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# Unusual Incident during Femoral Hemodialysis Catheter Insertion: A Case Report

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**Abstract** | **Case Report**

Guidewire accidental migration during femoral hemodialysis catheter placement is a rare but serious complication that can lead to critical conditions such as vessel perforation or cardiac arrythmia. We report a case of a 67-year-old woman with oliguric acute renal failure associated de acute pulmonary edema necessitating an urgent hemodialysis session. Guidewire accidentally migrated during femoral catheter insertion using the Seldinger technique. Radiographies revealed unintended migration of the guidewire. Immediate recognition allowed for prompt removal of the guidewire under real-time imaging via endovascular intervention, ensuring innocuous withdrawal of the foreign body and preventing further complications. This case highlights the importance of imaging guidance in vascular access procedures and emphasizes the need for standardized protocols alongside with sufficient anatomical apprehension and operator training to minimize such risks and improve patient safety.

**Keywords:** Central Veinous Catheter, Guidewire, Migration, Hemodialysis, Incident.



## INTRODUCTION

Central venous catheterization via the femoral vein is the most performed procedure in patients requiring urgent hemodialysis [1]. Despite its relatively easy access, femoral catheter placement is associated with various complications, including vascular injury, thrombosis, infection, and catheter malposition. Migration of the guiding catheter during placement is a rare but critical issue that can result in procedural failure and serious harm to the patient. This report describes a case of a catheter's guidewire migration during femoral hemodialysis catheter insertion and discusses its implications, diagnosis, and management.

## CASE PRESENTATION

We report the case of a 67-year-old woman with a history of diabetes mellitus, ischemic cardiopathy and chronic kidney disease. She was admitted to the emergency department due to severe dyspnea and oliguria. Biological and radiological explorations demonstrated hyperkalemia (6.9 mEq/L), severe renal impairment (urea: 3.5 g/L, creatinine: 232 mg/L) associated with acute pulmonary edema, slightly ameliorated after diuretics administration. Given the urgency of the condition, hemodialysis was indicated, necessitating the placement of a central venous catheter. The right femoral vein was chosen as the access site as usual, using a 20 cm length, 12G double-lumen catheter. During the placement of the femoral hemodialysis catheter using the Seldinger technique, an unintended migration of the guidewire was observed. The patient remained asymptomatic, with no signs of vascular injury or hemodynamic instability.

Radiographic imaging confirmed the guidewire's migration along the natural venous anatomical pathway, without deviation or entrapment **(Figure 1)**.

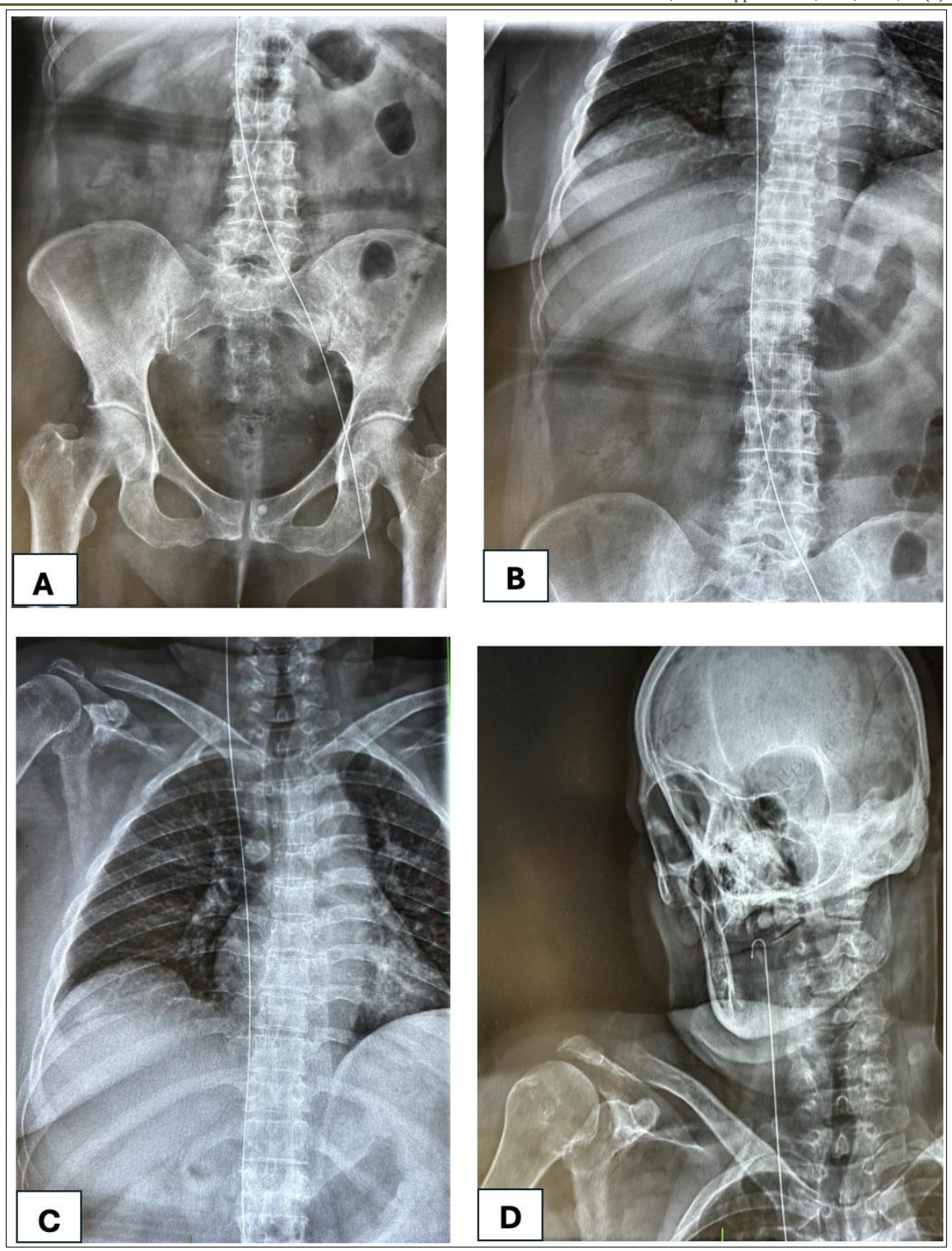


**Figure 1: X-ray images: right femoral catheter's guidewire migration along the natural venous anatomical pathway (femoral vein, inferior vena cava, superior vena cava, internal jugular vein) without deviation or entrapment**

Immediate recognition of the incident allowed for prompt and controlled removal under real-time radiological guidance via endovascular intervention by a vascular surgeon. A balloon catheter (Fogarty catheter) was inserted following a right internal jugular venotomy. The sheath was retrieved by inflating the balloon after the Fogarty catheter had been introduced. The guidewire was successfully withdrawn without resistance, ensuring an uneventful procedure and preventing further complications. Following the incident, a new femoral catheter was inserted correctly, and hemodialysis was initiated without delay.

## DISCUSSION

In nephrological emergencies requiring hemodialysis, central venous catheterization—particularly via the femoral vein—is often preferred due to its accessibility and ability to provide adequate perfusion flow. However, this technique carries a significant risk of thrombotic and infectious complications. A comprehensive understanding of the potential mechanical, hemorrhagic, thrombotic, and infectious risks associated with this procedure is crucial for optimizing patient outcomes and minimizing adverse events [2, 3].

Mechanical complications at the femoral access site are infrequent, with hematoma formation and arterial puncture being the most observed issues. However, rare and exceptional complications related to central venous catheterization have been documented in the literature. Gil *et al*., described a late vascular perforation occurring within the inferior vena cava [4]. El Bouazzaoui *et al*., reported a case of iatrogenic ileal perforation [5]. Jabrane *et al*., described a case blockage of the femoral catheter guide and its migration to the psoas muscle [6]. Lastly and as in our case, Berrada *et al*., reported the unusual case of metallic stent migration into the femoral vein lumen [7]. Femoral venous catheterization is performed via percutaneous puncture, relying on anatomical landmarks, skin and bone reference points, and palpation of the adjacent femoral artery to guide the procedure. The femoral vein is typically accessed within Scarpa's triangle, inferior to the inguinal ligament, which extends between the anterior superior iliac spine and the pubic tubercle [2].

The operator's experience significantly influences the risk of mechanical complications. Studies show an overall failure rate of 10.1% for experienced clinicians compared to 19.4% for those with less experience, with complication rates of 5.4% and 11%, respectively [8]. In the same time, it has been proven that the incidence of mechanical complications increased with multiple puncture attempts, reaching 54% when more than two attempts were required [9]. Therefore, many recommendations were elaborated in order to make the procedure safer and innocuous for the patient. In 2022, The National Institute for Health and Care Excellence has led to the issuance of recommendations emphasizing the critical need for ultrasound guidance in all central venous catheter placements [10].

Ultrasound guidance minimizes complications and procedural complications associated with central venous catheterization. This technique involves using an ultrasound probe to identify the target vein and assess its depth beneath the skin. The needle is then inserted under real-time ultrasound visualization to ensure accurate vascular access. However, as with any imaging modality, proper training is essential. In healthcare settings where ultrasound equipment is available and clinicians are adequately trained, the systematic use of ultrasound guidance should be prioritized, particularly for femoral and internal jugular vein catheterization [11, 12]. In our case, no ultrasound guidance and multiple insertion attempts likely played a significant role in elevating the risk of this early mechanical complications.

## CONCLUSION

This case illustrates the issue of guidewire migration as a rare and Unusual Incident during Femoral Hemodialysis Catheter Insertion. Prompt recognition and real-time imaging guidance are essential in addressing this complication effectively. Standardized protocols, operator training, and the use of imaging modalities can enhance the safety and success of vascular access procedures.

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