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Complete Catheter Disconnection and Migration of an Implantable Venous Access Device: The Disconnected Cap Sign

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The use of totally implantable venous access device has provided a solution to difficult venous access. Early reports have, however, recognized several complications with their use. Catheter disruption is a rare but important complication of these devices; it may be asymptomatic but can be fatal in some cases. We present a case of a patient who had a rare and serious complication secondary to catheter disconnection from its chamber.

The use of totally implantable venous access devices (TIVADs; Bard Access Systems, Salt Lake City, UT) has provided a solution to difficult venous access. They are used in cancer patients for the administration of chemotherapy and, compared with long-term percutaneous catheters, were shown to have reduced rates of catheter sepsis.[1]

The first step in the insertion of a TIVAD is accessing a central vein (subclavian vein, internal or external jugular vein), either percutaneously or through a cutdown procedure. Then, a vessel dilator and a sheath introducer (if percutaneous approach) are advanced over a guidewire, after which the guidewire and the dilator are withdrawn, leaving the sheath in place. The catheter is inserted, and the sheath is peeled apart and pulled out. Then, it is tunneled to reach a subclavicular incision, where the chamber is inserted and connected to the catheter (Fig. 1). When assembling and implanting the port, the catheter is advanced over the port stem until it is flush to the wall of the port chamber, then the catheter lock is advanced over the catheter straight until flush with the port, hence securing the system (Figs. 2 and 3).

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Ann Vasc Surg 2010; 24: 692.e11-692.e15
DOI: 10.1016/j.avsg.2010.02.011

Published online: April 22, 2010

Early reports have, however, recognized several complications with their use. Catheter disruption is a rare but important complication of these devices; it can present as an early or late complication. Early complications result from disconnection of the catheter from the device, whereas late complications are usually due to fracture or fragmentation of the catheter as a result of the pinch-out phenomenon. These complications may be asymptomatic but can be fatal in some cases.

We present a case of a patient who had a rare and serious complication secondary to catheter disconnection from its chamber.

CASE REPORTS

An 18-year-old male patient, with a known case of metastatic high-grade myxoid liposarcoma of the posterior paraspinal muscles, presented to our institution with a nonfunctional implantable venous device of an unknown manufacturer. The patient had had a left subclavian vein TIVAD implanted in another hospital 10 days before his presentation. Aspiration of blood could be done freely, but injection into the reservoir resulted in a painful extravasation of fluid under the skin at the site of the TIVAD.

A chest X-ray confirmed the position of the tip of the catheter at the right atrium. However, the catheter cap lock did not overlap the connection point between the catheter and the chamber but approximately 1 cm away from the expected position (Fig. 4).

The plan was to remove the device and reimplant a new one from the right side (right subclavian vein). On arrival to the anesthesia induction room, the patient suddenly developed a supraventricular tachycardia with a heart rate of 220/min. He was managed intravenously

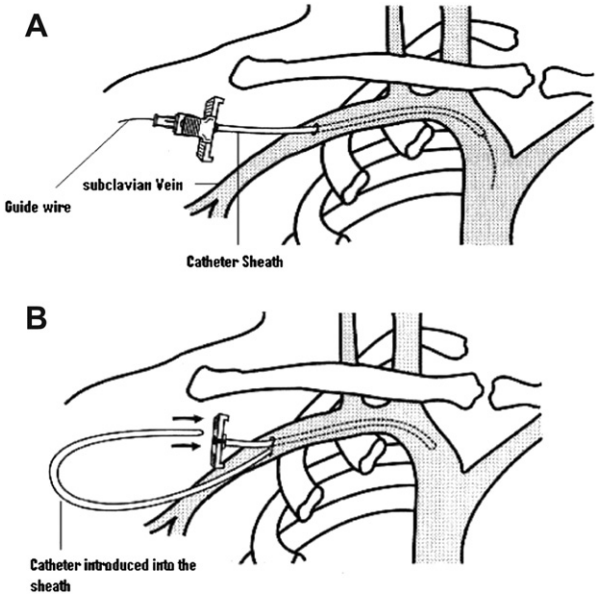

Fig. 1. A The catheter sheath with the guidewire introduced in the subclavian vein. **B** The catheter is introduced in the sheath before tearing the sheath away.

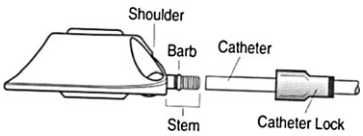

Fig. 2. The port chamber with the catheter and catheter lock.

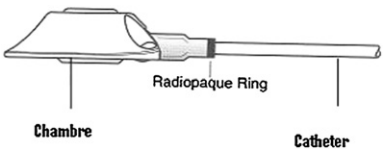

Fig. 3. The chamber with the catheter and the lock after being assembled.

with 6 mg adenosine. An urgent chest X-ray was performed, which revealed complete disconnection of the catheter with migration into the right atrium and inferior vena cava (Fig. 5).

Urgent radiological intervention was performed. The catheter was retrieved through a right femoral vein access using a 6F snare loop catheter. The reservoir and the catheter lock were removed from the previous wound site (Fig. 6). The next day, a new right subclavian TIVAD was implanted without complications. The patient is currently well with a functional venous access device.

DISCUSSION

The use of TIVADs has changed the care and quality of life of cancer patients. These devices allow the

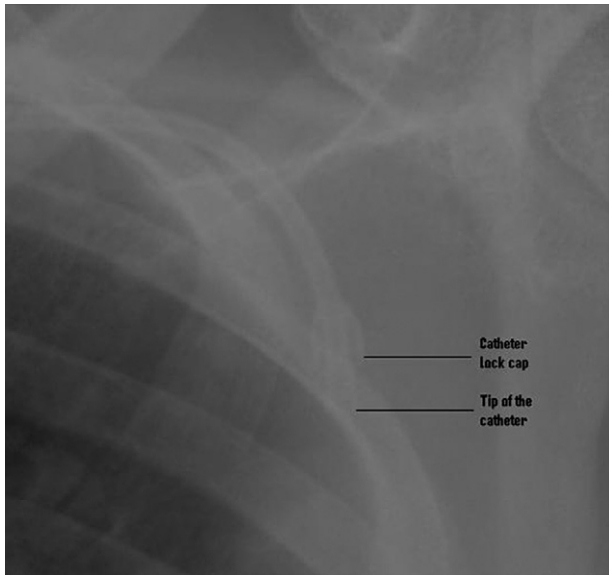

Fig. 4. Chest X-ray with the catheter lock cap displaced from the tip of the catheter at the connection to the lucent chamber.

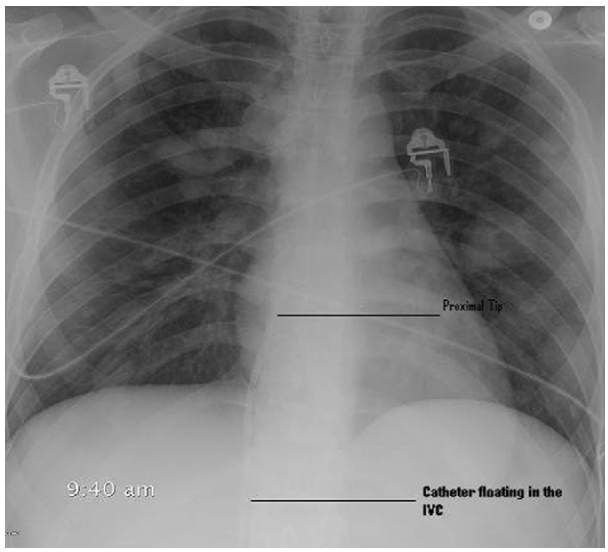

Fig. 5. Complete disconnection of the catheter and migration into the right atrium and inferior vena cava (IVC). The proximal catheter tip is located in the right atrium with the length of the line in the IVC.

administration of chemotherapy and blood aspiration without repeated venopuncture.

Although TIVAD insertion and use is generally well tolerated and safe, complications do occur. Kock et al.[2] reviewed 1,500 TIVAD retrospectively; they noted that the most common complications were infection (4.8%), thrombosis (3.2%), and malposition (2.4%). Other less common complications included catheter fracture, disconnection (0.5%), and secondary dislocation (1.5-2%).[1]