

# Intravenous Fracture of a Peripheral Cannula: A Rare Complication of Peripheral Cannulation

RMTM Gunawardena, N Gunawansa

National Institute for Nephrology, Dialysis and Transplant, Maligawaththa, Sri Lanka.

## Corresponding Author:

Dr. RMTM Gunawardena  
Email: thilnamg@gmail.com

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## Abstract

**Background:** Peripheral intravenous (IV) cannulation is a commonly done procedure in day to day clinical practice. Being an invasive procedure, it is invariably associated with complications. **Case Report:** A 61 year old diabetic patient who had undergone kidney transplantation presented with foot sepsis. A 23G peripheral intravenous cannula was inserted to his right external jugular vein (EJV) for vascular access. On removal of the device, the tip was found to be missing. Under local anesthesia the right EJV was explored and the foreign body extracted. **Conclusions:** Among the complications of peripheral IV cannulation, intravenous fracture of the cannula tip is a rare complication, albeit with serious consequences. Attempts should be made to localize and remove the missing segment.

**Keywords:** Cannula, Intravenous Infusions, Jugular Veins, Sepsis, Foreign Bodies.

## Introduction

Peripheral intravenous (IV) cannulation is a common procedure used for obtaining intravascular access. It is a routine bedside intervention performed by doctors, nurses and paramedical staff. Peripheral IV cannulas, invaluable in administering IV drugs, fluids and other adjuncts are not without potential complications. Hematomas, thrombophlebitis, cannula related infections, extravasation, injury to arteries, nerves, tendons which are within close proximity to the vein being cannulated and intravascular fracture of the cannula are some of these. Here we report a case of an intravascular fracture of an IV cannula, which is a rare but serious complication of peripheral cannulation.

## Case Report

A 61 year old diabetic patient who had kidney transplantation 2 years back was admitted to the surgical unit at National Institute for Nephrology

Dialysis and Transplant with a diabetic foot infection. On admission he had stable vitals with a total white cell count of  $18 \times 10^3 / \mu\text{L}$  (4-10). The C reactive protein level was 221 mg/L (0-6) and serum creatinine was 95.51  $\mu\text{mol/L}$  (60-120). He had a functioning brachio-cephalic arterio venous fistula on his right arm, therefore the left upper limb was cannulated and IV antibiotics were commenced pending wound debridement. At the operating theatre, a 23G IV cannula was inserted to his right external jugular vein (EJV) for IV access as there were no suitable limb veins. Wound debridement was done and IV antibiotics were continued in the ward using the same neck cannula. Three days later when this cannula was being removed it was noted that the tip was missing [Fig.1]. Palpation of the neck revealed some induration along the right EJV which was thought to be caused by the missing piece of cannula left inside the vein. The patient was taken to the theatre and under local anesthesia and the suspicious area of the neck was explored. The EJV was identified, a venotomy made and the

cannula tip retrieved [Fig.2]. The vein was ligated. The patient made an uneventful recovery and was discharged on oral antibiotics with follow-up for the foot wound.

## Discussion

Peripheral IV cannulation is a common procedure. Approximately 60% of all patients treated by a healthcare system will have an IV cannula inserted for varying purposes [1]. Among the complications of peripheral venous cannulation, intravascular fracture of the device is an infrequent complication. Its exact incidence is unknown and the literature is limited to case reports.

The broken off piece of cannula within a vein will act as an intravascular foreign body which can embolize. Embolism of broken cannula segments may result in sepsis, endocarditis, cardiac perforations and arrhythmias [2]. Repeated attempts at insertion, poor quality materials used for device manufacturing and keeping the cannula in situ for prolonged periods have been cited as reasons for breakage of these devices [3]. Reinsertion of the introducer needle into the cannula during repeated attempts at cannulation can damage the plastic tip of the device. This can lead to complete fracture or partial damage to the tip. A partially damaged cannula can completely transect at the time of its removal [2]. Leaving an IV cannula in situ for more than 48 hours should be avoided [4].

Fracture of a cannula may be evident immediately upon its removal or it may present late with local symptoms such as pain and swelling of the affected extremity or symptoms attributable to distal embolization [3]. Once a cannula fracture is diagnosed the major dilemma is to localize the missing piece. If it is palpable as in our patient exploration without imaging can be attempted. If it is not, blind exploration is likely to be unsuccessful. As almost all of these devices are made of plastic material they are radiolucent, so plain X ray is not helpful. Ultrasound and CT have been used



Fig.1: Fractured cannula against a fresh device.



Fig.2: Retrieved tip of the cannula.

successfully in the literature for locating these intravascular foreign bodies [3,5]. Once localized by imaging, surgical removal is advisable in order to avoid serious complications.

Proper training and technique can prevent potential complications associated with peripheral cannulation. Reintroduction of the needle into a partially inserted cannula should be avoided. Once inserted, the cannula insertion site should be regularly monitored. At removal the cannula should be checked for its completeness. If a piece of the cannula is missing some recommend an immediate proximal tourniquet to prevent migration of the missing segment until it is localized and removed [1,5].

## Conclusions

Peripheral IV cannulation is a common procedure invaluable in day to day clinical practice, but healthcare workers should be aware of its associated complications. To avoid these, proper training and correct technique in insertion, adequate surveillance during device maintenance and removal are mandatory.

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