

Retrieval of detached fragment of central venous pressure catheter (CVP) lodged in the right ventricle and pulmonary artery: a case report

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Summary

A successful retrieval of a detached segment of a CVP catheter by percutaneous right transfemoral venous route, using a Dotter intravascular retriever basket, is reported. The procedure was monitored under fluoroscopy. Only local anaesthesia, which was infiltrated around the puncture site, was given to the patient. No significant complication was encountered. Successful retrieval of the detached catheter fragment by percutaneous means obviates the need for thoracotomy.

Key words: Central venous pressure catheter, intravascular foreign body, fluoroscopy, Dotter intravascular retriever wire basket.

Introduction

Placement of central venous catheters is commonly performed, especially on patients requiring intensive medical or surgical care. A well recognised complication of this procedure is detachment of part of the catheter with subsequent embolisation of the material distally into the cardiac chambers and the pulmonary artery. The fragment should be removed to prevent complications such as repeated infected pulmonary embolisation, sepsis, endocarditis and cardiac rupture.¹ Surgical removal was the only method available to remove intravascular foreign body until 1964 when Thomas et al² reported a successful nonsurgical percutaneous removal of an embolised steel guide wire fragment from the right atrium and inferior vena cava.

We report a case where a detached distal segment of a central venous pressure catheter lodged in

the right ventricle and right main pulmonary artery, was successfully retrieved via percutaneous right transfemoral venous route using a Dotter intravascular retriever basket.

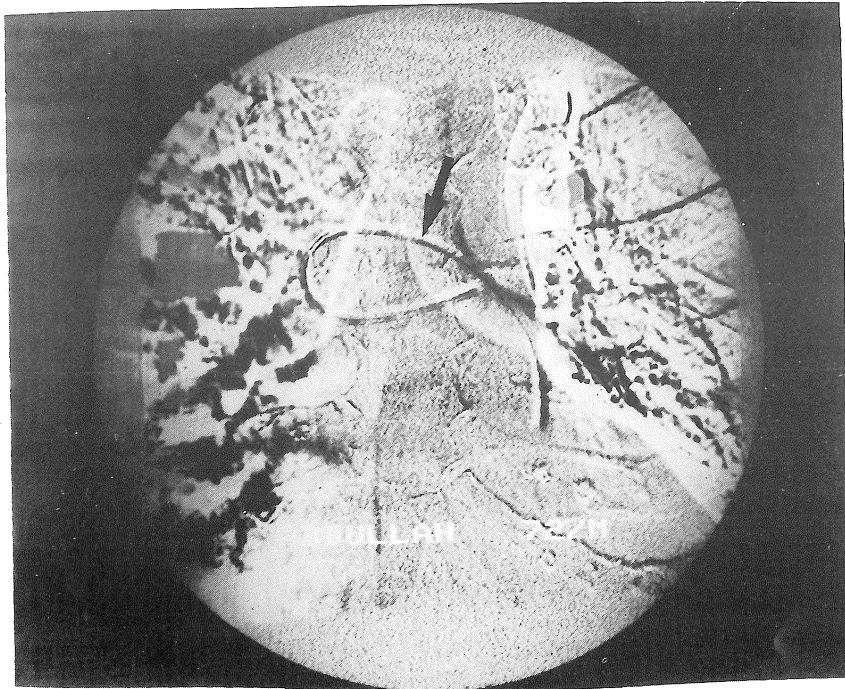


Figure 1: A digital subtraction radiograph of the heart showing a detached CVP catheter (arrow) lying partly in the right ventricle and partly coiled in the right main pulmonary artery.

Case report

MA, a 72 year old man, was admitted on the February 15, 1990 with carcinoma of the pyriform fossa. He had complete dysphagia and was being fed via a feeding gastrostomy, whilst undergoing radiotherapy. A central venous pressure (CVP) catheter was inserted one month following admission. The CVP catheter was inadvertently severed during an attempt at removal, detaching an estimated 15 cm segment of the catheter. A frontal chest radiograph done the following day showed the catheter segment lying partly in the right ventricle and partly coiled in the right main (pulmonary) artery. The catheter remained in this position for the next three days (Figure 1). An attempt was then made to remove the catheter via a percutaneous right femoral venous route. This was successfully accomplished using a commercially available Dotter intravascular retriever set (Cook DRS-100, Bloomington USA); consisting of 8 Fr size catheter introducer teflon sheath, a 95 cm long 8 Fr size teflon catheter and a helical loop basket made up of four stainless steel wires attached at one end to a long handle made of stainless steel wire.

The 8 Fr catheter sheath was first inserted into the right femoral vein by the standard Seldinger technique of catheterisation, to facilitate multiple guide wire and catheter entries into the vein. The entire procedure which requires several guide wire and catheter manipulations was monitored under fluoroscopy. Catheterisation of the right main pulmonary artery was carried out using an 8 Fr Cournand catheter. A 260 cm long, 0.035 inch teflon-sheathed exchange guide wire was then advanced into the catheter until its tip lied in the right descending pulmonary artery. The Cournand catheter was then completely removed. The next step in the procedure

involved introducing and advancing the Dotter intravascular retriever catheter over the exchange guide wire into the descending right pulmonary artery. The exchange guide wire was subsequently withdrawn completely out of the catheter. Finally, the Dotter intravascular retriever basket was fed into the catheter, and advanced beyond the tip of the catheter to allow reformation of the basket within the right main pulmonary artery. Rotatory movements of the basket entrapped part of the detached CVP catheter segment into it. The basket handle was then withdrawn while maintaining the catheter position, thus closing the basket loop and tightly trapping the CVP catheter between the basket and the catheter tip (Figure 2). The entire assembly including the introducer sheath and the trapped foreign body were finally withdrawn completely from the femoral vein. The length of the CVP catheter was 17.8 cm, and had extensive blood clots within its lumen.

Discussion

Most cases of catheter fragment embolisation are due to polyethylene catheters inserted into the veins of the upper extremities, the subclavian veins or the jugular veins for fluid and/or central venous pressure monitoring.¹ To date, there are more than 200 cases of catheter embolisations from a variety of foreign bodies documented in the literature.¹ The necessity of removing dislodged catheters from cardiac chambers and pulmonary arteries is now well established as documented by several fatal cases related to this complication.^{1,3}

It is suggested that removal of such a foreign body need not be done on an emergency basis, since most described complications are basically related to infection of thrombotic material.³ In our case, the patient was given three days before the foreign body was removed. It is very

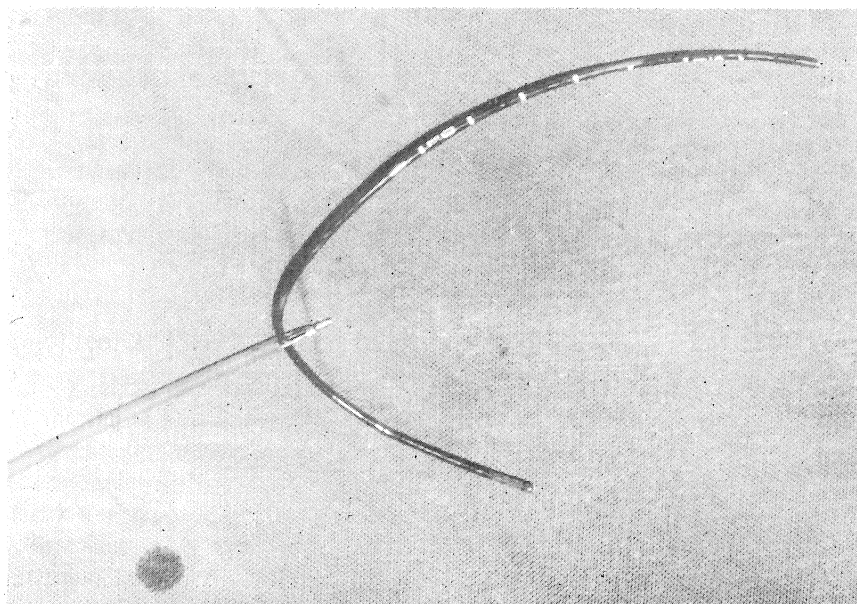


Figure 2: A 17.8 cm long segment of CVP catheter was retrieved. The catheter is trapped between the distal part of the basket and the retriever catheter tip.

likely that an encasement thrombus will form in less than one hour around the foreign body, but infection does not have to ensue immediately and complications of infection such as sepsis, massive intracardiac thrombus, and perforation of cardiac chambers probably require some time.³ Removal can therefore be done on an elective basis.

Percutaneous removal is preferred because of its relatively low risk. Successful percutaneous retrieval obviates the need for thoracotomy thus sparing the patient from the risks of surgery and general anaesthesia. A variety of percutaneous techniques have been used. These include guide wire loop snares, helical wire baskets, bronchoscopic forceps, hook catheter, hook guide wire and Fogarty catheter.¹ Each of these devices has its own advantages and limitations. Most of the successful retrievals reported have been accomplished with the loop system, using materials readily available and familiar to the radiologist, such as the angiographic guide wires and catheters. Generally, the success of retrieval of an intravascular foreign body depends on the type of foreign body, its location, type of retriever device and to a lesser extent expertise of the operator.

In conclusion, this case illustrates an uncommon complication of CVP catheter placement and the therapeutic role of interventional radiology.

References

1. Fisher RG and Ferreyro R. Evaluation of current techniques for nonsurgical removal of intravascular iatrogenic foreign bodies. *Am J Roentgenol* 1978; 130: 541-548.
2. Thomas J, Sinclair-Smith B, Bloomfield D, Davachi A. Nonsurgical retrieval of a broken segment of steel spring guide from the right atrium and inferior vena cava. *Circulation* 1964; 30: 106-108.
3. Randall PA. Percutaneous removal of iatrogenic intracardiac foreign body. *Radiology* 1972; 102: 591-595.