Percutaneous transvenous retrieval of intracardiac port-a-cath catheter fragment: a case report

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A female patient, 36 years of age, with a metastasised left breast cancer received several courses of chemotherapy for aggressive local tumour growth and multiple metastatic activity. In the current patient, surgical ablation of the left breast was carried out. Also loco-regional radiotherapy was conducted. To facilitate the administration of chemotherapy courses and prevent thrombophlebitis a vascular access port (port-a-cath) was surgically inserted via the right subclavian vein. After a few successful administrations of chemotherapeutic drugs the vascular port stopped functioning. It was demonstrated that a detached catheter fragment had dislodged into the right ventricle. Successful percutaneous, transvenous removal of the entrapped catheter fragment by the Gooseneck retrieval loop snare from the right ventricle was performed via the right femoral vein access. The procedure was uncomplicated and the patient tolerated the procedure well. (*Neth Heart J* 2004;12:117-20.)

Key words: chemotherapy, malignancy, percutaneous transevous retrieval, port-a-cath catheter dislodgement

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Patients with malignancy are at increased risk for superficial thrombophlebitis due to frequent injection of aggressive chemotherapy courses. In such patients, placement of a port-a-cath infusion system has been advocated and is reported to be safe. Dislodgement with subsequent migration of the catheter into the right side of the heart is rare and a potentially catastrophic complication of this procedure. In the current report, we describe successful percutaneous, femoral transvenous retrieval of a port-a-cath catheter from the right ventricle in a female patient.

Case report

A 36-year-old woman was being treated for metastasised and locally advanced left-sided breast cancer (T4N1-2M1) since August 2002. Her mother's sister and grandmother had died of breast cancer. She initially underwent a combined treatment strategy of chemotherapy and radiotherapy of the lumbar region. She responded reasonably well to this strategy and the tumour diameter regressed from 10 cm to 3 cm. But because of absence of complete remission following six courses of (CAF) chemotherapy and local growth of the tumour a left mastectomy was performed in January 2003. This was followed by locoregional radiotherapy. Immunohistochemical analysis demonstrated negative oestrogen and progesterone receptors.

A systemic therapy with herceptin and taxotere was chosen. Because of proven liver and axillary lymph node metastases and progression of documented bone metastases it was decided to start chemotherapy. On 6 February 2003, a port-a-cath infusion system was surgically inserted via the right subclavian vein. The routine chest X-ray showed the reservoir fixed in the infraclavicular region and the tip of the catheter was visible in the superior caval vein (figure 1A). The procedure was uneventful. On a second occasion, intravenous delivery of medication was not possible although the Huber needle was correctly inserted in the reservoir. It was thought that there was a leakage or dislodgement of the catheter from the reservoir. A decision was made for surgical exploration under local anaesthesia. The reservoir was found embedded in an

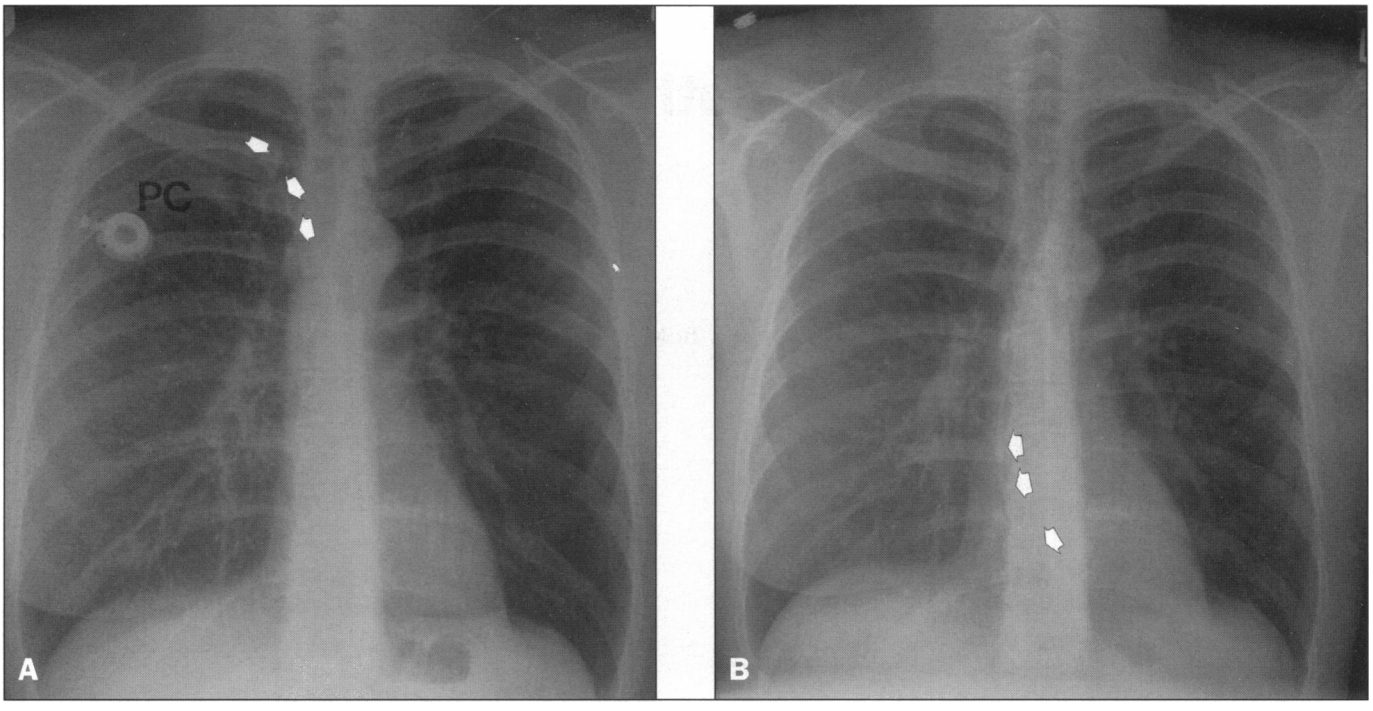

Figure 1A. Chest radiograph demonstrating a port-a-cath (PC) infusion system inserted via the right subclavian vein. The reservoir is placed at the right infraclavicular region and the tip of the catheter is seen at the level of the superior vena cava (arrows). B. A control X-ray revealed migration of the catheter from the right subclavian vein into the right atrium and lodged in the right ventricle (arrows).

old haematoma but the catheter could not be detected. The reservoir was removed. A control X-ray revealed migration of the catheter from the right subclavian vein into the superior caval vein lodging in the right ventricle (figure 1B). Confronted with these findings, the patient mentioned that, retrospectively, she had felt some sort of palpitations three weeks earlier after receiving the first course of medication. It was decided to try to remove the catheter transvenously.

The electrocardiogram was normal and there were no documented cardiac dysrhythmias.

A pulmonary perfusion-ventilation scintigraphy depicted no mismatch or signs of embolisation into the lungs. Transthoracic echocardiography revealed normal dimensions without pericardial effusion and a normokinetic left ventricle with mild mitral and tricuspid regurgitation. The catheter was clearly visible (figure 2) in the right atrium crossing the tricuspid valve lodging in the right ventricle.

Percutaneous transvenous removal of the catheter fragment by the Gooseneck retrieval catheter (GNC) was performed. In the catheterisation laboratory, initial fluoroscopy revealed the catheter situated vertically in the right ventricle. A GNC was introduced using the standard technique via the right femoral 9 F venous sheath. It was advanced and guided to the right atrium. The GNC retrieval catheter was then opened and the snare directed cranially and then inferiorly towards the entrapped catheter. This manipulation was repeated a few times until the catheter was seen to be captured by the snare. The catheter was tightly held with the GNC and smoothly pulled back into the inferior caval vein (figure 3). The entire system, the GNC with the captured catheter together with the 9F sheath, were all pulled out and removed. The procedure was uneventful and she was discharged home within 24 hours.

Discussion

Despite being very helpful, port-a-cath infusion systems are associated with inherent risk and complications. In

Table 1. Common causes and mechanisms of foreign body embolisation.[1]

Action leading to embolisation	Cause
Puncture of the catheter leading to dislodgement/migration	By sharp edge of the needle housing the catheter
Breakage of catheter	Spontaneous
Detachment from connector	Mechanical/loss of suture/physical activity

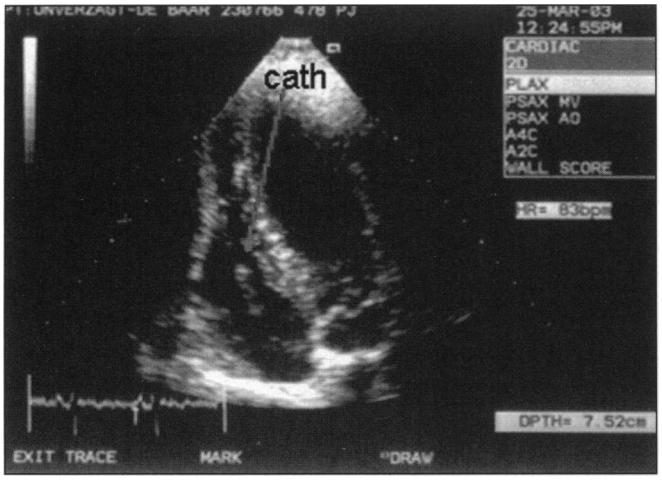

Figure 2. Echocardiographic frame depicting the entrapped catheter (cath) in the right atrium crossing the tricuspid valve lodging in the right ventricle.

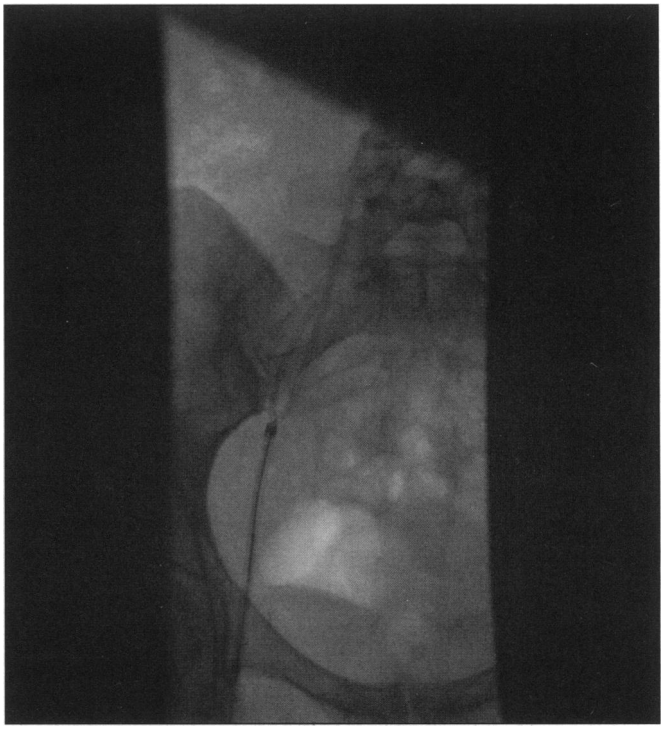

Figure 3. Anteroposterior view showing the catheter (c) snared by the Goosneck retrieval loop snare pulled to the level of the right femoral vein.

the current report, we describe a rare, yet potentially catastrophic, complication of port-a-cath catheter insertion. In our patient, a port-a-cath catheter migrated lodging in the right ventricle across the tricuspid valve.

Since the second half of the twentieth century, successful removal of embolised intravenous catheters has been reported. Causes and mechanisms of migration and embolisation of intravascular catheters are shown in table 1. Several retrieval techniques have been reported utilising rigid forceps with high risk for vascular and cardiac perforation, baskets, loop snares and balloon catheters. It has been recommended that intravascular foreign bodies should be removed as soon as they are diagnosed to prevent serious cardiovascular complications. In our current case, the GNC snare were used in the retrieval procedure to remove the dislodged catheter.

It has been demonstrated, as was the case in our current patient, that the foreign bodies mostly lie with their proximal end in the superior inflow site of the right atrium and their distal end lodged in the inferior right atrial or ventricular wall.

There are several causes of retrieval failure such as absence of free ends to be snared, the catheter end is dislodged far into peripherally localised vessel, the foreign bodies are nonopaque and finally the catheter is manufactured of friable material. The most common complications of percutaneous intravascular retrieval procedures are cardiac arrhythmias followed by vascular or cardiac perforation[1]. In our patient, cardiac arrhythmias were not documented. Through a percutaneous, transvenous approach, we successfully retrieved the entrapped port-a-cath catheter from the right ventricle.

In the late 1970s, Bloomfield and associates reported controversy regarding the need for the removal of entrapped intracardiac foreign bodies.[2] Removal was advocated because intracardiac foreign bodies may cause septicaemia, lung abscess, multiple pulmonary emboli, arrhythmia, perforation and sudden death. With the development of nonsurgical techniques, however, transvenous retrieval of intracardiac foreign bodies has become not only feasible, but also commonplace.[3] In 1964, Thomas et al. described for the first time the nonsurgical retrieval of an intracardiac foreign body.[4] There are three basic retrieval techniques: the loop snares, the wire basket, and the endoscopy forceps.[2,3,5]

In our patient, we used a Gooseneck retrieval loop snare for removal of the dislodged port-a-cath catheter from the inferior area of the right ventricle.

In conclusion, dislodgement and subsequent migration of the catheter of a port-a-cath infusion system can lead to serious complications. Intracardiac entrapment of such catheters can potentially lead to cardiac arrhythmia, vascular or cardiac perforation and pulmonary embolisation. No significant cardiac arrhythmias were detected in our patient. As was shown in this case report, transthoracic echocardiography is useful in delineating the relation of the entrapped catheter to the intracardiac structures.[6] Percutaneous, transvenous retrieval of intracardiac foreign bodies, including entrapped port-a-cath catheter, as our case demonstrates, is safe and technically feasible and could be successfully performed in a peripheral regional hospital. ■

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