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Case Report

A rare case report: Guiding wire fracture during CT-guided abscess drainage session and subsequent retrieval under fluoroscopy by the endoscopic grasp ☆☆☆

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ABSTRACT

Guiding wire fractures sometimes occur during cardiological interventional procedures or orthopedic operations, but rarely reported guiding wire fractures during interventional radiological sessions. We present a case of right breast cancer with right axillary nodal metastasis and received surgical resection and neoadjuvant chemotherapy and target therapy. An intramuscular abscess at the right gluteal muscle groups was noted in the contrast-enhanced computer tomography (CT) during her follow up clinic visit. We decided to drain the abscess with CT guiding. A Fr. 10 pig-tail catheter was inserted into the abscess cavity successfully, however, the postprocedure CT found a fragment of the guiding wire retained in the abscess cavity. We exchanged the pig-tail catheter to remove the retained guiding wire and the fragment was successfully retrieved using the endoscopic grasp under fluoroscopy. The fracture event of the guiding wire is rare but may cause severe complications. We identify several considerations that should be aware during the guiding wire usage procedure, and discuss the strategies to manage the condition. The treatment depends on the location of the retained guiding wires, the clinical situation of the patient, and the related complications.

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Introduction

Guiding wire fractures sometimes occur during cardiologi- cal interventional procedures or orthopedic operations [1-3]. However, no relevant publications have reported guiding wire fractures during interventional radiological sessions, such as abscess drainage in which the fractured remains may become an infection source. We present a case of this event and dis- cuss the strategies to manage the condition.

Case presentation

A 48-year-old female was diagnosed with right breast can- cer with right axillary nodal metastasis in 2022. She received sessions of neoadjuvant chemotherapy and target therapy with herceptin, perjeta, docetaxel, and cyclophosphamide regimens in the following 3 months. After surgical resection, she continued the adjuvant chemotherapy with epirubicin, dox- orubicin, and cyclophosphamide regimen.

During her follow-up clinic visit after completing the treat- ment, leukocytopenia emerged (Table 1). The patient suffered from fever and right hip pain for 4 days. The physical exami- nation showed right hip tenderness and local heat. After admission, the laboratory data revealed leukocytosis with left shift and elevated C-reactive protein (Table 1). The contrast- enhanced computed tomography (CT) showed an intramus- cular abscess at the right gluteal muscle groups presenting a horseshoe shape on the coronal image, with a maximal diam- eter of 7-8 cm (Fig. 1A). We decided to drain the abscess with CT guiding. After puncturing the abscess cavity with the 18 Gauge Chiba needle (18 Gauge x 15 cm, Argon Medical devices), the abscess cavity was cannulated with a guiding wire (80 cm, stiff, Terumo). Some resistance was encountered when with- drawing the Chiba needle. Finally, we exchanged the Chiba needle with a 10 Fr. pig-tail catheter and inserted into the abscess cavity along the guiding wire without the dilator us-

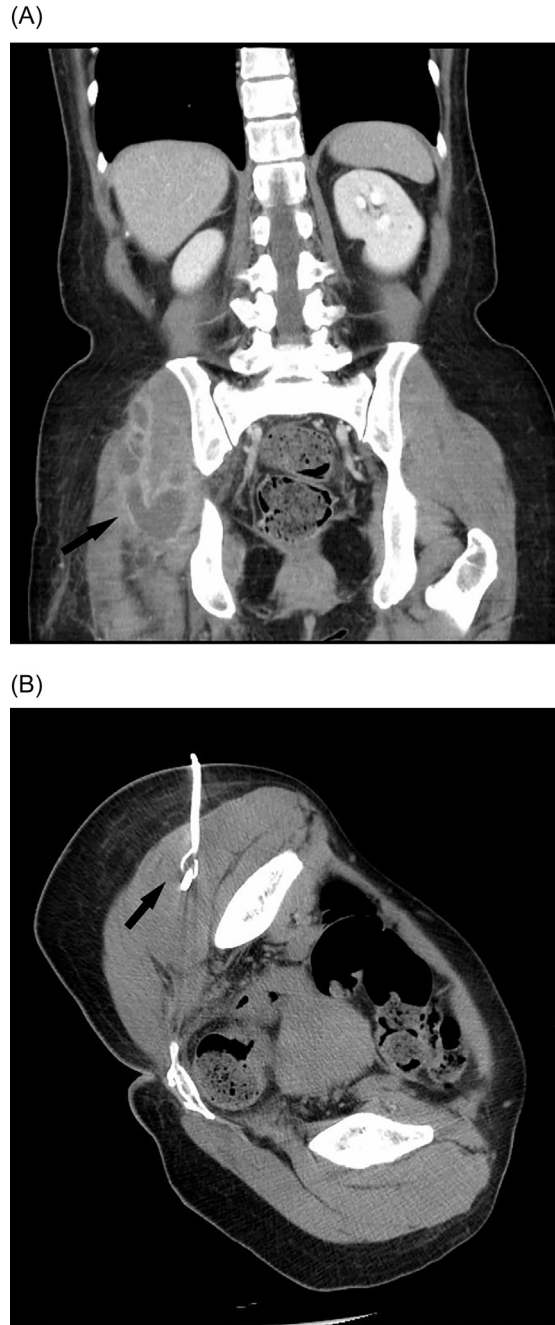


Fig. 1(A) – Horseshoe-shaped abscess (arrow) at the right gluteal muscle groups. (B) Fractured guiding-wire fragment (arrow) entangled with the pig-tail drainage in the intramuscular abscess.

Table 1 – Lab data during follow-up in the outpatient de- partment and after admission.

Lab data during follow-up	
Neutrophil	1.8% [40.0-74.0]
Lymphocyte	85.7% [19.0-48.0]
Monocyte	1.8% [3.4-9.0]
Basophil	7.1% [0.0-1.5]
Atypical lymphocyte	3.6% [0.0-0.0]
WBC	0.55 × 10 ³ /μL [4.80-10.80]
Admission lab data	
WBC	22.17 × 10 ³ /μL [4.80-10.80]
RBC	3.03 × 10 ⁶ /μL [4.20-5.40]
HGB	9.9 g/dL [12.0-16.0]
Neutrophil	76.6% [40.0-74.0]
Lymphocyte	9.4% [19.0-48.0]
Band	4.5% [0.0-1.0]
Myelocyte	1.5% [0.0-0.0]
Promyelocyte	0.5% [0.0-0.0]
CRP	18.38 mg/dL [0.00-0.50]

age. The post-procedural CT found a fragment of the guiding wire retained above the pig-tail catheter in the abscess cavity (Fig. 1B).

The attending general surgeon formed a surgical team with an interventional radiologist, plastic surgeon, and cardiologist to retrieve the retained fragment. After discussion with the patient, 3 strategies were proposed: (1) withdraw the pig-tail catheter and bring out the fragment; (2) use a snare or forceps to retrieve the fragment if the first strategy fails; (3) open de-

bridement would be the last choice if the first 2 strategies have failed. When the patient and the team returned to the operating room, the fragment had already separated from the pig-tail catheter and descended to the deeper part of the abscess cavity at the dorsal side, as shown under the fluoroscopy in hybrid-OR (Fig. 2A). Thus, the second strategy was chosen. The draining pig-tail catheter was withdrawn using a new guiding wire support, and a new 9 Fr. sheath was inserted into the abscess cavity. The fragment was successfully retrieved using the endoscopic grasp under fluoroscopy (Fig. 2B). No new wound was created during the retrieved procedure.

Discussion

Guidewire fracture due to shearing is uncommon during a radiological intervention. We encountered a patient with a rare complication of fractured hydrophilic guidewire necessitating surgical intervention, and this was the first case report of hydrophilic guidewire fracture during intra-muscular abscess drainage tube insertion.

The causes of in vivo guidewire entrapment are unclear. Most studies of guidewire fracture or hearing were related to percutaneous coronary intervention (PCI), orthopedic surgery for hip fracture, and EUS-guided transluminal intervention. The incidence of PCI and EUS-guided intervention is around 0.1%-0.2% [2,4], and reasonably, only a few cases were reported.

Multiple factors may contribute to the mishap. The guidewire may break under stress from the lever effect, for example, during the reduction of orthopedic surgery [5]. The beveled needle and threaded catheter are significantly associated with more scraping and shearing of the guidewire and thus increase the risk of fracture, especially in the steeper angle [1,6]. Repeated use of guidewires leads to deformation and decreases bending and torsional strength, which can also lead to breakage of the hydrophilic coating [5,3]. Finally, the material used to make the wire also plays a role. Distal detachment seems more common in the so-called "hydrophilic" wires [7].

Complications may occur if the retained fractured guidewire is not removed. The intravascular wire fragments are highly thrombogenic and can lead to perforation, thrombosis, embolic phenomena, vessel occlusion, and others [2]. Guidewire breaking during hip fracture surgery poses an additional risk of intra-pelvic migration and neurovascular or visceral injury and may lead to devastating complications if not addressed timely [3]. The other complications include pain, foreign body sensation, joint arthritis, and infection.

Several techniques have been recommended for managing fractured guidewires depending on the location of the retained. The removal of intravascular guidewire includes emergent surgery, loop snare removal, triple wire rotation, stenting over the retained wire, or conservative treatment, depending on the patient's clinical situation and the guidewire's position inside the vessel [1,2]. Previously reported techniques for removing fractured guidewires in the hip joint include using over-reaming, dissectomy forceps, arthroscopically assisted methods, and arthrotomy of the hip joint [3]. For the

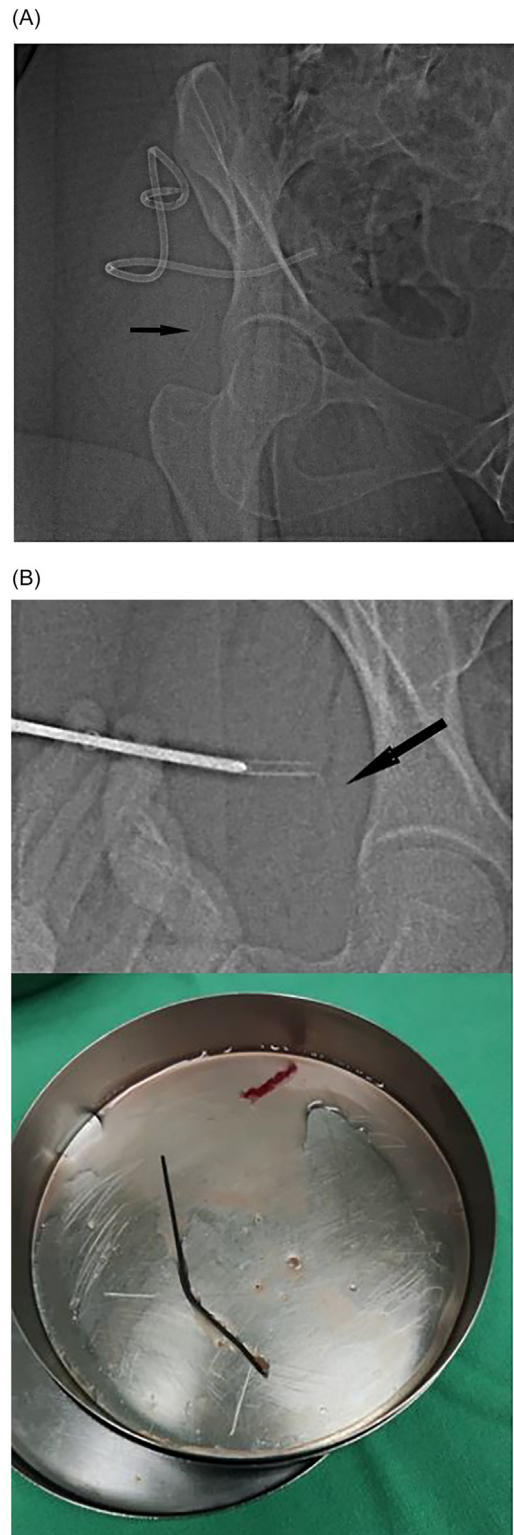


Fig. 2(A) – The fractured fragment (arrow) descended to the deeper part of the abscess under fluoroscopy. (B) The fractured guiding-wire fragment (arrow) was retrieved using the endoscopic grasp under fluoroscopy and specimen.

retained guidewire in the gastrointestinal tract, biliary system, and intra-abdominal region, the application of interventional radiology and endoscopic ultrasonography-guided intervention may provide a minimally invasive treatment [8,9]. In our case, the intramuscular abscess was the drainage target. The guidewire coiling against the firm muscle wall might decrease the tolerance of the guidewire and cause an acute angle between the beveled Chiba needle and the guidewire, resulting in the shearing of the hydrophilic coating and entrapping in the abscess. The retrieval procedure under the fluoroscopy was conducted through the original drainage hole via a 9 Fr. sheath. The retained fragment was removed with endoscopic forceps smoothly, and no further complication was noted.

Several tips may prevent the mishap. If the guidewire has been rotated counterclockwise when moving in, it should be slightly rotated clockwise before pulling back [8]. When a wire shows resistance to withdrawal, the possibility of wire damage with protruding mandrel should be considered, and a fluoroscopy or endoscopic imaging evaluation is suggested [10]. The non-beveled needle and less steep entry angle have less risk of shearing the guidewire coating [6]. Additionally, using a guidewire with a smaller diameter may reduce the risk of shearing by the entry needle [6,8].

Conclusion

Guidewire has been increasingly used in minimally invasive treatments. The fracture event is rare but may cause severe complications when it occurs. The operators should be aware and familiar with preventing and treating a potential fracture. The treatment depends on the location of the retained guidewires, the clinical situation of the patient, and the related complications.

Patient consent

I, the author of the article “A rare case report: guiding wire fracture during CT-guided abscess drainage session and sub-

sequent retrieval under fluoroscopy by the endoscopic grasp,” approve that the patient gives her consent for information to be published in *Radiology Case Reports*.

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