Removal of Intracardiac Fractured Port-A Catheter Utilizing an Existing Forearm Peripheral Intravenous Access Site in the Cath Lab

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ABSTRACT: The intravascular port-A catheters are widely used for long-term central venous access in cancer patients. Spontaneous fracture and migration of implanted port catheters is a known complication and necessitates immediate removal. Percutaneous retrieval of intravascular foreign body has become a common practice and is commonly performed through central venous access, mostly using femoral, subclavian, or internal jugular veins. Although the percutaneous approach is relatively safe, it can lead to potential iatrogenic complications. We report the first case report of percutaneous removal of intravascular foreign body using forearm peripheral intravenous access.

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Totally implantable venous access devices (TIVADs) like the port-A catheter have been increasingly used, especially in cancer patients. The fractured port-A catheter is a rare complication, but necessitates immediate removal of the fragmented segment of the catheter since it can be fatal if the dislodged fragment migrates into the heart, causing embolization. Nowadays, percutaneous transvenous technique is the standard approach to remove a fractured catheter fragment. The percutaneous retrieval is most commonly performed through central venous catheterization using femoral, subclavian, or internal jugular vein.1 We report a case in which a fractured and distally migrated port-A catheter was successfully removed using right forearm peripheral intravenous access site. Percutaneous retrieval of intravascular foreign body through peripheral forearm venous access is a minimally invasive and simple technique. It can be performed safely without risking the femoral or neck approaches, which should minimize the potential iatrogenic complications inherent in more invasive techniques using central venous access. This technique can be performed easily, safely, and successfully.1

Case Presentation

A 67-year-old white female with a history of colon adenocarcinoma diagnosed in June 2009 had to undergo right hemicolectomy and chemotherapy through left subclavian port-A catheter, which was placed in August 2009. She was in cancer remission since December 2009. She underwent surveillance positron emission tomography (PET) in January 2012, which revealed fractured left chest port-A catheter with loose proximal end attached to the reservoir or bulb and distal loose end (catheter) extending from the right ventricle into the pulmonary artery (Figure 1). The patient was clinically asymptomatic. A chest X-ray and transthoracic echocardiogram confirmed intracardiac location of the fractured catheter. The patient was evaluated by vascular surgery, interventional radiology, and cardiac surgery, and was later referred to interventional cardiology due to intracardiac location of foreign body and availability of minimally invasive percutaneous retrieval.

The patient was scheduled as a routine outpatient cardiology procedure. She was brought to the cath lab; an 8 Fr hydrophilic glide sheath was exchanged using her existing peripheral intravenous line in the right cephalic vein. Nitroglycerin was used as a venoodilator. A Terumo Run-through NS Extra-floppy wire (0.014 mm) and EN Snare (10 mm) catheter were used and an approximately 8-cm long fractured catheter segment that was lodged in the right ventricle and pulmonary artery was removed along with the sheath (Figures 2 and 3) (Video 1 available at www.invasivecardiology.com). Hemostasis was achieved through manual pressure. Postprocedure course was uneventful and the nature of vascular access made early ambulation possible.

Discussion

The implantation of central venous access devices has increased, especially in those patients needing chemotherapy and parenteral nutrition. The total incidence of fracture or dislodgment of central venous catheter is between 0.2%-1%.2 Fractured catheters can be diagnosed incidentally on imaging in an asymptomatic patient or can present with various clinical presentations. The common locations of fractured catheter tip are right atrium, right ventricle, and pulmonary artery.2

The dislodged migrated fragment of the catheter should be removed as soon as possible, since it can have serious sequelae secondary to embolization and/or infection.2 Since the first report by Thomas et al in 1964, percutaneous transvenous approach using central venous access has become the most common technique to remove intravascular foreign bodies.3 The central venous access and catheterization can have potential iatrogenic complications, with hematoma over the venipuncture site the most common complication.4 In the above case, we reported a new minimally invasive technique of percutaneous retrieval of intravascular foreign body using peripheral forearm venous access. Although peripheral access from the arm to the central venous system was reported in the first heart catheterization by Werner Forssmann in 1929, it is generally forgotten as a technique.5 The main advantage of this technique rests in the low risk of bleeding even in patients who are anticoagulated without reversal of anticoagulation or exposure to blood products.6 The nature of access and hemostasis also make early ambulation possible. This is an easy and straightforward technique that can be mastered by one with basic transradial skills with little extra effort.
The peripheral venous access, also known as heparin lock, can be achieved either outside or after arrival to cardiac catheterization lab. The arm is a rich source of venous access. The actual course and number of these veins are extremely variable among individuals, but they are all potential sources of access to the central venous system. The venous entry site should receive some subcutaneous anesthesia to prevent pain at the skin entry site before exchanging the heparin lock for a vascular sheath. After anesthesia using a radial artery kit, an exchange wire (0.021 mm) is passed through the intravenous catheter into the arm vein. The wire should be passed without resistance far enough to allow the exchange of the intravenous catheter for the access sheath. We used a hydrophilic glide sheath along with nitroglycerin as venodilator to overcome venous impedance and reduce functional spasm in the venous system. We use Terumo Run-through NS extra-floppy wire (0.014 mm) under fluoroscopy for navigation through valves and bends in the venous system. Advancing the wire medially into the basilic and axillary vein is a very direct route to the central/subclavian system, and fluoroscopy is rarely needed except for troubleshooting. However, entering the central venous system from the lateral aspect of the arm through the cephalic vein may require an evaluation at the level of the T-junction (the point where the cephalic vein enters the axillary vein with a right-angle turn) under fluoroscopy to ensure proper passage of the catheter toward the central system and not back down the axillary vein into the arm. Several devices are available for percutaneous transcatheter retrieval. We recommend the EN Snare catheter, which is designed with three loops to increase the probability of foreign body capture. Its kink-resistant guiding catheter with distal radiopaque band and wire with platinum strands provide excellent fluoroscopic visualization. Force should never be applied when manipulating catheters through peripheral forearm veins, since veins are more fragile than arteries and can tear or perforate if mishandled. Intravascular foreign body is removed using EN Snare catheter along with hydrophilic glide sheath. Hemostasis is achieved through manual compression. In our experience, retrieval of dislodged intravascular catheters by percutaneous approach through a forearm vein should be the first choice of treatment because it is least invasive, as well as safe and effective.

References