

## CASE REPORT

# An Unusual Case of a Displaced Hemodialysis Catheter Guidewire Spontaneously Coming Out of Skull

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### ABSTRACT

Hemodialysis catheter insertion is a common practice for the patients with renal failure. There are several complications associated with hemodialysis catheter insertion such as infection, catheter thrombosis, malposition, or vein stenosis; however, loss of guidewire during catheter insertion with its migration is a rare complication. We report the case of a 75-year-old male with forgotten displaced guidewire which came out spontaneously from the skull in the occipital region, three years after the hemodialysis. To the best of our knowledge, this is the only case that has been reported in literature till date. We also discuss the possible causes of a retained guidewire and measure to prevent it.

**Keywords:** Case report, Catheter, Complication, Foreign object, Hemodialysis, Retained guidewire, Surgery.

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### BACKGROUND

In certain patients with renal failure, vascular access is gained for hemodialysis by catheter insertion, the procedure for which involves the use of a guidewire. In few instances, the guidewire is retained within the catheter which may later migrate into the vascular system or the heart. We report a rare case of an entire retained and displaced guidewire which entered the cranium via the jugular foramen, traversed through the cerebral parenchyma, penetrated the skull by causing its erosions and protruded extracranially.

### CASE DESCRIPTION

A 75-year-old male noticed something coming out of his skull while he was combing his hair which he tried to pull out a bit (Fig. 1). The patient had no complaints of pain at that site in the scalp, headache, fever, nausea, convulsions, altered sensorium, loss of consciousness, oliguria, or hematuria. He is a known case of hypertension and diabetes mellitus with a history of alcohol addiction since 36 years. The patient had a past history of hemodialysis in view of leptospirosis-induced acute kidney injury with uremic encephalopathy three years back.

A CT scan of the head was performed in view of a foreign body coming out of skull. A hyperdense linear foreign body was seen extending from the upper part of the right internal jugular vein, coursing cranially, piercing the right tentorial leaflet, traversing through the right posterior parieto-occipital parenchyma, and exiting extracranially through the right parietal bone. Similar smaller variable-sized metallic structures continued with the aforementioned foreign body, in the right half of posterior fossa and right occipital region were also seen. A small peripherally enhancing hypodense area was seen along the catheter in the right posterior parieto-occipital region, representing a focal-forming abscess. Partial thrombosis of the internal jugular vein was seen (Fig. 2). The patient was taken up for emergency surgery for the removal of the foreign body. In the left lateral position, a skin incision was taken at the exit point and flap was raised. There was a small 0.2 × 0.1 mm-sized opening in the right posterior parietal bone. The wire was gently pulled out as much as possible. Bone wax was applied over a small defect in the bone. Hemostasis was done. The incision was closed over a suction

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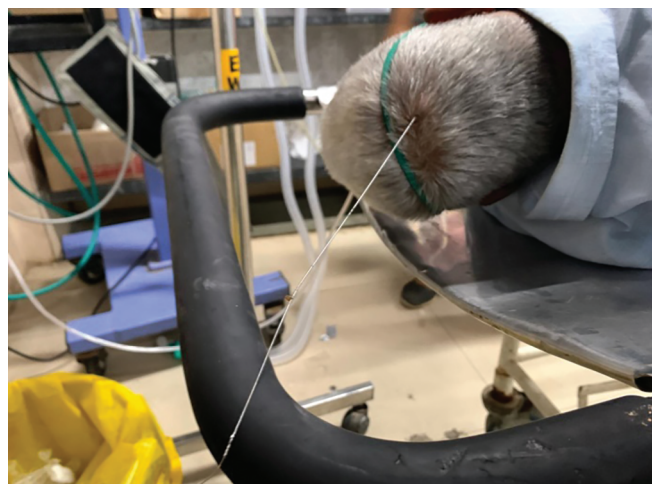
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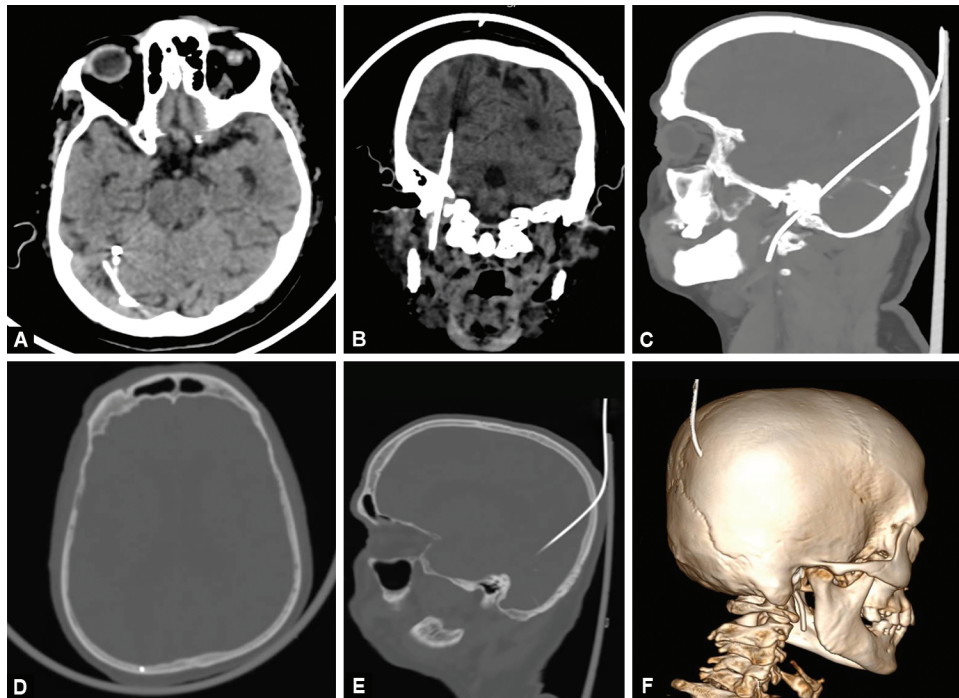
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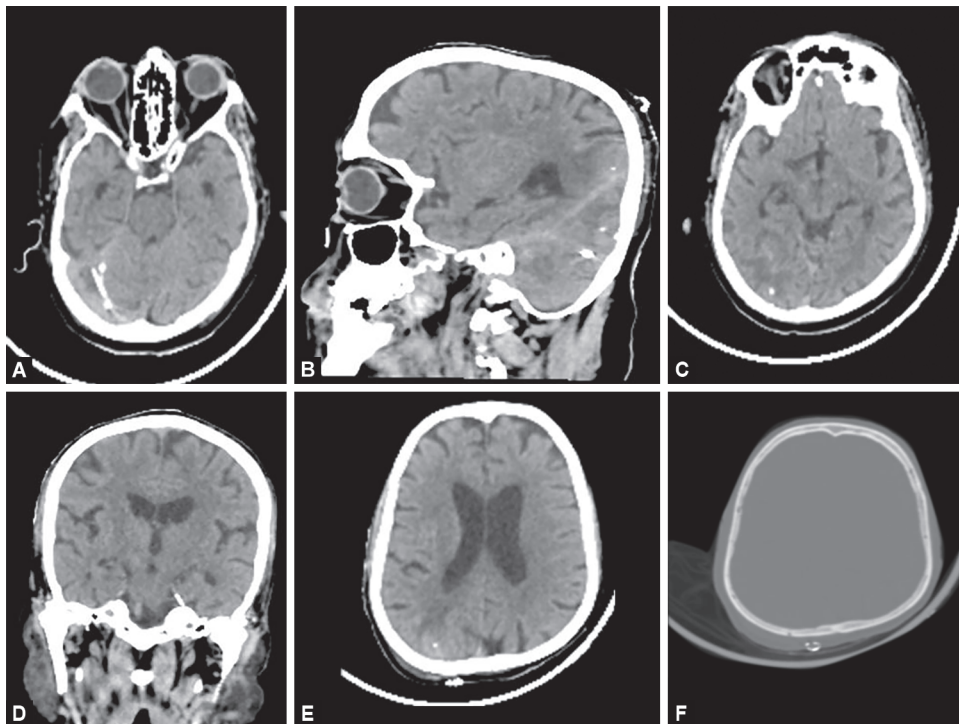
drain. The procedure was uneventful and the patient was apparently all right after regaining consciousness. A postoperative CT head was performed which revealed few (at least four) fragments of retained



**Fig. 1:** The foreign body (guidewire) seen protruding out of the skull of patient



**Figs 2A to F:** (A) Axial CT image shows the foreign body (guidewire) in right cerebellar hemisphere; (B–E) Show the foreign body (guidewire) extending from the upper part of right internal jugular vein coursing cranially traversing through the right posterior parieto-occipital parenchyma and exiting extracranially through the right parietal bone; (F) Volume-rendered image showing the foreign body (guidewire) exiting extracranially through the right parietal bone



**Figs 3A to F:** (A, B and E) Reveal fragments of retained catheter; (C) Sagittal image shows the tract formed by the guidewire; (D) Coronal image reveals fragments of retained catheter in the internal jugular vein; (F) Axial image reveals the tiny bone defect and postoperative staples

catheter seen in the right cerebellar hemisphere, beneath the right tentorial leaflet extra-axially, along the right transverse sinus, and the right occipital extra-axial region (Fig. 3). There was mild surrounding vasogenic edema, likely postoperative.

## DISCUSSION

Hemodialysis catheter insertion is performed for the patients with renal failure who require immediate hemodialysis and patients with failed arteriovenous fistula or at least 6 weeks after formation

of a new arteriovenous fistula. Hemodialysis catheter insertion involves the use of guidewires. An internal jugular vein is the commonest site for hemodialysis catheter insertion. Guidewire-related complications are infection, perforation of vessels, kinking of wire, entanglement of previously placed intravascular devices, cardiac dysrhythmias, breakage of guidewire, and complete loss of guidewire within the vascular system.<sup>1</sup> Retention of guidewire is not very common. Guidewire loss can occur from any of the vascular sites of venous catheterization. Patients with a complete loss of guidewire may be asymptomatic. They may be incidentally detected on the radiological examination or on the development of symptoms.<sup>2</sup> However, patients with a broken guidewire may be symptomatic due to vascular damage, thrombosis, and arrhythmias.<sup>3</sup> Guidewires that are retained may be found near the site of catheter insertion, right common iliac vein, superior or inferior vena cava, right atrium, or right ventricle.<sup>3</sup> Most of these cases are detected early, within 2 to 3 months after the procedure. However, not many cases of asymptomatic migrated retained guidewire have been documented in the literature. A case of a lost guidewire extending from the inferior vena cava to the back of the neck after central venous catheterization has been reported which remained asymptomatic and was detected after 6 weeks.<sup>4</sup> However, a retained displaced guidewire migrating into the brain parenchyma and coming out spontaneously from the skull is unheard of and has never been reported in the literature.

Vascular punctures for catheter insertion are commonly performed by Seldinger technique which involves the use of a guidewire. Blood is aspirated from the catheter at the end of the procedure to establish patency and appropriate placement of the catheter. As the guidewire does not completely occlude the lumen, the blood gets aspirated. There is a mild resistance to blood aspiration and poor backflow.

The retained guidewire is caused due to human mistakes which can be eliminated if appropriate precautions are taken. It is important to recognize the causes of retained guidewires and devise methods to prevent it.<sup>3</sup> The factors such as lack of experience, inadequate supervision by an expert physician, physician distraction, busy and tired medical staff, and hastiness are associated with this type of human error.<sup>5-8</sup> Training of the doctors about the procedure and following the appropriate guidelines are of utmost importance. The physicians can follow certain safety procedures such as being consciously aware of the guidewire position and holding on to the catheter tip. Force should not be applied during the withdrawal of the guidewire which may result in its breaking with its embolization or vascular injury. There should be a checklist of the steps involved for catheter insertion. Recognizing the signs of retained guidewire such as resistance to blood aspiration as well as injection via the distal lumen and poor backflow will help in reminding the physician about the retained guidewire. The use of not only ultrasound guidance for accurate venous catheterization but also a postprocedure ultrasound will help in recognizing the retained catheter which will be seen as an intravascular linear hyperechoic structure. A postprocedure radiograph will also help in diagnosing

a retained catheter. It is also important to meticulously document the procedure steps which will aid in reminding the physician about the non-removal of the guidewire. Immediate documentation of a misplaced guidewire is also of utmost importance to aid in prompt treatment and to prevent complications. The patient may be referred to an interventional radiologist who can retrieve the guidewire. Rarely, surgery may be required for its retrieval. In cases like ours where the guidewire is impacted into the organs, surgery is required for its retrieval.

## CONCLUSION

The retained foreign body postprocedure or postsurgery occurs due to human errors. Imaging, especially cross-sectional imaging, plays a pivotal role in cases suspected of internal foreign body, be it related to trauma or iatrogenic. It is of utmost importance to interpret the location of the foreign body, so that the patient receives prompt management, like in our case.

## CLINICAL SIGNIFICANCE

Retained guidewire is a complication which occurs due to human errors and can be prevented by adequate knowledge of the technique, physician attention towards the procedure, and recognizing the signs of a retained guidewire. Reporting the cases of retained guidewires is also of utmost importance so that the patient receives prompt management.

## REFERENCES

1. Khasawneh FA, Smalligan RD. Guidewire-related complications during central venous catheter placement: a case report and review of the literature. *Case Rep Crit Care* 2011;2011:287261. DOI: 10.1155/2011/287261.
2. Rossi P, Pavone P. Angiographic management of vascular obstruction in interventional radiology. In: Dondelinger RF, Kurdziel JC. *Interventional radiology*. 1st ed., New York: Thieme Medical Publishers, Incorporated; 1990. p. 720.
3. Auweiler M, Kampe S, Zahringer M, Buzello S, von Spiegel T, Buzello W, et al. The human error: delayed diagnosis of intravascular loss of guidewire for central venous catheterization. *J Clin Anesth* 2005;17:562–564. DOI: 10.1016/j.jclinane.2004.11.007.
4. Department of Cardiology, Shaoxing People's Hospital, The First Affiliated Hospital of Shaoxing University, Shaoxing, Zhejiang 312000, China. ghangyuan@hotmail.com.
5. Schummer W, Schummer C, Gaser E, Bartunek R. Loss of the guide wire: Mishap or blunder? *Br J Anaesth* 2002;88:144–146. DOI: 10.1093/bja/88.1.144.
6. Bream PR, Heffernan DS, Shukrallah B. Retrieval of a wire lost during central venous catheter replacement. *Endovascular Today* 2008. 38–41.
7. Sridhar J. A forgotten guidewire. *Ann Card Anaesth* 2005;8(1):74.
8. Gunduz Y, Vatan MB, Osken A, Cakar MA. A delayed diagnosis of a retained guidewire during central venous catheterisation: a case report and review of the literature. *BMJ Case Rep* 2012;2012:bcr2012007064. Published 2012 Nov 19 10.1136/bcr-2012-007064.