Case Report

Intravascular Looping of Subclavian Central Venous Catheter

Hemlata Kapoor, Harshal Wagh

Department of Anaesthesiology, Kokilaben Dhirubhai Ambani Hospital and Research Centre, Mumbai, Maharashtra, India

Abstract

Central venous catheterization is usually carried out using modified Seldinger technique. Usually the mechanical complications such as looping and kinking are associated with the guide wire. We present a case of intravascular looping of a central venous catheter despite straightforward insertion and withdrawal of an intact undamaged guide wire.

Keywords: Central venous catheter, looping, subclavian catheter

Introduction

Central venous catheterization is routinely carried out using the modified Seldinger technique. Complications commonly associated with the guidewire include kinking, breakage, loss in the vessel, failure to thread, and rarely, looping and knotting of guide wires.[1,2] Looping of pulmonary artery catheters has been described in literature.[3] Knotting of central catheters has also been described, however, most have been of pulmonary artery catheters or guide wires.[4,5] We present a case of intravascular looping of central venous catheter and its successful correction under fluoroscopic guidance. Consent for reporting of personal health information was obtained in accordance with our institutional guidelines.

Case Report

A 50-year-old male ASA II patient was admitted for open elective laparotomy. He was a well controlled hypertensive and had a body mass index of 23. Written consent for central venous catheterization was taken. A standard triple lumen central venous catheter set was used (Certofix®Trio, 7F 6", B. Braun). The enclosed standard needle was used to puncture the right subclavian vein using the landmark technique and blood was freely aspirated in the first attempt. The J-shaped end of the guide wire was passed through the needle without any resistance. Track was dilated with the dilator without any difficulty. Mild resistance was felt while passing the catheter over the guide wire and the guide wire was removed with some difficulty. The guide wire showed no evidence of kinking at any point. On aspiration through the ports, blood could be freely aspirated only through the proximal port. There was no aspiration of blood from the middle and distal ports. However, fluid could be pushed with mild resistance through these two ports. These two ports were not used during the surgery.

After an uneventful surgery, the catheter was visualized using an X-ray image intensifier (C-Arm). The catheter was found to be looped in the subclavian vein [Figure 1]. The guide wire was re-threaded through the catheter, and then the catheter and guide wire were withdrawn slowly simultaneously under fluoroscopic guidance. The maneuver was slow and gentle and the catheter and guide wire were withdrawn till the catheter straightened out, however, at the same time enough length of the guide wire was maintained inside the vessel [Figure 2]. Once the catheter was straightened, the guide wire was threaded further into the subclavian vein and then the catheter was passed over it and the position was confirmed fluoroscopically [Figure 3]. On aspiration, all three ports were functioning well. The patient tolerated the procedure well with no further complications.

Address for correspondence: Dr. Hemlata Kapoor, Department of Anaesthesiology, Kokilaben Dhirubhai Ambani Hospital and Research Centre, Mumbai - 400 053, Maharashtra, India.
E-mail: h_sarinkapoor@hotmail.co.uk

Access this article online

Quick Response Code:

Website: www.karnatakaanaesthj.org

DOI: 10.4103/kaj.kaj_46_16

How to cite this article: Kapoor H, Wagh H. Intravascular looping of subclavian central venous catheter. Karnataka Anaesth J 2016;2:122-4.

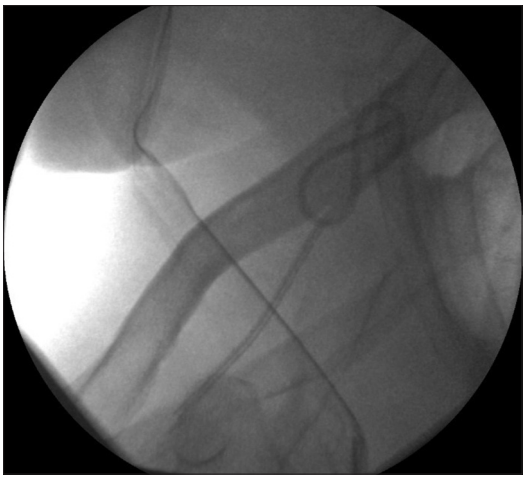

Figure 1: Chest radiograph showing catheter looped in the subclavian vein

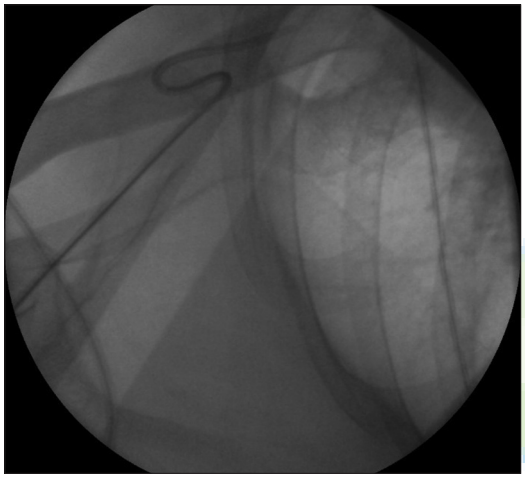

Figure 2: Chest radiograph showing catheter partially straightened with the guide wire inside it

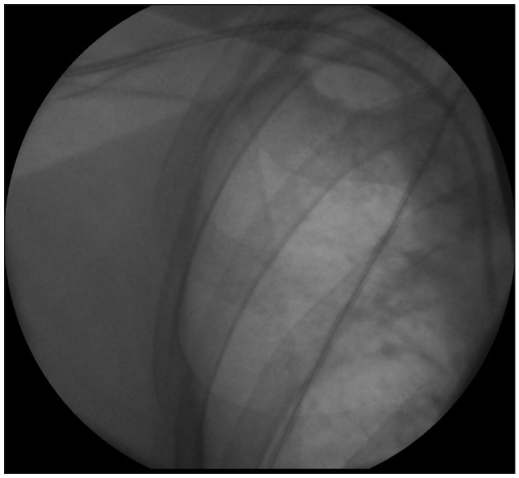

Figure 3: Chest radiograph showing properly positioned catheter

Discussion

Mechanical complications commonly associated with subclavian route for central venous catherisation are misplacement of catheter into the internal jugular vein and pneumothorax.[6] A range of complications attributable to guide wire use in the Seldinger technique have been described in literature. Extravascular and intravascular looping and knotting of guidewires are well-known complications. There have been instances of shearing or fracture of guide wires. In most cases, difficulty in the insertion of guidewire through the introducer needle is encountered. Because guide wires are not rigid, force at an angle is likely to kink them or lead to formation of a loop, which further can get knotted. During the seldinger technique the wire should pass freely through the introducer needle, and second, the dilator should be passed in the direction of the path of the wire. These two steps are fundamental in preventing kinking or looping of guide wire.

The subclavian vein loops over the first rib to descend into the superior mediastinum. Hence, its path is not straight. Further, there is a pinch area between the clavicle and the first rib, which can impede the anterograde threading of the wire and lead to its looping and knotting. Knotting of guide wires has been mostly associated with the subclavian approach.[7]

In our case, the guide wire was passed without resistance through the introducer needle, and the dilator was passed smoothly over the guide wire after removing the needle. The guide wire was found to be intact without any kink. Possible causes could be that the J-shaped tip must have dragged on the vessel wall and looped over or the catheter may have looped intravsacularly while the guidewire was being withdrawn through it. There is growing evidence that ultrasound guided catheterisation reduces complication and failure rate as compared to the landmark technique.[8]

Conclusion

In conclusion, even mild resistance encountered during central venous catheterisation should be thoroughly probed. Further, ultrasound-guided approach should be encouraged for central venous catheterisation, and radiological confirmation of correct placement and exclusion of pneumothorax must be done.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Wang LP, Einarsson E. A complication of subclavian vein catheterization. Extravascular knotting of a guidewire. Acta Anaesthesiol Scand 1987;31:187-8.
2. Monaca E, Trojan S, Lynch J, Doehn M, Wappler F. Broken guide wire – A fault of design? Can J Anesth 2005;52:801-4.
3. Bhatia P, Saied NN, Comunale ME. Management of an unusual complication during placement of pulmonary artery catheter. Anesth Anag 2004;99:669-71.
4. Bagul NB, Menon NJ, Pathak R, Platts A, Hamilton G. Knot in the cava- an unusual complication of Swanz Ganz catheters. Eur J Vasc Endovasc Surg 2005;29:651-3.
5. Olsfanger D, Jedeiken R, Fredman B, Ben-Or A. Intertwining

and knotting of a guidewire with a central venous catheter. Chest 1993;104:623-4.
6. Merrer J, De Jonghe BD, Golliot F, Lefrant JY, Raffy B, Barre E, *et al*. Complications of femoral and subclavian venous catheterization in critically ill patients: A randomized controlled trial. JAMA 2001;286:700-7.
7. Khan KZ, Graham D, Ermenyi A, Pillay WR. Case Report: Managing a knotted seldinger wire in the subclavian vein during central venous cannulation. Can J Anaesth 2007;54:375-9.
8. Gulaltieri E, Sipperley ME, Thompson DR. Subclavian venous catheterization – Greater success rate for less experienced operators using ultrasound guidance. Crit Care Med 1995;23:692-7.