IJBCS
ISSN: 2147-1428

Case Report

International Journal of Basic and Clinical Studies (IJBCS)
2014;3(1): 55-58 Arslan Z et al.

A Rare Occurrence of Central Venous Catheter Misplacement: Case Report

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Abstract

Central venous catheters (CVCs) are used in various hospital wards. CVCs are typically inserted through the internal jugular, subclavian, or femoral veins. Subclavian(SV) vein has anatomic advantages such as large diameter, absence of valves and lower risk of catheter-related infection and thrombosis than other veins. Various rates of acute complications such as arterial puncture, hemothorax, pneumothorax, hematoma due to catheter placement, as well as catheter misplacement have been reported. An anterior posterior chest X-ray is usually obtained after cannulation to assess the location of the catheter tip. In this case report, we presented one of the rare form of these CVCs misplacements that the SV catheter was misplaced into the contralateral SV in an 84-year-old female patient hospitalized to the intensive care unit.

Key words: Central catheterization, venous, subclavian, misplacement.

Introduction

Central venous catheters (CVCs) are often used in critically ill patients in various clinics. They allow monitoring of hemodynamic variables, administration of medications, intravenous fluids, parenteral nutrition and hemodialysis. However, the insertion of CVCs may result in infectious, thrombotic or mechanical complications. Various rates of complications according to the anatomic site and operator experience have been published. Mechanical complications are reported to occur in 5 to 19 percent of patients and include failure of placement, arterial injury, catheter misplacement, pneumothorax, subcutaneous hematoma, hemothorax and death (1). A routine chest radiograph to confirm position and to rule out complications is obtained before CVCs are used (2).

CVCs are typically inserted through the internal jugular (IJV), subclavian (SV), or femoral veins (FV). SV has anatomic advantages such as large diameter, absence of valves and lower risk of catheter-related infection and thrombosis than other veins (1, 3). During SV catheterization, misplacement is more than other complications (4). The most common misplacement of the catheter is into the ipsilateral IJV. Other unusual placements reported include in the left internal mammary vein, azygous vein, hemiazygos vein, lateral thoracic vein, inferior thyroid vein, left superior intercostal vein, thymic vein, pleural cavity, and the jugular foramen. Misplacement of catheter tip in contralateral SV is reported rarely (5). We presented one of the rare form of these CVCs misplacements that the SV catheter was misplaced into the contralateral SV.

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Case

An 84 year-old female patient admitted to our emergency room with dyspnea. On admission, her Glasgow coma scale was 8 and she had serious respiratory effort. Her vital signs were as follows; blood pressure 72/43 mmHg, heart rate 100/min, respiratory rate 21/min and pulse oxygen saturation 82% with room air. On physical examination, she had inspiratory crepitant rales that were heard bilaterally on auscultation, distended abdomen and pretibial edema in both lower extremities. The patient was intubated and hospitalized to intensive care unit with diagnosis of respiratory failure and acute pulmonary edema. Arterial blood gas analysis revealed (FiO2:1) pH: 7.57, PaO2: 54, PaCO2: 25 and SpO2: %91. A CVC was inserted through right SV and post-procedural chest X-ray was performed. It was seen that the catheter was placed in the contralateral SV (Figure 1.). It was withdrawn and inserted into the correct position.

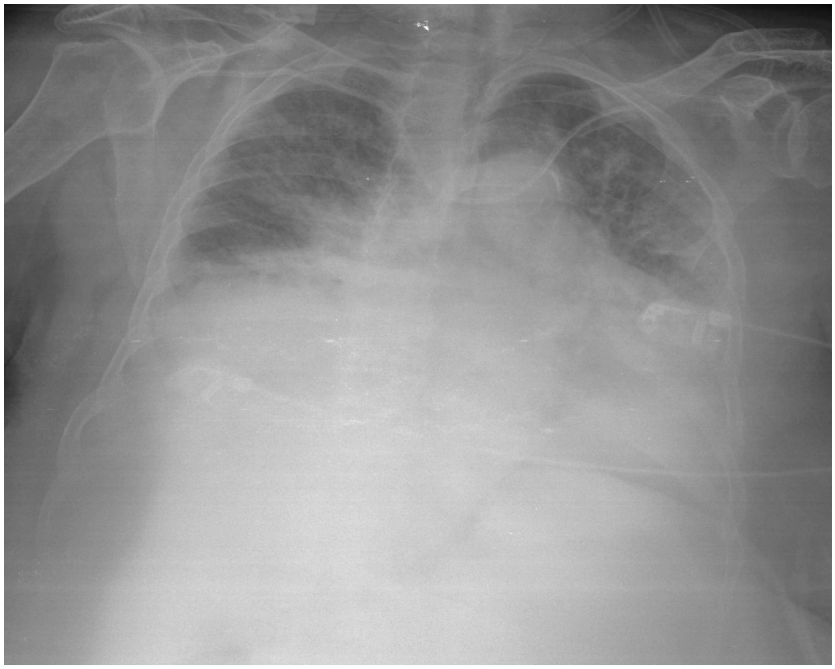

Figure: Anterior-posterior chest X-ray shows misplacement of right subclavian vein catheter into the contralateral subclavian vein

Discussion

CVC is commonly used for many conditions such as fluid resuscitation, blood transfusion, central venous pressure monitoring, various drug infusion, hemodialysis and hyperalimentation in many patients, especially in critically ill patients. Anatomically different access points in the body can be used for CVC. Many of these anatomic points are localized in the upper half of the body where the vessels are closer each other. Also the upper half of the body is more preferable due to less contamination rates

(6). Acute complications frequently seen during the CVC practices include arterial puncture, hemothorax, pneumothorax, hematoma due to catheter placement, as well as catheter mal-positioning (7).

Anatomical and physical properties of patients (obesity and cachexia), experience of person performing catheterization and the quality of the materials used are among the important factors which may affect the development of complications (8, 9). SV has several anatomic advantages for preference of central catheterization such as its large diameter (0.5-1.5 cm), absence of valves, and ability to remain patent and in a relatively constant position, lower risk of catheter-related infection and thrombosis. Among the significant disadvantages of SV, it has higher risk of pneumothorax and catheter dysfunction (3, 10). For these reasons, the rate of malposition is higher in this part of the body. In addition, the junction points of vessels play an important role in the development of the malposition. The right SV joining with the right IJV forms the right brachiocephalic vein which passes almost vertically downwards. The left brachiocephalic vein runs obliquely downwards and to the right and unites with the right brachiocephalic vein to form the superior vena cava. The angle of two brachiocephalic veins is very variable and this is an important determinant of the ease of central catheter positioning. Anatomic abnormalities of the veins may predispose to catheter misplacement (11). Misplacement of right SV catheter into the contralateral SV in our case may be due to a variation of this angle.

As presented in a case, the right IJV catheter placed in the right axillary vein. In the same study, a wide range of catheter malposition from less than 1% to more than 60% was reported(6).Catheter insertion point is important in occurrence of complications. The rate of complications varies according to the use of different anatomical tracts (12).Yavuz et al. (7) reported that, the safest way is IJV and the FV has the highest risk for complications. In the same study the most frequent complication was catheter dysfunction with rate of 2.15%. Pikwer et al. (13) reported that catheterization from the right SV had the highest risk of malposition with the incidence of 9.1% compared with 1.4% from the right IJV. In a review performed by Ruesch et al. (14), it was reported that catheter malposition rate for IJV was 5.3% and for SV was 9.3%.

In conclusion, the misplacement of CVCs may be seen during central catheterizations and SV insertions have higher rates of misplacement with various positions. Findings reported in the literature emphasize that taking routine chest radiograph to confirm appropriate catheter tip position after central catheterization is easy and useful.

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