Guidewire Related Complication during Femoral Haemodialysis Catheter Placement: Intravascular Knotted Guidewire

Ehab Elshaal, Ayman Elsaid, Ihab Gaourou, Tamer Salamony, Ibrahim Said

Introduction

Seldinger’s technique is widely used to place haemodialysis catheters and is generally considered safe. However, it may be associated with certain known risks and complications even in experienced hands. Guidewire-related complications are rare but potentially serious. We report a catheterization of a right femoral central vein that became complicated by unexplained entrapment of the guidewire used for the procedure.

CASE REPORT

A 40-year-old female patient with hypertension and chronic kidney disease (CKD) was admitted for thrombectomy of the left forearm arterio-venous (AV) fistula. After the procedure was done, the patient admitted to haemodialysis unit and was prepared for emergency right femoral vein insertion of a double-lumen haemodialysis catheter by attending nephrologist. After obtaining a good back flow of blood from an 18-Gauge introducer needle, a J-tip guidewire was advanced. The guidewire encountered a resistance during insertion, which was overcome by manipulating and redirecting it. The introducer needle was removed and the skin dilator was passed over the guidewire after a small skin nick. There was significant resistance to the advancement of the dilator in the subcutaneous tissue. The skin incision was deepened and the tract was re-dilated with continuous firm pressure on the dilator. On removal of the dilator the wire was found to be kinked, so it was decided to remove it. The wire was initially withdrawn easily, but later became fixed despite firm tension.

Vascular surgical advice was sought while a pelvic x-ray was performed which showed the guidewire to be looped and kotted. Following discussion with the consultant vascular surgeon, a decision was made to surgically remove the wire under sedation in the operating room. After explaining the situation to the patient and obtaining informed consent, she was transferred to the emergency operating room. A combination of fentanyl and midazolam was used for conscious sedation under routine monitoring.

On exploration, the femoral vein was found to be lacerated, and the guide wire had travelled for a short distance intramusculously in the femoral vein and had entered the lumen forming an intravascular knot. Venotomy was made over the guide wire, the vein was explored and the guide wire was then retrieved. The venotomy was closed with 7-0 Prolene.

DISCUSSION

Femoral venous catheterization was associated with greater risk of infectious and thrombotic complication rather than subclavian catheterization. On other hand, complications related to guide wire use include kinking, knotting, looping, breakage, and fracture of the catheter were higher in subclavian catheterization. Both intravascular as well intraluminal kinking have been reported. These complications are related to damage or mechanical disruption of the normal structure of the wire. Applying force to thread a guidewire through the introducer needle despite significant resistance is likely to cause such a problem. Kinking can also result if the dilator is forced in a direction that diverges from the original path of the wire. Application of increasing force after loopng or kinking sometimes results in knot formation. This complication should be suspected when the guidewire cannot be pulled out after successful catheter insertion. In this situation, no force should be used to pull the catheter and wire out, and an immediate X-ray should be ordered. Once the diagnosis is established, interventional radiology should be consulted, and sometimes surgical intervention is necessary.

There are two elements in the sequence of the Seldinger technique that are potentially important in preventing the kinking of the wire. First, during insertion of the wire through the needle no resistance should be encountered, and the wire should pass freely, without any force into the vein. To avoid shearing, the wire should not be pulled back through the needle once it has passed the bevel. Second, care should be exercised when passing the dilator over the wire. Forcing the dilator in a direction that diverges from the path of the wire can result in kinking the wire and potentially cutting out through the vein with possibly fatal consequences. To avoid these complications, it is strongly recommended to perform these percutaneous procedures under fluoroscopy or ultrasound guidance. The level of expertise of the performe is also important in the case of absence of ultrasound or fluoroscopic guidance, or under emergent conditions, and this critical site should be chosen only by highly experienced practitioners.

Conclusion

This case serves as a reminder of key precautions that should be exercised with every central line placement, specifically:

- The guidewire should not be advanced if resistance is encountered.
- The guidewire should not be removed if resistance is encountered it should come out as easily as it went in.
- Particular caution should be used when attempting central catheter placement in patients who are predisposed to thrombosis or have had repeated catheterizations of a particular vessel.