Intravascular repositioning of a ventriculoatrial shunt

Technical note

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Intravascular repositioning of a misdirected ventriculoatrial shunt from the left innominate vein into the right atrium was accomplished using a Muller guidewire deflector system. The guidewire and its surrounding small polyethylene catheter were inserted into a left superficial saphenous vein and advanced through the right side of the heart into the superior vena cava. The deflector system was activated and easily hooked the misplaced ventriculoatrial catheter. With gentle traction it was repositioned in the right atrium. The simplicity and safety of this approach make it recommended for use in infants and children.

KEY WORDS shunt complications Muller deflector system intravascular manipulation

MISPLACEMENT of the distal tip of a ventriculoatrial shunt into one of the contralateral brachycephalic veins is an important though rare complication of shunting procedures. Management of this problem by intravascular manipulation with a guidewire deflector system from a femoral approach is the subject of this report.

Case Report

This was the third Children's Hospital admission of this 5-year-old white boy with communicating hydrocephalus diagnosed during the first few months of life. He was admitted at this time for the second revision of a ventriculoatrial shunt. At surgery, a new tapered catheter could only be passed a distance equal to the length of the catheter that had been removed. A second incision was made just above the right clavicle and dissection carried down to the junction of the thrombosed jugular vein and the patent subclavian vein. The tapered catheter was inserted at this junction and directed toward the heart. Technical problems were experienced with the EKG monitoring system, and a follow-up film showed the distal tip to lie in the left innominate vein near the junction of the vertebral and subclavian veins (Fig. 1).

A previous successful removal of an embolized ventriculoatrial shunt from the right side of the heart using a Muller deflector system from a femoral approach prompted a similar course in this patient before reoperation. An attempted percutaneous right femoral venotomy was unsuccessful, and for this reason a left superficial saphenous cutdown was accomplished. The .045 Hanafee catheter had been custom-fitted to the .035 Pilotip guide of the Muller deflector. The catheter
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Fig. 1. Chest films. *Left:* Following revision, the misplaced ventriculoatrial shunt is shown extending into the left innominate vein. *Right:* After intravascular manipulation with the deflector system, the ventriculoatrial shunt is now in proper position in the right atrium.

Fig. 2. Diagram of complication and method of correction. *Left:* The Muller deflector guide and the Hanafee catheter are depicted extending from the left superficial saphenous cutdown through the right side of the heart into the superior vena cava, and the misplaced ventriculoatrial shunt is shown extending into the left innominate vein. *Center:* The deflector system has been activated and the misplaced V-A shunt hooked. *Right:* With the use of gentle traction, the ventriculoatrial shunt has been properly positioned and is now disengaged from the Muller deflector system.
and guidewire were passed from the left saphenous via the inferior vena cava through the right atrium to the junction of the right and left innominate veins under fluoroscopic control. The misplaced ventriculoatrial shunt was easily hooked by the activated deflector system, under gentle traction its tip was repositioned in the right atrium (Fig. 2). The deflector system was removed, the venotomy repaired, and the patient recovered with the shunt functioning well.

Discussion

Deflector guide systems have continuing use in angiography because they occasionally permit selective catheterization of vessels that otherwise could not be. The small thin-walled tubing used in our pediatric patients has poor "memory" in that appropriate curves for selective catheterization are often lost during the procedure. The Muller deflector system, which is capable of inducing a curve of 180° when activated, has been particularly useful in pediatric angiography.

Although the doubled wire-loop technique for the snaring of embolized intravascular foreign bodies remains the method of choice,1,3,4,6,11 we have had the experience of using a deflector system for retrieval of an embolized ventriculoatrial shunt from the right side of the heart which had lain in place for 5 months.5 Because of this and because we were concerned that the loop technique might damage the ventriculoatrial shunt, the use of the deflector system seemed most appropriate. The ease and safety of the method make it useful in other patients with comparable complications.

References


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