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Case Report

Percutaneous Retrieval of the Broken Guiding Catheter During Primary Percutaneous Intervention by Using a Snare-Loop Catheter

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Abstract

Intravascular broken of catheters, particularly guiding catheters breaks, are uncommon. We discuss a rare instance in which a guiding catheter twisted and broke in a tortious iliac artery during guiding catheter manipulation and had to be retrieved with a Snare-Loop Catheter.

Keywords: *Percutaneous Retrieval; Broken Guiding Catheter; Primary Percutaneous Intervention; Snare-Loop Catheter*

Introduction

At the present time, Interventional cardiology procedure has been used for an increasing number. Consequently, broken of various materials inside the vessel and intravascular retrieval have been extensive published [1-5].

Broken guiding catheter is a rare but dangerous complication [6] that requires patience and pre-defined management strategies in order to avoid morbidity or worse, mortality. Prompt extraction is necessary. Here, we report a case and ultimately describe the successful strategy used to retrieve a broken and entrapped guiding catheter by using a Snare-Loop Catheter.

Case Presentation

66-year-old male presented with chest pain at rest of 3 hours duration. The patient was hypertensive, with dyslipidemia, and a current smoker. An electrocardiogram (ECG) showed ST segment elevation at the inferior leads with a positive troponin T level, Echocardiogram showed LVEF 57% with no regional wall motion abnormality, normal valve and he was transferred to cardiac catheterization room for emergency coronary angiography. Coronary angiography was initially preformed using a 6 F system and a right femoral artery approach, which showed triple vessel disease with bifurcation lesion at LAD/DG, a culprit total occluded lesion at the Left circumflex artery (LCX) (Figure 1), and the right coronary artery (RCA) was 70% stenosis at the proximal part (Figure 2). The culprit lesion (occluded LCX) was planned for primary Percutaneous Coronary Intervention (primary PCI). The JL 5.0 /6 F guiding catheter (Cordis, Miami Lakes, FL) was attempted to engage the Left coronary artery but was unsuccessful, and could not transmit torque through the guiding catheter. The distal guiding catheter kinked in the right external iliac artery, as detected by fluoroscopy. Attempts to straighten the guiding catheter by counterclockwise rotation resulted in the guiding catheter breaking into two pieces (Figure 3). The broken piece came out. A 6F sheath was removed and then new 8 F arterial sheath was reintroduced. JR 4.0 /6F diagnostic catheter with a 10-mm Amplatz gooseneck snare (ev3 Inc., Plymouth, MN) to snare out the remaining fragment, The remaining guiding catheter was captured by the snare and it was

pulled back while simultaneously advancing the 8F sheath over the guiding catheter and we removed them all together simultaneously (Figure 4). After the distal portion of the fractured guiding catheter was out (Figure 5), hemostasis of the right groin was achieved using manual pressure. We continue to perform primary PCI at LCX via the left femoral artery. The LCX was finally stented with 2 drug-eluting stents with a TIMI III flow result (Figure 6) and the femoral angiogram showed tortuous right iliac arteries without leak, no dissection, or perforation. The patient remained stable and symptom-free throughout the procedure and the following day. He was discharged with no hematoma, and no new complications during the follow-up period.

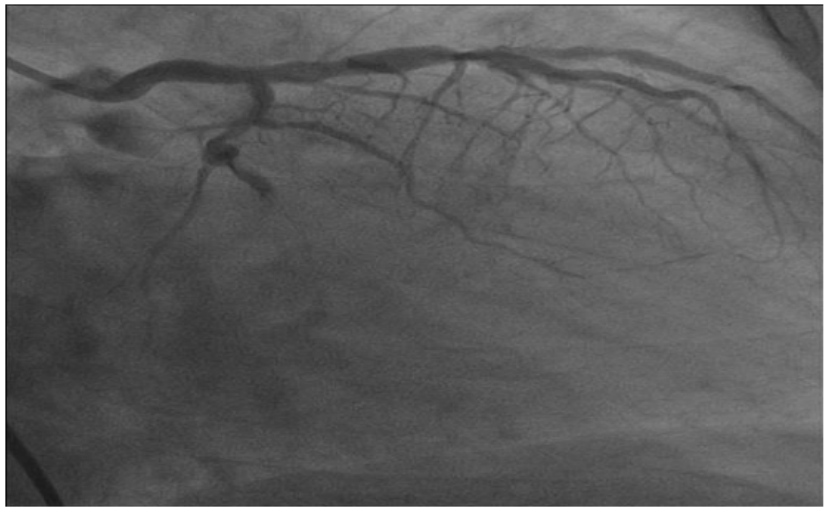

Figure 1: *Left coronary angiography demonstrated occlusion of the mid left circumflex artery (LCX).*

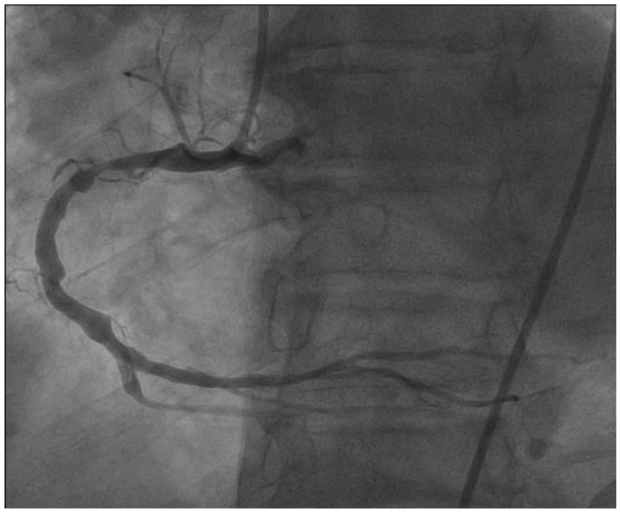

Figure 2: *Right coronary angiography demonstrated occlusion of the right coronary arteries (RCA).*

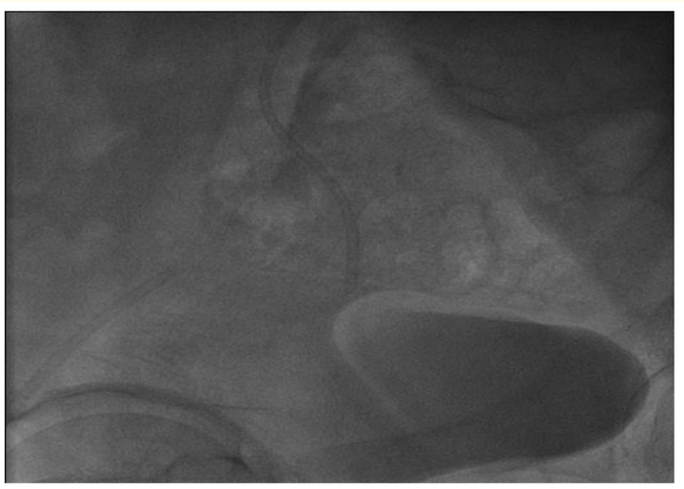

Figure 3: *Fractured guiding catheter in the proximal external iliac artery.*

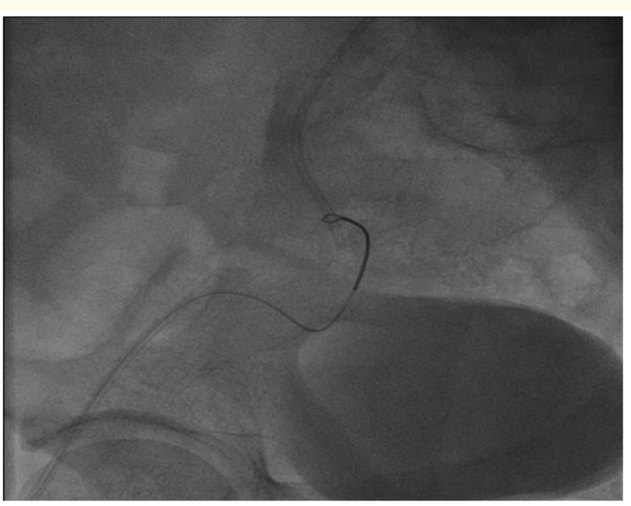

Figure 4: *The broken fragment catheter was removed by a snare-loop catheter.*

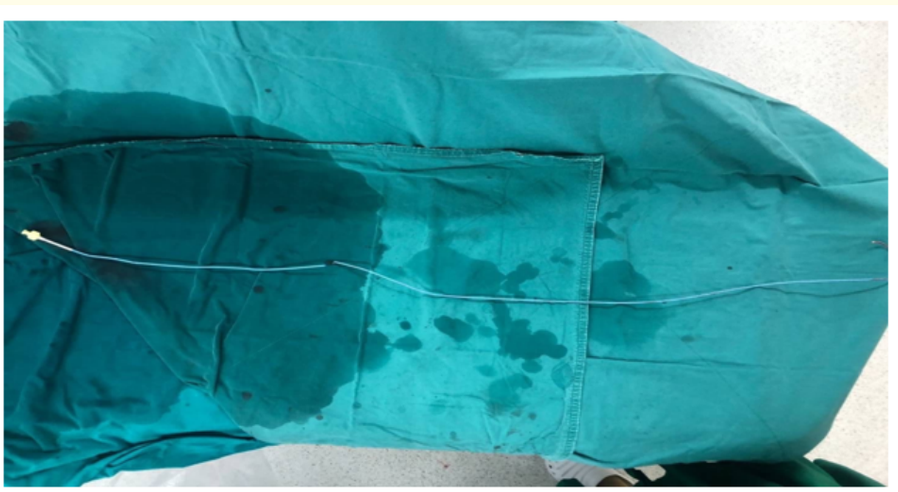

Figure 5: *The broken Guiding catheter was out.*

Figure 6: *Final angiogram.*

Discussion

Catheter materials must be strong enough to maintain structural integrity while remaining flexible enough to avoid discomfort or harm; they are constructed of polyvinyl chloride (PVC), polyethylene (PE), polyolefin copolymer (POC), or polyethylene terephthalate (PET). Diagnostic catheters are flexible, whereas guiding catheters are stiffer and have a greater lumen size. They have a polytetrafluoroethylene (PTFE) coating on the inside that has lubricating qualities, a middle layer made of braided stainless steel that has stiffening capabilities, and an exterior layer made of a mixture of nylon polymers [7].

Intravascular catheter breakage are extremely rare, with only a few cases recorded in the literature [2,8,9]. The causes of breakage include manufacturing defects, multiple reused processes with high-temperature sterilization and polymer aging, mechanical trauma or angulation and distortion of the catheter during insertion, and finally the resistance to removal caused by different factors [10].

Intravascular foreign bodies that cannot be removed have a morbidity and mortality rate of 71% [11], with a mortality rate ranging from 24 - 60% [12,13]. Nevertheless, surgical retrieval carries high morbidity. We cannot use conservative management in this case because a very long remaining fragment inside the aorta will cause high morbidity and mortality. Percutaneous removal has been the preferred method due to its safety and low morbidity. Snare loop, proximal grab technique, distal wire grab technique, coaxial snare technique, lateral grip technique, tiny balloon catheter technique, and more procedures are available for percutaneous removal of intravascular foreign bodies. [14]. The snare loop method is the most frequently employed [15]. Gooseneck snares are made of nickel-titanium cables and come in a variety of loop diameters (5, 10, 15, 25 and 35 mm) [16]. When the wire is deployed, the loop is positioned perpendicular to the cable, and when pulled, the remaining guiding catheter becomes stuck between the wire and the outer catheter. Continuous traction keeps the remaining guiding catheter from escaping, allowing the entire device to be withdrawn.

In this case, the cause of the broken guiding catheter may from reuse catheter and polymer aging but we were able to advance a larger (8F) sheath and then used a snare loop in 10 mm diameter to capture the remaining guiding catheter and successfully retrieved it by simultaneously pushing the sheath and pulling the guiding catheter, advance the bigger sheath with caused less chance of vessel trauma. In this case, the catheter was successfully retrieved with no dissection or damage. As a result, this instance demonstrates that the used combination is both safe and effective for retrieving broken catheter fragments.

Conclusion

We demonstrate a strategy for retrieving broken guiding catheter fragments from the tortuous iliac artery by using a snare loop catheter, and then progressively removing the entire assembly. Using a long sheath and avoiding excessive manipulation would have prevented this complication. When torquing the catheters encounters resistance, it is critical to examine catheter shape at the level of the iliac arteries or aorta for knot formation before proceeding with additional manipulation. If there is a catheter fracture, changing a bigger sheath and capturing the broken segment with a snare can be considered for extraction of this segment.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Bibliography

1. Chunjian Li., *et al*. "Retrieval of dislodged coronary stent from left renal artery by gooseneck snare". *Journal of Biomedical Research* 24.6 (2010): 479-482.

2. Nuri Ilker Akkus., *et al*. "Fracture of a guiding catheter in a tortuous iliac artery and its retrieval by a larger sheath". *Revista Portuguesa de Cardiologia* 32.4 (2013): 341-344.

3. Gus Mitsopoulos., *et al*. "Retrieval of a Dislodged Catheter Using Combined Fluoroscopy and Intracardiac Echocardiography". *Case Reports in Radiology* (2015): 1-4.

4. GMA Dato., *et al*. "Posttraumatic and iatrogenic foreign bodies in the heart: report of fourteen cases and review of the literature". *Journal of Thoracic and Cardiovascular Surgery* 126.2 (2003): 408-414.

5. Brilakis ES., *et al*. "Incidence, retrieval methods, and outcomes of stent loss during percutaneous coronary intervention: a large single-center experience". *Catheterization and Cardiovascular Interventions* 66 (2005): 333-340.

6. K Pathak and D Yadav. "Percutaneous removal of intracardiac and intravascular foreign bodies". *Medical Journal Armed Forces India* 67.4 (2011): 367-369.

7. Kern MJ., *et al*. "SCAI Interventional Cardiology Board Review Book". 1st edition. Philadelphia: Lippincott Williams and Wilkins (2006).

8. Kyriakides ZS., *et al*. "Catheter separation during cardiac catheterization and coronary angiography. A report of four incidents and review of the literature". *Angiology* 37 (1986): 762-765.

9. Kim JH., *et al*. "Successful transradial retrieval of broken catheter fragment during transradial coronary angiography". *The Journal of Invasive Cardiology* 24 (2012): 74-75.

10. Harikrishnan S., *et al*. "Retrieval of friable catheter fragments". *International Journal of Cardiology* 106 (2006): 282-284.

11. Rubinstein Z., *et al*. "Percutaneous removal of intravascular foreign bodies". *CardioVascular and Interventional Radiology* 5.2 (1982): 64-68.

12. Bernhardt LC., *et al*. "Intravenous catheter embolization of the pulmonary artery". *Chest* 57 (1970): 329-332.

13. Richardson JD., *et al*. "Intravenous catheter emboli: experience with 20 cases and collective review". *The American Journal of Surgery* 128 (1974): 722-727.

14. Woodhouse JB and Uberoi R. "Techniques for intravascular foreign body retrieval". *CardioVascular and Interventional Radiology* 36.4 (2013): 888.

15. Umberto G Rossi., *et al*. "Materials and techniques for percutaneous retrieval of intravascular foreign bodies". *The Journal of Vascular Access* 20.1 (2019): 87-94.

16. Koseoglu K., *et al*. "Retrieval of intravascular foreign bodies with goose neck snare". *European Journal of Radiology* 49 (2004): 281-285.

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