

Perforation of Internal Jugular Vein: An Avoidable Rare Complication in Permanent Haemodialysis Catheter Insertion

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Abstract

Insertion of permanent haemodialysis catheters is a common medical procedure for patients requiring regular haemodialysis. The procedure has certain risks, including vessel perforation. A 60 year old male, with end stage renal disease, had a permanent dialysis catheter inserted into the right internal jugular vein, complicated by perforation of the right internal jugular vein. We discuss the subsequent management and learning points.

Keywords: Haemodialysis Catheter; Internal Jugular Vein; Vascular Access; Perforation

Introduction

In most situations, central catheters are implanted in the right jugular vein as initial access for haemodialysis. However, after repeated punctures, the proximal vessels become stenosed and thrombosed and misplacement is likely to occur [1]. These catheters are commonly inserted percutaneously using anatomic landmarks, but the technique is far from being perfect and serious complications may occur during the procedure [2] if not careful.

Case Report

60 year old male, diagnosed with end stage renal disease, had been on haemodialysis for the past 2 years. He previously had multiple haemodialysis catheters, the latest a temporary right femoral vein haemodialysis catheter that malfunctioned necessitating permanent dialysis catheter. Insertion of a permanent dialysis catheter into the right internal jugular vein was performed and he was able to undergo two haemodialysis sessions using the permanent catheter. During his 3rd dialysis session, after flushing of catheter with heparinised saline, he experienced sudden onset of pain and neck swelling.

A chest radiograph revealed the catheter was displaced superiorly, with its tip in the internal jugular vein. A Doppler ultrasound of the neck showed a patent carotid artery with associated neck haematoma. As a result of the severe neck swelling, he developed difficulty breathing, leading to respiratory failure and emergent intubation. The following day, he developed sepsis with disseminated intravascular coagulation. He responded to antibiotics, vitamin K, and steroids.

He underwent surgical exploration of the right neck by the cardiothoracic surgeon, revealing a perforated right internal jugular vein, with the catheter overlying the carotid artery. The catheter was removed and internal jugular vein repaired with subsequent resolution of the neck swelling.

Post-operatively, he was noted to have upper limb oedema, that was worse on the right.

A doppler ultrasound confirmed right basilic and cephalic thrombus, and he was started on anticoagulation. Symptoms resolved, discharged from the intensive care unit and successfully underwent left arm arteriovenous fistula surgery.



Figure 1: Chest radiograph of haemodialysis catheter crossing midline.



Figure 2: Intra-op picture: catheter perforation of internal jugular vein.

Discussion and Conclusion

Catheter malposition during cannulation of the subclavian or internal jugular veins is not common, occurring in only 2% of cases [3]. Complications of catheter placement can be related to malposition, perforation or injury of nearby blood vessels and structures [4]. Removal of a misplaced catheter may lead to massive uncontrolled bleeding and should be managed surgically [2].

In this case we had to await the resolution of disseminated intravascular coagulopathy (DIC) secondary to blood transfusions and sepsis. The procedure was uneventful, with no involvement of the carotid artery; however post operatively complicated by deep vein thrombosis of the upper limb. This could possibly be related to the vitamin K, DIC and catheter.

It is important to be aware of the risk of potential incorrect positioning of dialysis catheters. Due to the stenosis and fragility of the vessel wall, perforation may occur. In cases of doubt, correct placement of large-bore catheters via the internal jugular vein should be verified by means of appropriate imaging before hemodialysis is performed [1]. One should be aware that in spite of ultrasound guidance, fluoroscopy for guidewire and sheath advancement, normal venous blood aspiration and a normal appearing postoperative x-ray, traumatic central venous catheter placement is still possible [5].

The patient had multiple catheters placed in the past, and this current procedure was difficult and required two operators. Haemodialysis was performed successfully as the dialysis catheter was partially inside the jugular vein lumen. Radiograph being performed to check the catheter position is mandatory after the procedure. If it had been performed post insertion perhaps reposition may have prevented this complication.

Acute catheters should be inserted in the internal jugular or femoral vein under ultrasound guidance to minimize complications. Subclavian catheters cause stenosis, thrombosis, and perforation of vessels [6]. Subclavian veins should be avoided if other access sites are accessible. Vein stenosis was significantly more common in patients with previous or current subclavian vein catheterization compared to no catheter placement in this vein [7]. This stenosis leads to the increased risk of perforation or thrombosis.

The standard protocol for checking catheter placement should be followed. The procedure should be ultrasound guided to minimise on complications. Subclavian veins should be used as a last resort due to issues related to stenosis and thrombosis.

Radiographs should be performed to confirm correct positioning of the catheter. In the event of great vessel perforation, management should be surgical, and removal of the catheter to minimise the risks of bleeding as demonstrated by our case study.

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