lumen could be identified. The tapered Teflon catheter was inserted into the opening and gently forced toward the heart under image amplifier guidance. This dilated the fibrotic jugular vein; the catheter tip was then observed to enter the right atrium. The guide wire was advanced a distance of about 2.0 cm, and a loop was formed by advancing one limb of the protruding guide wires (Fig. 3 left); this also produced a distal curve, which could be adjusted into various positions. The looped wire was then maneuvered around and under the distal end of the Holter catheter. By retracting the limb of the wire that had been advanced, and then retracting both limbs together, the distal end of the Holter catheter was caught between the wire loop and Teflon catheter (Fig. 3 center). The entire assembly was then retracted into the superior vena cava. This procedure folded the Holter catheter over on itself (Fig. 3 right), and the assembly could then be drawn into the internal jugular vein where further gentle retraction allowed withdrawal through the internal jugular vein and out to the surface. A new catheter was passed by image intensifier guidance into the right atrium through the same vein. This catheter was then connected to the proximal catheter by a connector, which was secured to the vein by a circumferential ligature.

Postoperative Course. The patient had an uneventful recovery and was discharged 6 days after operation.

Discussion

Disruption of the shunting device and mi-

FIG. 2. Reestablishment of the ventriculoatrial shunt by a new catheter following retrieval of the detached intracardiac catheter.

FIG. 3. Artist’s drawings of the retrieval procedure. Left: The wire loop has been advanced and lies adjacent to the distal tip of the detached catheter. Center: The wire loop has been passed around the distal tip of the catheter and both limbs of wire retracted within the retrieval catheter. The detached Holter catheter is thus secured between the wire loop and the Teflon catheter. Right: Retraction of the retrieval catheter into the superior vena cava, producing a “folding-over” of the detached Holter catheter.