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Case Report

Migration of fractured guidewire and its retrieval by endovascular snare catheter: A case report [☆]

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ABSTRACT

Central venous catheterization is commonly used in patients undergoing cardiovascular surgery and it is a relatively safe procedure. A 62-year-old woman who underwent emergency mitral valve replacement for infective endocarditis received a central venous catheter after induction of anesthesia. Postoperative chest radiography revealed a wire-like foreign body near the puncture site of the internal jugular vein, which was later retrieved successfully using a snare catheter under fluoroscopy. This report highlights the importance of careful observation of the withdrawn guidewire and dilator and the role of perivascular ultrasound in all cases requiring this procedure.

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Introduction

Central venous and pulmonary artery catheterization are very common in cardiovascular surgery to monitor circulatory dynamics and administer vasoactive drugs. Although complications of central venous catheters are relatively common, it is very rare for a guidewire to be fractured and retained in the body.[1] Herein, I report a case of a fractured guidewire lost during central venous and pulmonary artery catheterization and its retrieval through an endovascular snare catheter. Written patient consent was obtained and this manuscript adheres to the CARE reporting guideline.

Case report

A 62-year-old woman (weight 42 kg, height 144 cm) presented to the outpatient department for anorexia and general malaise following dental treatment without extractions a couple of months earlier and had not received any antimicrobial medication. Blood tests showed white blood cell count, 17900 μL^{-1} (3300~8600 μL^{-1}); hemoglobin, 7.8 g·dL⁻¹(11.6~14.8 g·dL⁻¹); platelets, 99000 μL^{-1} (158000~348000 μL^{-1}); CRP, 6.65 mg·dL⁻¹(≤ 0.14 mg·dL⁻¹); D-Dimer, 8.7 $\mu\text{g}\cdot\text{mL}^{-1}$ (≤ 1.0 $\mu\text{g}\cdot\text{mL}^{-1}$). Full-body computed tomography (CT) revealed cerebral and splenic infarction. Echocardiography showed severe mitral re-

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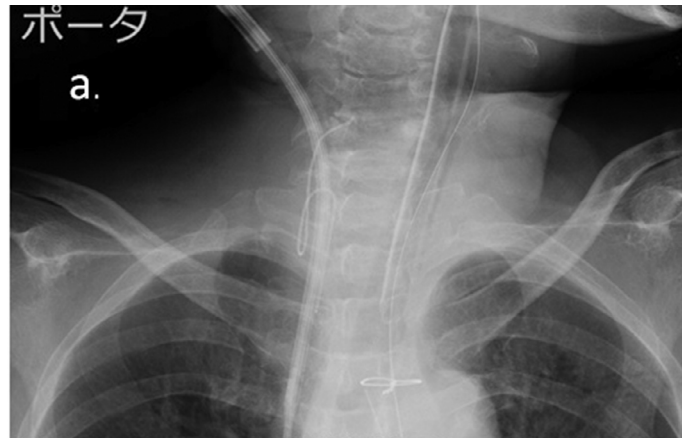


Fig. 1A – Chest radiograph taken after surgery showed a fractured guidewire near the right internal jugular vein.

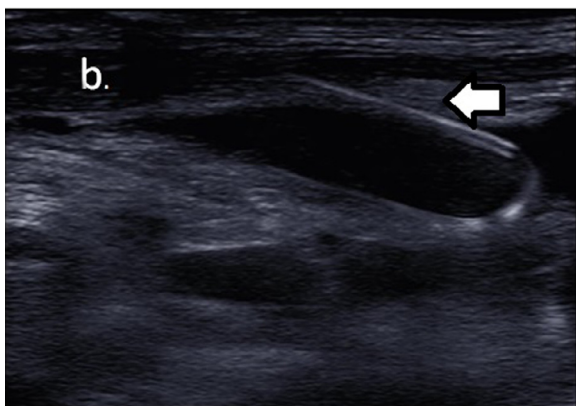


Fig. 1B – Ultrasonography of the right internal jugular vein. White arrow indicate that the foreign body is both inside and outside the blood vessel.



Fig. 1C – 3D CT Reconstruction. The lost guidewire folded from caudal to cephalad side on the extravascular side, and then from cephalad to caudal intravascularly in the internal jugular vein.

gurgitation with vegetations on the mitral valve consistent with a diagnosis of infective endocarditis. Owing to the severity of the condition, an emergency mitral valve replacement was warranted.

After induction of general anesthesia and tracheal intubation, a central venous catheter was inserted through the right internal jugular vein under real-time ultrasound guidance.

After confirming proper placement, we then attempted to insert a catheter (MAC™ Two-lumen central venous access kit with integral hemostasis valve for use with 7.5–8-Fr. Catheters, Teleflex Medical Japan, Tokyo). However, due to the resistance, the catheter, dilator, and guidewire were removed. At that point, we did not realize that the guidewire had fractured. The same procedure was performed again using a new same catheter kit at the same site and the catheter was successfully inserted. The pulmonary artery catheter was then placed and the surgery was successfully performed.

A chest radiograph taken post-surgery showed the remnants of a guidewire near the right internal jugular vein (as demonstrated in Fig. 1A). Ultrasonography (as demonstrated in Fig. 1B) and CT (as demonstrated in Fig. 1C) confirmed the presence of a large part of the guidewire inside the vein. Through a multidisciplinary and interdisciplinary management team, the guidewire was retrieved using a snare catheter the day after the surgery under fluoroscopy (as demonstrated in Fig. 2).

A few hours after retrieve of migrated catheter, she was extubated and she made a full recovery, just like a usual mitral valve replacement patient.

Discussion

Although many complications of central venous catheterization have been published, intravascular migration and guidewire loss are very rare. Unlike the studies of Najari et al.[1] and Khatami et al.[2] regarding guidewire migration, Monaka et al.,[3] reported the migration of a fractured guidewire. These studies strongly indicate the possibility of flaws in the design or manufacturing process of central venous catheters.

The guidewire we used had an inner core with a coiled elastic spiral cover wire around it. The manufacturer recommends several precautions to use their product and to protect the

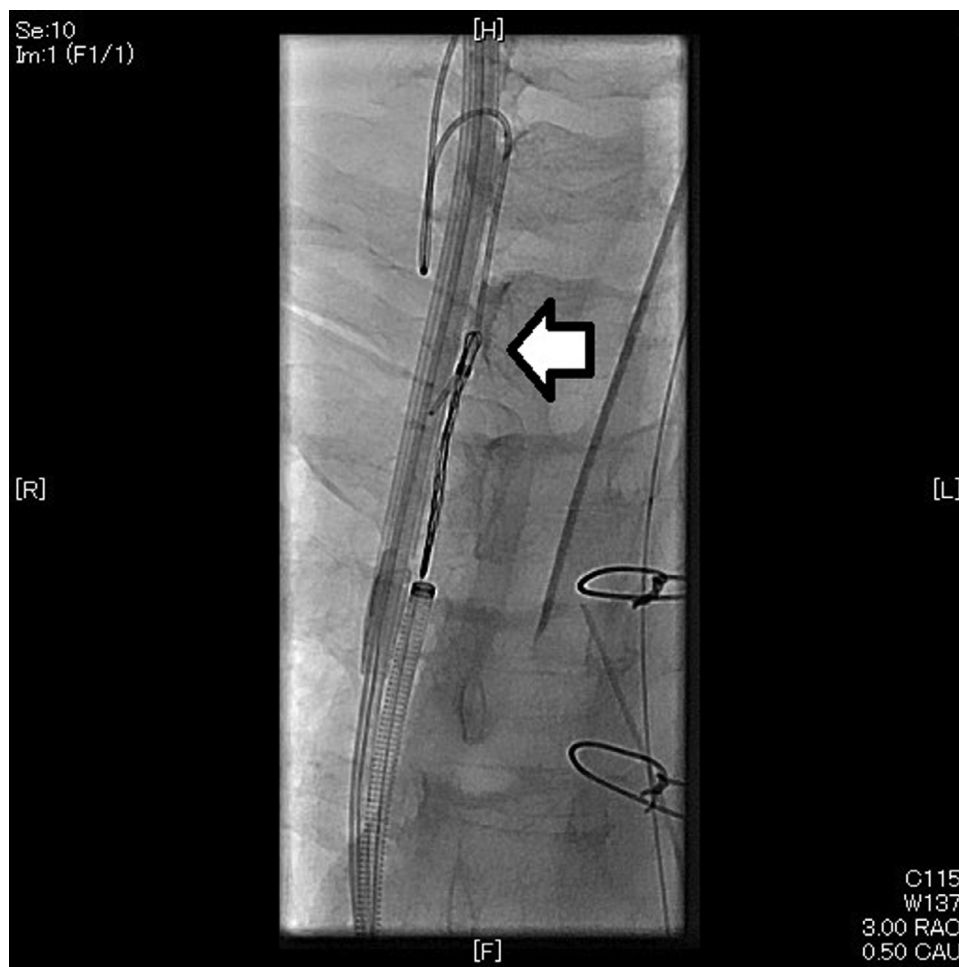


Fig. 2 – An image of a guidewire retrieved by the snare catheter. White arrow indicate Snare catheter is grasping foreign body, guidewire.

guidewire.[4] First, the cutting edge of the scalpel must be positioned away from the guidewire. In addition, the guidewire should not be withdrawn against the needle bevel. It is important to point out that although the device was withdrawn, only the catheter and the dilator were pulled out. Despite following these strict recommendations, the guidewire was still fractured.

Vascular ultrasonography and CT showed that the lost guidewire folded (1) from caudal to cephalad extravascularly, and then (2) from cephalad to caudal intravascularly in the internal jugular vein. This indicates that during the first insertion attempt, the catheter and the dilator reached only subcutaneously, thereby, kinking the guidewire. Usually, a guidewire cannot be easily cut even in the case of a target fracture point, such as a kink.[3] In Japan, the approved pull strength of the 0.89 mm diameter guidewire used in this case is at least 10 N. However, Schwarz et al.[5] reported a case in which the core portion protruded, and the surrounding spiral portion separated upon withdrawal of the guidewire with moderate resistance.

Because the patient had a central venous catheter from the same site during cardiovascular surgery, the migrated

guidewire was removed from the inguinal vein using a snare catheter under angiography after a thorough discussion of the multidisciplinary team. It is, hence, crucial to carefully inspect the guidewire should resistance upon withdrawal is felt.

Although central venous catheterization is a simple and relatively safe procedure, especially with real-time ultrasound-guided methods, serious complications such as guidewire migration can occur.

This report highlights the importance of careful inspection of the withdrawn guidewire and dilator, and the utility of perivascular ultrasonography after catheter placement to detect the abnormal catheter position and residual foreign body if any. Using snare catheter under fluoroscopic guidance may be effective for removal of this kind of foreign bodies.

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Patient Consent Statement

Written consent was obtained from the patient for publication of the case information.

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