Malpositioning of right internal jugular central venous catheter into right external jugular vein forming “figure of eight”

The Editor,

A 55-year-old, American Society of Anesthesiologist I male patient underwent completion colectomy and small bowel resection anastomosis for cancer colon. He was operated for left hemicolecctiony 2 months back. He was in postoperative intensive care unit after surgery. On postoperative day 2, central venous cannulation was done in right internal jugular vein (IJV) under full aseptic precautions for total parenteral nutrition. Puncture of the IJV and confirmation of guidewire position in IJV was done under ultrasound guidance. After catheter placement, chest X-ray was done to confirm the position of the catheter, it was found to be in ipsilateral external jugular vein (confirmed by radiologist) and made a “figure of 8” on chest X-ray [Figure 1a]. Again under the full aseptic precautions and ultrasound guidance, it was removed half and again guidewire was placed and repositioned. Chest X-ray postrepositioning showed a normally placed catheter [Figure 1b].

The most common indications for the central venous catheter (CVC) placements are central venous pressure monitoring, infusion of vasoactive agents and total parenteral nutrition. Insertion of the CVC has some complications that are mostly arterial puncture, pneumothorax and hematoma that are presented mostly during insertion of a catheter. The incidence of malpositioning of CVC placement varies in different routes of CVC placement.

Pikwer et al.,[1] reported the total 3.3% (confidence interval 25% to 4.3%) incidence of catheter tip malpositioning on radiography.

Right subclavian vein had the highest risk (9.1%) of malposition as compared with the right IJV (1.4%).[1] Ruesch et al.,[2] in a systematic review reported that the catheter malposition rates were 9.3% and 5.3% for subclavian vein and IJV catheterization, respectively.

Bankier et al.,[3] in a study of 1,287 examinations and 3,441 follow-up examinations of chest X-ray after CVC placement reported that left-sided CVC placement have significantly high chances of azygos arch cannulation than right side CVC (P = 0.001). Turi et al.,[4] reported the anterior mediastinal positioning of right subclavian CVC and subsequent perforation of vena cava. Other rare malformations reported are, deviation of right IJV catheter into the left and projected over the aortic knuckle,[5] malpositioning of left IJV catheter into right internal mammary artery[6] and also report of left external jugular catheter malpositioning into the left IJV.[7]

In our case, the right IJV catheter, turn toward the ipsilateral subclavian and entered into the ipsilateral external jugular vein. External jugular vein traverses the deep fascia of subclavian triangle and ends in the subclavian
vein, lateral or anterior to scalenus anterior. It has valves at its entrance into the subclavian vein and about 4 cm above the clavicle. Possible complications of such malpositioning may be the perforation of the vein if the caliber is so small and also injury due to the presence of valves. If the catheter takes “U” turn and enters into the same vein (right IJV in our case), and knot formation occurs, it can be a more dangerous complication requiring surgical intervention.

Real-time ultrasound is recommended now a day for puncture of vein and confirmation of correct placement of guidewire into the vein after puncture and it is good for IJV puncture and confirmation of guidewire in vein but studies failed to prove benefits of ultrasound for subclavian vein cannulation. Chest X-ray is still mandatory to rule out the catheter malposition.

Sohan Lal Solanki, Raghu S. Thota, Vasant P. Patil
Department of Anaesthesiology, Tata Memorial Centre, Mumbai, Maharashtra, India

Address for correspondences:
Dr. Sohan Lal Solanki,
Department of Anaesthesiology, Critical Care and Pain,
2nd Floor, Main Building, Tata Memorial Centre, Parel,
Mumbai - 400 012, Maharashtra, India.
E-mail: me_sohans@yahoo.co.in

REFERENCES

1. Pikwer A, Bååth L, Davidson B, Perstoft J, Akeson J. The incidence and risk of central venous catheter malpositioning: A prospective cohort study in 1619 patients. Anaesth Intensive Care 2008;36:30-7.
2. Ruesch S, Walder B, Tramèr MR. Complications of central venous catheters: Internal jugular versus subclavian access – A systematic review. Crit Care Med 2002;30:454-60.
3. Bankier AA, Mallek R, Wiesmayr MN, Fleischmann D, Kranz A, Kontrus M, et al. Azygos arch cannulation by central venous catheters: Radiographic detection of malposition and subsequent complications. J Thorac Imaging 1997;12:64-9.
4. Turi G, Tordiglione P, Arai M. Case report: Anterior mediastinal central line malposition. Anesth Analg 2013;117:123-5.
5. Ni KM, Watts JC, Panditaratne SS. Malposition of a left-sided central venous pressure line. Anaesthesia 2004;59:407-8.
6. Sakan S, Basic-Jukic N, Kes P, Stern-Padovan R, Peric M. Malposition of central venous dialysis catheter in the right internal mammary vein in uremic patient: Case report. Acta Clin Croat 2011;50:623-6.
7. Khajavi MR, Sedighi M. Malposition of central venous catheter in the left internal jugular vein – A case report. Middle East J Anaesthesiol 2006;18:1157-60.
8. Mansfield PF, Hohn DC, Fornage BD, Gregurich MA, Ota DM. Complications and failures of subclavian-vein catheterization. N Engl J Med 1994;331:1735-8.