Broken, Inflated Angioplasty Balloon on a Wire

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In our hospital, management of poorly functioning dialysis catheters is a daily occurrence. Our algorithm is to first exchange the dysfunctional catheter over guide wires and test the new catheter by rapidly withdrawing blood using a 10-mL syringe. If blood cannot be rapidly aspirated, the new catheter is removed over guide wires and angioplasty of the superior vena cava (SVC) is performed to disrupt the offending fibrin sheath or dilate the caval stenosis. We rarely perform catheter stripping as we have not found this practice to be superior to catheter exchange, and compared with catheter exchange, it is a lengthier and more complex procedure.

COMPLICATION

A 47-year-old man with end-stage kidneys on catheter dialysis was referred to interventional radiology for management of nonfunctioning right internal jugular vein tunneled catheter. After routine prepping of the indwelling catheter, the patient received conscious sedation. Two stiff angled hydrophilic guide wires (Glidewire, Terumo; Boston Scientific, Natick, MA) were advanced into the catheter and down into the inferior vena cava. The catheter was then removed over these wires and a new tunneled catheter was inserted and positioned with its tip in the proximal right atrium. Upon aspirating both ports, minimal blood return was observed. Thus the decision to angioplasty the SVC was made.

The new catheter was removed over two guide wires and a 10-French sheath was inserted over the wires into the SVC. A venogram was performed revealing a fibrin sheath in a widely patent cava. A 10-mm diameter angioplasty balloon catheter was advanced over the guide wires and dilated in the cava to disrupt the fibrin sheath.

During the multiple inflations, the balloon was retracted slightly into the proximal end of the sheath. This maneuver sheared the inflated balloon off the catheter (Fig. 1A).

Fortunately, the fragment remained on the guide wire, precluding its passage through the heart into the pulmonary artery. The right femoral vein was quickly catheterized and a 8-French sheath was inserted. A 25-mm Gooseneck snare (Amplatz Goose Neck Snare Kit, EV3 Inc., Plymouth, MN) was advanced from the femoral vein. The guide wires in the inferior vena cava were encircled and the lasso of the snare was advanced over the wires to the inflated balloon fragment. Despite multiple attempts, the balloon could not be deflated by closing the snare (Fig. 1B). When the balloon tip was sheared off the angioplasty catheter, the lumen to the balloon was stretched shut.

The snare was used to grasp the guide wire with the balloon and the wire was pulled out of the groin sheath to secure through-and-through access. The balloon fragment was then ensnared and pulled from the SVC through the heart into the inferior vena cava and finally into right external iliac vein. Under direct fluoroscopic guidance, the balloon was punctured using a 21-gauge micropuncture needle and a 10-mL syringe was aspirated to deflate the balloon (Fig. 1C). The fragment was then pulled into the sheath and removed from the patient (Fig. 1D). A new tunneled catheter was inserted over guide wires into the SVC and functioned adequately.

DISCUSSION

This preceding example is an unusual complication highlighting the fact that the attachment point of an

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Figure 1 (A) Fluoroscopic image revealing inflated balloon fragment on guide wire in superior vena cava. (B) Fluoroscopic image demonstrating snare encircling balloon fragment in superior vena cava. (C) Fluoroscopic image showing balloon fragment in the right external iliac vein. A needle has been inserted into the balloon to deflate it. (D) Final fluoroscopic image documenting removal of fragment.

angioplasty balloon to its catheter is the weakest point of the unit. There are several teaching points from this case. First, vigorous movement of an angioplasty balloon in the SVC is unwise and usually unnecessary for fibrin sheath disruption. Second, when performing catheter exchange, it is advisable to position guide wire tips in the inferior vena cava. This usually precludes cardiac ectopy

and catastrophic complications such as great vessel or caval laceration. In this case, it prevented the fractured balloon tip from migrating into the pulmonary artery. Finally, it is important to remember that the most straightforward approach to a vascular or intravascular abnormality may be directly percutaneous, even if other routes through the vascular system exist.