Case Report

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Mediastinal Hematoma after Internal Jugular Venous Cannulation: A Rare Complication

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Abstract

Internal jugular venous cannulation is a common procedure performed in the hospitals for monitoring and therapeutic purposes. We report an extremely rare complication of mediastinal haematoma following Internal jugular venous cannulation in a 55 years old female patient with subarachnoid haemorrhage following rupture of right p-com aneurysm. Post procedural chest X ray showed a large mediastinal hæmatoma occupying the right hemithorax and the patient became symptomatic in the form of development of stridor for which she had to be reintubated. Patient was managed conservatively and subsequent serial chest X- ray showed gradual resolution of the haematoma. The occurrence of mediastinal hematoma resulting from vascular injury in close proximity to the mediastinum is an extremely rare complication. It is documented in the literature in very few case reports [10]. We report this rare case to highlight the importance of supervised catheter insertion, use of ultrasound for insertion , the important role of post procedural chest X ray to detect and for early management of complications.

Key words: Cannulation; Haematoma; Internal Jugular Vein; Mediastinum; Stridor.

Introduction

Since the introduction of central venous catheterization in clinical practice in 1945, the technique has been widely used for management of severely ill patients [20]. Central venous catheters allow measurement of haemodynamic variables that cannot be measured accurately by noninvasive means and allow delivery of medications and nutritional support that cannot be given safely through peripheral venous catheters. The indications of central venous catheterization include cardiopulmonary arrest, shock, central venous pressure monitoring, poor peripheral venous access, administration of hypertonic or irritating solutions, prolonged intravenous infusions and hyperalimentation.

Unfortunately, the use of central venous catheters is associated with adverse events that are both hazardous to patients and expensive to treat. The reported hazards of central venous catheterization include venous laceration [9], haematoma formation [3], arterial puncture [14], catheter embolism [25], Horner's syndrome with vocal cord paralysis [6], pneumothorax, hydrothorax [12], haemothorax, subcutaneous emphysema, arteriovenous fistula, brachial plexus injury, air embolism [15], thoracic duct injury [4], hydromediastinum [1], laceration of vertebral artery [19], thrombus formation [11], cardiac tamponade [7], tracheal puncture [13], local and systemic infection [2]. More than 15 percent of patients who receive these catheters have complications [18,23,24]. Mechanical complications are reported to occur in 5 to 19 percent of patients [17,18,23], infectious complications in 5 to 26 percent [18,21,24], and thrombotic complications in 2 to 26 percent [18].

Six techniques of central venous catheterization have been developed(1)infraclavicular subclavian, (2)supraclavicular subclavian, (3)external jugular, and internal jugular via the (4)anterior, (5)posterior, or (6)central approach.

There is some evidence that there are more arterial punctures but less catheter malpositions with the internal jugular compared with the subclavian access. There is no evidence of any difference in the incidence

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of haemo- or pneumothorax and vessel occlusion [5]. Bloodstream infection happens more often with the internal jugular access, but the data is heterogeneous and there is no statistical significance [5].

The procedure is contraindicated when landmarks are distorted by deformity, trauma, surgery or radiation therapy, in combative patients and in patients with altered coagulation. Chest radiography, recommended as a routine procedure after any attempted central venous catheterization, whether successful or not, helps determine catheter position and detect immediate complications.

We report a rare case of inadvertent mediastinal hematoma following insertion of a central venous catheter through right internal jugular access in a 55 years old female patient with subarachnoid hemorrhage following rupture of a right p-com aneurysm.

Case Report

A 55 year old female patient, was admitted with history of sudden onset headache and altered sensorium 14 days prior to the day of admission. At the time of admission GCS was E3V4M6 without any focal deficit. Angiography showed a right p com aneurysm of size 5.7X3.5X6.3 cm with neck of size 4.3 mm directed posteriorly. Severe vasospasm was seen in the right ICA. Blood parameters were normal and there was no evidence of any coagulopathy. Coiling was done on the next day of admission under general anesthesia and patient was shifted to ICU intubated. Internal jugular venous cannulation was done in the ICU by a trainee anesthetist with Seldinger technique without supervision and without USG guidance. Considerable resistance was encountered during the threading of the guidewire and also during placement of the dilators. Catheter was inserted after multiple attempts. Post procedural X ray showed a large mediastinal haematoma in the right hemithorax displacing the right lung laterally.

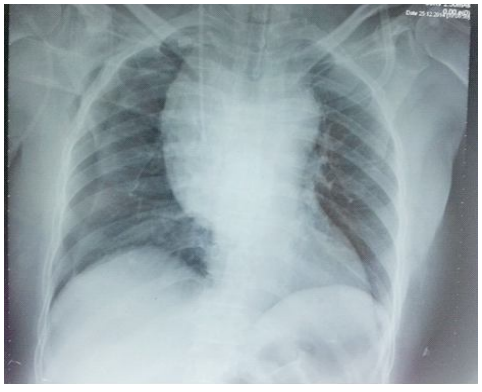

Fig. 1: Chest X ray showing right mediastinal haematoma

Extubation trial was made next day but the patient developed stridor immediately after extubation and had to be reintubated urgently. HRCT chest showed an ill marginal collection of Hounsfield units 55-60 in superior mediastinum along the right paratracheal region extending cranially from posterior margin of the right SCM till root of the aorta inferiorly suggestive of haematoma , the size of which is approximately

Fig. 2: HRCT showing mediastinal hematoma

(6.3X4.7X10 cm), limited laterally by mediastinal boundary and is displacing the trachea anteriorly.

Consultation with vascular surgeon was made and they have advised for conservative management with serial chest X rays expecting spontaneous resolution of the hematoma. There was gradual resolution of the hematoma, patient was gradually weaned off and was extubated 11 days after she was re-intubated for respiratory difficulty.

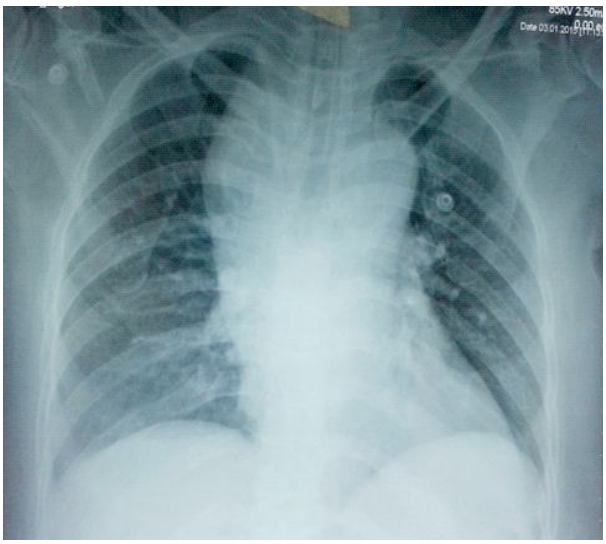

Fig. 3: Chest X ray on the day of extubation

She was discharged 4 days after extubation in a stable condition without any respiratory difficulty.

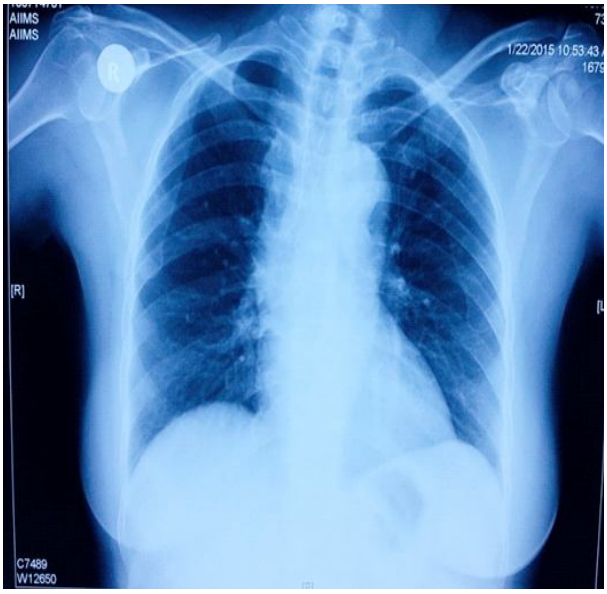

Fig. 4: Chest X ray showing complete resolution of mediastinal hematoma at 2 weeks of discharge

She was followed regularly in the OPD and X ray done at 2 weeks of discharge showed complete resolution of the hematoma

Discussion

Right internal jugular vein (RIJV) is often selected as an ideal vein for central venous access because of its straight course, reduced risk of malposition, and thrombosis. The occurrence of mediastinal hematoma resulting from vascular injury in close proximity to the mediastinum is an extremely rare complication. It is documented in the literature in very few case reports [10]. Gupta et al. [10] have reported a case series of eight cases of mediastinal hematoma following central line placement.

A possible explanation of the mechanism of vascular complications includes forced manipulation of the dilators or guide wires against resistance. Other possible mechanism of injury include kinking of the guide wire, resulting in misdirection of the dilator and perhaps insertion of the guide wire outside the vessel. All these complications result from inexperience, the number of needle passes made, the use of relatively larger gauge needle, severe dehydration, morbid obesity and coagulopathy. In our case the anaesthesist appreciated considerable resistance while threading the guidewire. Multiple attempts were made and there was no supervision from any senior experienced fellow. USG guidance was not used for the procedure.

As with most medical procedures, the level of experience of the physician reduces the risk of complications [8,23]. Insertion of a catheter by a physician who has performed fifty or more catheterizations is half as likely to result in a mechanical complication as insertion by a physician who has performed fewer than fifty catheterizations [23]. If a physician is unable to insert a catheter after three attempts, he or she should seek help rather than continue to attempt the procedure. The incidence of mechanical complications after three or more insertion attempts is six times more after one attempt [17].

The use of ultrasound guidance has been promoted as a method for reducing the risk of complications during central venous catheterization. During internal jugular venous catheterization, ultrasound guidance reduces the number of mechanical complications, the number of catheter placement failures, and the time required for insertion.[22] However, its use during subclavian venous catheterization has had mixed results in clinical trials [16,22] probably for anatomical reasons.

Management of mediastinal haematoma can be done conservatively in case of asymptomatic patients, may require sternotomy and evacuation of haematoma in symptomatic patients, placement of intercostals drains and coiling in case of arterial puncture. In our case conservative management was done and it was successful.

Conclusion

Expertise , knowledge of anatomy, proper supervision, use of USG , routine post procedural chest X ray may prevent or help in early detection of this rare but life threatening complication of mediastinal haematoma following central venous catheter insertion.

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