



Delayed Hydrothorax After Subclavian Vein Cannulation

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ABSTRACT

Central venous cannulation forms one of the mainstays of management of patients in intensive care unit. We are reporting two cases of iatrogenic massive pleural effusion following subclavian vein catheterization necessitating intercostal tube drainage. Catheter removal and chest drainage led to an uneventful recovery.

KEYWORDS : Pneumothorax, hydrothorax, subclavian vein, cannulation.

INTRODUCTION

The placement of central venous catheters is often necessary in the ICU for delivering fluids, nutrients, drugs and monitoring central venous pressure¹. There may be immediate or delayed complications due to this procedure such as pneumothorax, hemothorax, pleural effusions, cardiac tamponade, sepsis, and thrombosis²⁻⁵. Although Massive pleural effusion due to intrapleural pouring of fluids administered to the patient has been rarely reported, such complication can sometimes be associated with significant morbidity and mortality. We are describing 2 cases whose initial chest radiograph was normal following insertion of subclavian central venous catheter and they subsequently developed massive hydrothorax.

CASE REPORT 1

A 46 yr female patient was posted for Whipple's operation. Her G/E, RS, CVS, blood investigation, ECG, Chest X-Ray were WNL. Preoperative subclavian vein cannulation was planned for monitoring central venous pressure (CVP), frequent investigations, total parental nutrition (TPN) and post op venous access. Right subclavian vein was cannulated with a 15cm7 French catheter in single puncture. An initial chest radiograph showed the catheter in an acceptable position in the superior vena cava with no evidence of pneumothorax or hydrothorax. On 5th postoperative day, patient developed respiratory distress with Respiratory Rate of 40/min, absent air entry on right side of chest. Fall in SpO₂ up to 80%. There was no rise in temperature, no infection. There was negative aspiration for blood from CVC. IV fluid from CVC stopped. Clinical examination and chest radiograph disclosed massive right sided pleural effusion (figure1).



Figure1: Massive right side pleural effusion

28 French intercostal drain was inserted which drained 2.5 litre fluid. The patient's condition improved markedly with SpO₂ 99% with O₂ inhalation. Supportive and symptomatic treatment continued.

CASE REPORT 2

A 53 yr male patient was posted for right hepatectomy. His G/E, RS, CVS, blood investigation, ECG, Chest X-Ray were WNL. Preoperative right subclavian vein cannulation was planned for monitoring CVP, frequent investigations, TPN and post op venous access. Right subclavian vein was cannulated with a 15 cm7 French catheter. Immediate post procedure X-ray confirms catheter in an acceptable position in the superior vena cava with absence of pneumothorax or hydrothorax. After 17 hours of subclavian vein cannulation patient was taken into operation theatre. On examination, patient's respiratory rate was 38/min with absent air entry on right side of chest and SpO₂ 89%. There was negative aspiration of blood from CVC. Operation postponed and Patient shifted to recovery room. Chest radiograph was done which revealed massive right sided pleural effusion. A 28 French intercostal drain was inserted and 1.5 litre fluid was withdrawn from drain. Patient improved symptomatically. SpO₂ 99% with O₂ inhalation. Supportive and symptomatic treatment was continued.

DISCUSSION

Central venous cannulation is often necessary in the ICU for delivering fluids, nutrients, drugs and monitoring volume status. It can sometimes be associated with the immediate or delayed complications such as pneumothorax, artery puncture, catheter-related infection, hemothorax, pleural effusions, cardiac tamponade, and thrombosis. Subclavian vein cannulation is more tolerated by patients because of large caliber with estimated diameter of 2cm and running a fixed course. The risk of pneumothorax is because at some points, the subclavian vein is only 5mm above the apical pleura of the lung.

Hydrothorax is another complication of central venous catheterization^{3,6,7}. It can develop if part or all of the catheter is removed from the vein or perforates the vein while continuing the infusion of fluid. Perforation is thought to occur as a result of mechanical trauma from the catheter tip or chemical damage from infused solutions⁸. Erosion may lead to perforation of the vein, and fluids may then be directly infused into the right pleural cavity⁹.

Thomas CJ, Butler CS said that catheter tip migration is a common phenomenon following CVC occurs in approx 17% of all³. Another case report by Lang-Jensen⁷ had mentioned secondary malposition as a result of catheter tip migration occurs in up to 6% of catheter¹⁰. Kunizawa A. experienced CVC induced delayed hydrothorax via progressive erosion of central venous wall after 30 hrs. They suggested that this may occur after patient's position changes, usually in cases where catheter tip was initially in ideal position¹¹.

We experienced 2 cases of massive pleural effusion after subclavian vein catheterization. In both cases immediate post procedure X-ray confirmed catheter in an acceptable position in the superior vena cava with absence of pneumothorax or hydrothorax. Afterwards both patients developed respiratory distress due to massive pleural effusion as delayed complication of subclavian vein catheterization which was confirmed by chest radiographs.

CONCLUSION

The incidence of delayed hydrothorax following subclavian vein catheterization is low, but it may be associated with significant morbidity. These cases show that complications causing clinical deterioration may be delayed and emphasized need to carefully monitor the patient's vital signs and symptoms. Thus, chest radiography should be performed after insertion of central venous catheters and a high index of suspicion should be maintained in order to detect and effectively treat the rare and delayed complications of central venous catheterization.

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