

## ***Fractured Femoral Catheter Tip in Repeated Femoral Vein Cannulation for Haemodialysis Vascular Access***

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### **INTRODUCTION**

Percutaneous insertion of haemodialysis HD catheters can be readily performed by the bedside in any of the accessible central veins, for immediate use in patients requiring dialysis. The femoral, internal jugular or subclavian veins are the favoured sites for catheter insertion.

Although the jugular and subclavian access routes are more commonly used than the femoral vein for haemodialysis because of higher incidence of thrombosis and infections seen in femoral vein cannulations, the femoral route is still considered less risky. First, there is no risk of pneumothorax and secondly, the site is directly compressible should bleeding occur. Therefore, the frequency of life-threatening complications is lower for femoral cannulation than for the other sites.

However, life-threatening complications do occur in femoral cannulations. Here we describe a case of fractured catheter tip with development of extensive deep vein thrombosis that was successfully managed in our hospital. The problems encountered in the management of the patient are highlighted.

**Keywords:** *Fractured femoral catheter, central venous catheter complication, haemodialysis*

### **CASE REPORT**

S.O a 26yr old female student was referred to our nephrology unit on the 4<sup>th</sup> of June 2009 in view of recurrent generalized tonic – clonic seizures and reduction in urine output of 4 days duration. Her illness started about one year prior to presentation when she was diagnosed as having HIV infection and was placed on HAART therapy. Her compliance with medication was fairly regular.

Six months prior to presentation, recurrent fever and progressive leg swelling was noticed. Screening for opportunistic infections was negative. However, renal function impairment was evident, with progressive worsening over time. Patient developed tonic-clonic convulsions 4 days prior to presentation. Each episode lasting about 4-6 minutes with full recovery of consciousness in the inter-ictal period. She had six convulsions prior to her referral. Serum urea done two days prior to referral was 184mg/dl.

Physical examination at presentation showed a young woman who was conscious and alert. She was pale, anicteric, afebrile to touch and not dehydrated. She had mild pitting pedal oedema. Her vital signs at presentation were as follows: Temperature 36.1°C, Pulse 88/min and a respiratory rate of 28cycles/min. Systemic examination was unremarkable except for a blood pressure of 170/100mmHg.

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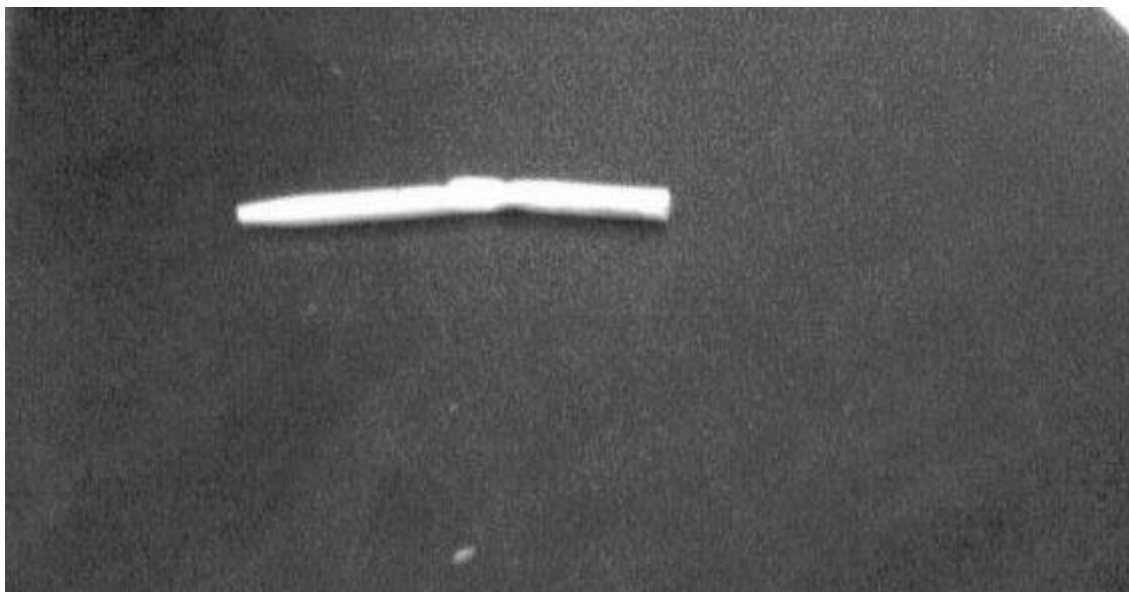


**Fig. 1:** Fractured catheter tip in the right femoral vein arrowed

Laboratory results are as follows: - Urea 386mg/dl, creatinine 17.0mg/dl, Na<sup>+</sup> 128mmol/L, K<sup>+</sup> 3.6mmol/L, HCO<sub>3</sub><sup>-</sup> 21mmol/L, Cl<sup>-</sup> 101mmol/L, Ca<sup>2+</sup> 10.4mg/dl, PO<sub>4</sub><sup>2+</sup> 4.0mg/dl, Cholesterol 232mg/dl, Triglyceride 125mg/dl, Total Protein 5.2mg/dl, Albumin 3.0mg/dl, PCV 18%, WBC 20,000/mm<sup>3</sup>.

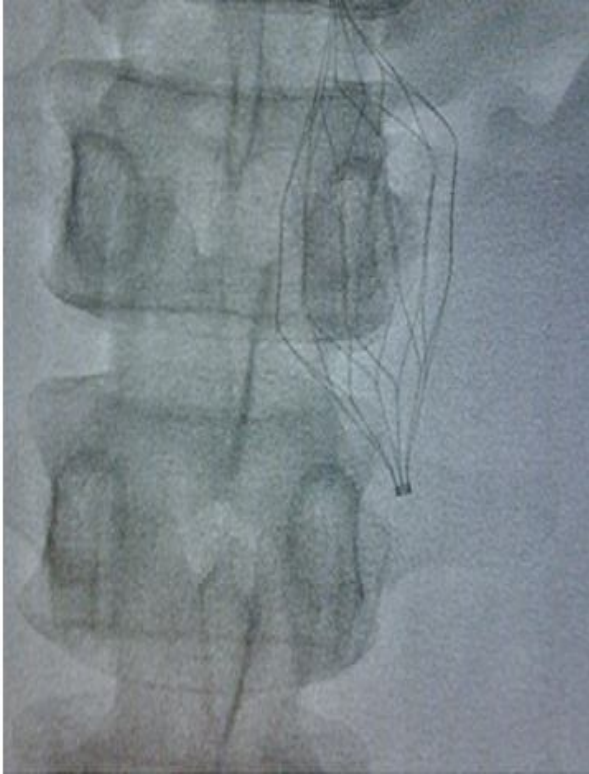
HIV Positive, HCV negative, HBsAg Negative. Renal scan revealed increased renal echogenicity bilaterally with normal renal sizes, situations where the required skills are unavailable[2].

The femoral access is still the most commonly used access route in Nigeria due to the lack of required clinical experience on internal jugular vein



**Fig. 2:** Retrieved fractured catheter tip

cannulation in many centres, and the relatively high cost of catheter insertion in some centres which places an additional financial burden to the patient that is hardly coping with the cost of dialysis. For



**Fig. 3:** Vascular filter in the inferior vena cava

instance, the average cost of internal jugular catheter insertion in Lagos is about N40,000.00.

Catheter fracture is one of the rare complications of venous access usage for various types of diagnostic and therapeutic management of patients. Reported cases of catheter fractures have appeared in the literature since the mid 1950s[3]. More recent publications have reported the complication to occur in 0.5% to 3% of patients with indwelling central venous catheters[4,5]. These reported cases were mainly in subclavian and internal jugular catheterizations[6,7]. The lack of report for femoral vein route is possibly related to the fact that the route is less frequently used in most developed countries for procedures such as haemodialysis. Suggested reasons for fracture occurrence include mechanical damage during insertion, manufacture defects and the 'pinch off' syndrome recognized in subclavian catheterization[6,7,8,9]. Additional reasons that may be pertinent to local practice in Nigeria is

repeated use of patient's catheter many times to reduce cost to the patient and also shear and tear from friction of cannulating over a fibrosed cannulation site.

In our patient, complete catheter fracture was recognized soon after occurrence as this was noticed during catheter removal post dialysis. This is usually not the case in catheter fractures occurring at other central venous sites. Catheter fracture at these sites was usually a late complication and recognition in these circumstances was evident after catheter tip embolization to either the lungs causing pulmonary embolism[10], or the heart causing cardiac perforation, arrhythmias or atrial thrombus formation[11,12]. Partial catheter fractures have also been reported with clinical presentations attributable to extravasation of fluid and blood into the subcutaneous tissue[13,14]. Contrast radiography of the fractured catheter may reveal extravasation of the contrast medium in these instances[13].

A delay of about one month occurred between the occurrence of catheter fracture and removal in our patient. This was due to non-availability of required devices for catheter removal in the country and the need to place order for their importation abroad. During this period, the risk of catheter and/or clot embolization and also haemorrhage from anticoagulation in a patient on regular dialysis was very high. Regional anticoagulation during dialysis was considered but our experience with this modality of anticoagulation during dialysis was limited. Hence, we opted to reduce her heparin dose to 75% of her usual heparin requirement. We recorded no incidence of extracorporeal clotting in her dialysis sessions during the period. She also had no clinically significant haemorrhage at any point of her care.

Several endovascular interventional techniques for intravascular foreign body extraction are available. The array of available devices include forceps, baskets, loop snares, moulded catheters, magnets, directable guide-wires and balloons [15,16,17,18].

These devices have been used successfully in many centres. Loop snares however appear to be the most favoured device. Advantages of these devices include minimal tissue invasion, absence of surgical scars and possible shortened hospital stay post removal. None of these devices are currently available in the country. Thus, surgical exploration and removal was performed on the patient by our cardiothoracic unit. This approach may allow better

clot removal from the thrombosed vein in addition to the fractured catheter tip removal.

Our case demonstrate some of the challenges being faced by nephrologists practicing in a developing country with inadequate facilities. More importantly, we would like to pass across the lesson we learnt that successful management through collaborative efforts, perseverance and multidisciplinary approach to patients care is achievable in face of these challenges.

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