Non-surgical extraction of a broken catheter sheath lodged in the right atrium, using a Dormia ureteral stone dislodger

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SUMMARY A broken Desillets Hoffman (DH) sheath which had lodged in the right atrium was extracted with the help of a Dormia ureteral stone dislodger. A critical appraisal of various non-surgical methods used so far to remove foreign bodies from the heart and great vessels is presented.

Intravascular catheterisation is widely practised in intensive care units and other hospital services as well as in the traditional cardiac catheterisation laboratories. Often foreign materials are left in the circulation at various points for a considerable length of time. Consequently the loss into the circulation of various fragments of catheters or ancillary materials (during placement or later) is being increasingly encountered. Removal is necessary in view of the dangers of septicaemia, arrhythmias, perforation, myocardial damage, thromboembolism, and sudden death (Harken and Zoll, 1946; Lassers and Pickering, 1967). Surgical retrieval of materials inside the heart carries a substantial risk of morbidity and perhaps even mortality. Various ingenious methods have, therefore, been used in an attempt to avoid thoracotomy for such iatrogenic complications. We report our experience with the retrieval of a Desillets Hoffman sheath from the right atrium and briefly appraise other methods.

Case report

A 22-year-old man was admitted to the cardiology service of the Nehru Hospital of this Institute for the investigation of repeated attacks of paroxysmal atrial tachycardia. The surface electrocardiogram showed type B WPW syndrome. In the course of percutaneous catheter placement for electrophysiological studies the entire body of a Desillets Hoffman

(DH) sheath became detached from its head and lodged in the right atrium (Fig. 1). Attempts to remove it with various manoeuvres, including myocardial biopsy forceps, were unsuccessful. A Dormia ureteral stone dislodger was introduced

Fig. 1 X-ray film of chest, anteroposterior view showing the Desillets Hoffman sheath in the right atrium. The outline of the sheath has been drawn in with a dotted line.

through the right antecubital vein and advanced into the right atrium, and the sheath was entrapped in the basket and extracted.

Discussion

Non-surgical removal of a foreign body from the circulation was first reported by Thomas *et al.* (1964) who recovered the broken segment of a spring guide wire from the right atrium with a bronchoscopic forceps. Since then various devices have been used with some success.

GRASPING FORCEPS

Earlier reports advocated the use of bronchoscopic grasping forceps (Thomas *et al.*, 1964; Bloomfield, 1971). However, this technique is of limited use

because grasping forceps are rigid and there is a danger of accidental perforation of blood vessels or cardiac chambers and damage to the valve apparatus. At present there is little support for the use of this instrument.

The use of a biopptome, often readily available in a cardiac catheterisation laboratory, has been advocated (Kurita *et al.*, 1972), but we found this of little value. The size and configuration of the grasping jaws clearly limits its usefulness, and the cutting edges may well bite through soft plastic materials.

LOOPSNARE CATHETERS

A doubled up guide wire inside a polythene catheter has been used to form a loop into which the foreign

Fig. 2 (a) The Dormia ureteral stone dislodger. Bottom row shows the complete catheter assembly. The middle row shows the closed end of the catheter at higher magnification. The top row shows the opened up strands of the basket when the metallic intruder is pushed out. (b) The Desillets Hoffman sheath retrieved from this patient is seen in a dummy operation within the closed catheter (top) and in the open basket (middle). The entire catheter assembly with open basket is shown at the bottom.

body may be snared for removal (Massumi and Ross, 1967; Ramo *et al.*, 1968). The polythene catheter could be introduced percutaneously or through a cut down and advanced into the cardiac chambers or great vessels. Because of their encouraging results such catheters are now available commercially (Curry, 1969) though they can easily be designed from materials readily available in any cardiac catheterisation laboratory. Custom built designs can thus be fashioned. Even a flexible preformed hook-ended snare has been used in 2 cases (Rossi, 1970).

BASKET CATHETERS

Lassers and Pickering (1967) described the removal of a broken piece of guide wire from the aorta with the help of a Dormia ureteral stone dislodger introduced retrogradely from the femoral artery. There has been some concern at the possibility of perforation of the great vessels or the cardiac chambers by the hard tip of the Dormia catheter (Bloomfield, 1971; Block, 1973). Recently a similar catheter with a flexible filiform tip has been introduced (Drabinsky, 1976). Retrieval in our case was also possible with the Dormia catheter. When the inner steel core of the catheter (Fig. 2) is pushed out the helicoid strands open up into a basket cage into which the foreign body is carefully guided. Withdrawal of the basket into the lumen of the sheath closes the basket thus gripping the foreign body which is removed along with the catheter (Fig. 2). The fairly large size to which the basket opens would allow a large piece of catheter fragment to be removed. A Dotter retrieval set (Dotter *et al.*, 1971), which is a modification of the Dormia catheter, can be introduced percutaneously and is now available commercially. We feel that this should be stocked by all cardiac catheterisation laboratories.

Successful retrieval of foreign bodies from the right ventricle and pulmonary artery is reported with this catheter without any damage to valve apparatus and chordae tendineae (Dhingra *et al.*, 1973). Indeed, non-surgical retrieval appears to be possible and should be tried before surgical intervention is sought. There do not seem to be any published figures to allow one to estimate the percentage of failures when non-surgical techniques are used.

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