

Case report

Near fatal outcome following internal jugular vein catheterization for haemodialysis

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Introduction

In the recent years, the internal jugular vein has become the access route of choice for placement of hemodialysis catheters¹. The internal jugular vein is now the preferred route for dialysis access in the Dialysis Outcomes Quality Initiative guidelines². Neck hematoma following internal jugular vein catheter insertion is uncommon, especially the one that leads to acute airway obstruction which is due to the progressively expanding neck hematoma^{3,4}.

Case Summary

A 46 years old female patient, a known case of Active Systemic Lupus Erythematosus (SLE) with Lupus Nephritis and Nephrotic Syndrome was having persistent proteinuria despite oral Prednisolone 60 mg daily that was prescribed since six months ago. She was admitted for renal biopsy but was postponed due to her high blood urea level. She was diagnosed to have acute on chronic renal failure secondary to existing disease superimposed by the infections (gastroenteritis).

She was then planned for haemodialysis via the left femoral line. However after two days running the dialysis via the line, it was not functioning well with on and off obstructed flow. The left internal jugular catheter insertion was advocated.

After the area was cleaned and draped, the left internal jugular catheter was inserted using the usual Seldinger's technique at around 3.00 pm. After the insertion, there

was a small swelling noted at the site of puncture. The swollen area was compressed for about 30 minutes and the size did not progress. A chest radiograph post-insertion was obtained and showed the catheter tip in correct position with no evidence of pneumothorax. A trial of haemodialysis using the internal jugular catheter inserted failed evidenced by no outflow from it. Haemodialysis was reverted back to the left femoral line.

After 2 hours post IJV puncture, the swelling in the left side of the neck was noted to increase in size. The patient also complained of pain over the swollen area. Then the haemodialysis was abandoned and the swollen left neck was compressed with sandbag and ice packs.

Patient was then referred to ORL team for consultation regarding the rapidly increased neck swelling. Examination confirmed the presence of huge hematoma over the left upper neck involving the submental, left digastric, left carotid and left muscular triangles. It was soft and tender but no surgical emphysema palpated. Patient was noted to have short neck and morbid obesity (Figure 1 & 2).

Blood investigations done earlier was traced and revealed that patient got coagulopathy with Prothrombin time (PT) was > 120 seconds, INR of >120 and aPTT > 240 and Hemoglobin were 8.1 gm/dL. By 7.30 pm, 4 units of Fresh Frozen Plasma (FFP) were transfused.

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Figure 1: Anterior view of swollen neck following left internal jugular catheter insertion.

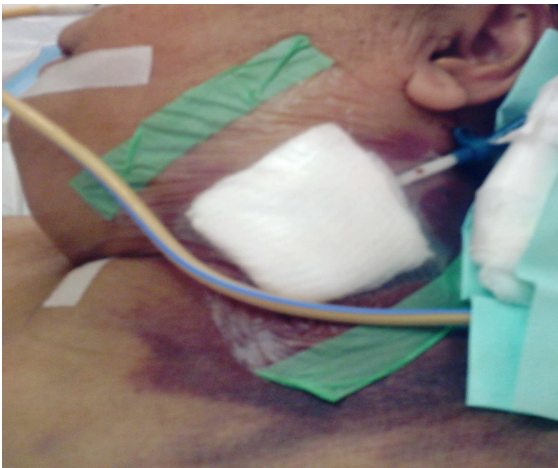


Figure 2: Lateral view of swollen neck following left internal jugular catheter insertion.

However, the size of swelling progressed by 11.00 pm. The patient started to have increasing neck pain and breathing discomfort. At this time the left neck swelling has progressed to involved the whole left side of the neck and crossed one inch beyond the midline. It also extended to the left upper chest. It was firm, tensed and tender. Her neck circumference was 47 cm. She also has on and off inspiratory stridor. Her arterial blood gas showed early respiratory failure.

Patient was brought into Operation Theater by 12 midnight for intubation. While giving salbutamol with lignocaine nebulizer prior to the procedure, her condition deteriorated and she went into laryngeal spasm. The anesthetists were

able to intubate patient after the third attempt using Armour tube size 4.0. Post-intubation was uneventful and another 4 units of FFP and 2 pints of packed cell were transfused.

The coagulopathy resolved by the next day with patient was kept intubated and observed in ICU until for few days. The neck hematoma gradually reduced in size. Patient was transferred to general ward and later on was discharged well with neck circumference of 37 cm. She was and prescribed regular haemodialysis via femoral line until the given new date for renal biopsy.

Discussion

In a rapidly progressive neck hematoma following internal jugular vein catheter insertion, arterial puncture is suspected along with coagulopathy. However, airway obstruction as a complication of jugular vein cannulation is rare, even in patients with abnormal coagulation profile. In a large series of 1000 cannulations in patients with coagulopathy, only one patient developed airway obstruction despite inadvertent carotid artery puncture in 74 patients⁵.

Incidence of inadvertent carotid arterial puncture complication is reported to be 2% - 8%⁶. The hematoma may enlarged rapidly if the patient is coagulopathic, or if a large puncture wound is produced by the introduction of the sheath itself into the carotid artery. The carotid artery is commonly involved and punctured by a large bore internal jugular cannula or vessel dilator⁴.

The recognition and treatment of the compromised airway needs to be quick and systematic. Airway obstructions if not promptly managed, can rapidly progresses to hypoxia and irreversible cerebral damage and death, within minutes. Hence, management of the unstable airway has the highest treatment priority regardless of the presence of other medical conditions.

Direct compression of trachea by the large hematoma can result in airway obstruction³. However, some disagree due to the facts that trachea is a rigid structure and a lot of pressure is needed in order to compress it⁷. Pharyngolaryngeal oedema secondary to venous and lymphatic obstruction by the hematoma is more likely the cause of the airway obstruction^{4,8}. The latter mechanism is possible in this case evidenced by difficult intubation which may be due to the development of pharyngolaryngeal oedema that leads to distorted internal laryngotracheal anatomy.

This case report illustrated another rare but may leads to fatal outcome following the internal jugular catheter insertion. Hence, a more selective method of insertion may be needed to be considered in a high risk

patients such as ultrasound guided method, usage of smaller size gauge needle (e.g. 18 gauges), etc. The application of ultrasound guided IJV catheter insertion is associated with a reduced number of attempts, better success rates and a reduced incidence of arterial puncture⁹.

In conclusion, the increasing neck swelling caused by internal jugular catheter insertion that result in upper airway compression and rapid desaturation is very rare but could be hazardous with fatal outcome. Hence, more caution and care need to be considered in selecting the insertion method in a high risks patients, e.g. obesity, short neck, coagulopathy, family history of aneurysms and who needs repeated cannulations.

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