

# A Broken Intravenous Cannula in External Jugular Vein

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## Abstract

Peripheral intravenous cannulation (PIVC) is an ordinary invasive procedure, used for the infusion of intravenous fluids, medications and sampling of blood in health care centres. In an emergency, where rapid resuscitation is required or PIVC is difficult, external jugular vein (EJV) cannulation is preferred because of its anatomy and superficial location. Since the fracture of the tip of the cannula is a very rare complication, it can lead to intravenous migration, embolization, and thrombosis. The issue of cannula fracture is a serious problem that must be undertaken and mandates proper diagnosis and treatment. In conclusion, training of the staff, good technique of insertion, proper care, attentive removal, early recognition and emergent removal of the fractured segment of the cannula are of utmost importance.

**Keywords:** importance, cannula, recognition, embolization, migration

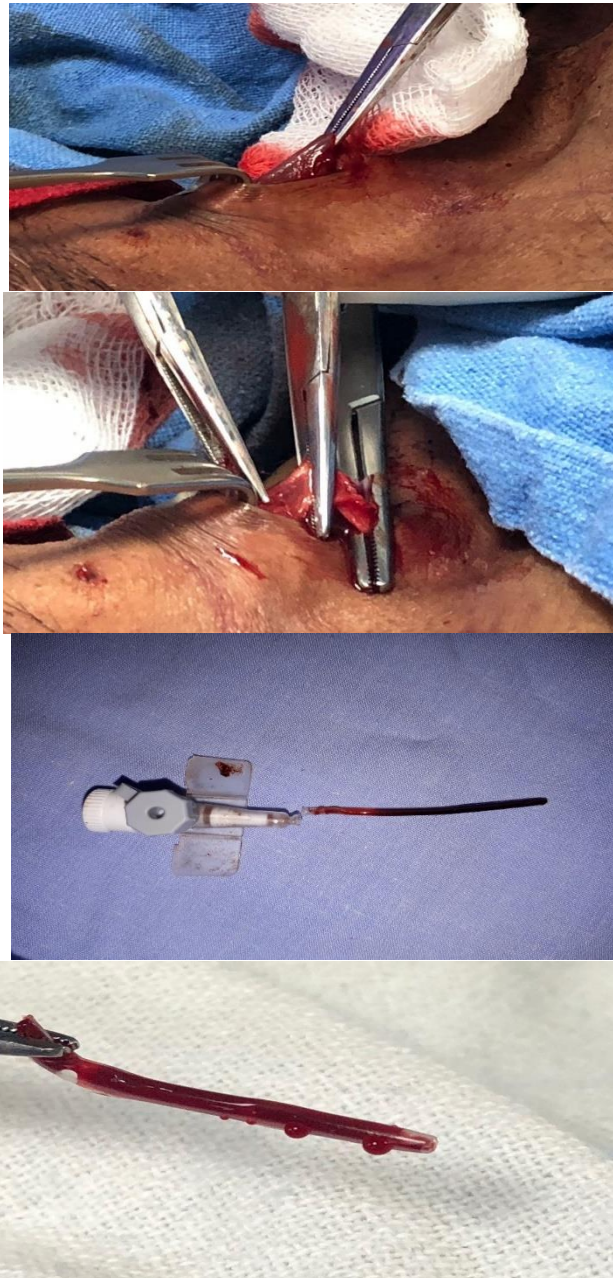
## Introduction

Intravenous cannulation is mostly frequently performed intervention by medical and paramedical staffs all over the world. The frequent complications associated with the procedure are vein rupture, phlebitis and thrombosis.<sup>ref</sup> One of the rare but life-threatening complication associated with indwelling plastic catheter is its breakage and subsequent embolization of the fractured segment.<sup>ref</sup> If the fractured segment is allowed to enter into the heart or the pulmonary circulation it may threaten patient's life and often requires prompt intervention. We report a case of fracture of Fluoro-ethylene propylene (FEP) catheter (Placeholder10) placed in external jugular vein which required surgical removal to avoid embolization into central circulation.

## Case summary

53-year-old male, a known case alcohol related CLD with past history of esophageal varices ligation presented to our trauma casualty following road traffic accident. On initial evaluation, he was hemodynamically stable. CECT torso revealed bilateral multiple rib fracture / Lt hemothorax and pneumothorax with no significant intraabdominal

injuries. Fluid resuscitation was started immediately and blood products were arranged. Left ICD was placed which drained 700 ml of frank blood with gush of air. Following ICD placement patient developed hypotension and required transient noradrenaline support to maintain hemodynamics. Since the patient had difficult intravenous access and coagulopathy, 16G polyethylene cannula was placed in external jugular vein for vasopressor support. After blood products transfusion, hemodynamic was stabilized and EJV cannula was removed under aseptic precautions. When removed it was noted that the long piece of the sheath was broken and left in the vein. Immediate vein ultrasound and clinical examination revealed that the cannula was in EJV only. To prevent distal embolization manual pressure was applied distal to the palpated distal tip of cannula and trauma surgeons was called immediately. After discussing with the surgeons, EJV was explored and broken segment was removed uneventfully.



### Discussion

Fracture of the catheter segment is known complication of the venous cannulation; first reported by Turner et al in 1954, following which several reports has been published. The incidence of catheter embolization ranges from 0.2 % to 4.2 % and occurs mainly with central venous catheter rather than peripheral catheter. The most probable

hypothesis would be partial transection of catheter would have happened while trying to reinsert the needle in to already inserted catheter in order to correct the malposition. This may have been compounded by excessive movement of the patient neck which lead to the weakening of the transected cannula. The partially damaged catheter might have got broken while removing the cannula leaving the fractured segment in the vessel.

In a systemic review, it was found that the most embolized catheter fragments were located in the pulmonary arteries (35%), followed by right atrium (27.6%), right ventricle (22%), and superior vena cava or peripheral veins (15.4%). Life threatening complications like tricuspid valvulitis, endocarditis, systemic candidiasis, arrhythmias, sepsis and embolization to pulmonary artery requiring thoracotomy has been described in the literature following embolization of the fractured segment in to the central circulation. However, in our case embolization was prevented by immediately recognising and rapid removal of the fractured segment by venotomy thereby preventing any life-threatening complications. Though there are no clear guidelines for management of fractured segment, percutaneous removal is justified in our case because of closeness to central circulation. Closely monitoring the patient for catheter malfunctions (resistance to fluid injection), local signs like erythema and swelling may help in early identification and may avoid serious complications. Few proportion of cases may not have any signs of malfunction despite embolization of the catheters. So, after removal of the cannula, it should be carefully inspected to confirm its integrity. In such cases every attempt should be made to locate the fractured/embolised segment by radiological investigations and clinical examination. If there is evidence of embolism to central circulation immediate vascular surgeon should be sought. In this case fractured segment was located by clinical examination and confirmed by ultrasonography. FEP catheter being radiopaque doing x-ray could have also helped.

### **Conclusions**

Broken intravenous cannula is a dangerous situation and rapid response will avoid any major complication. Avoiding reinsertion of a needle into a catheter will prevent catheter damage. Every time after removal, the cannula should be examined to confirm the integrity. Immediate location of the broken segment by radiological techniques and individualised management strategies based on location of broken segment will avoid any life-threatening complications.

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