



A successful retrieval of stripped outer coating of J-tip diagnostic guidewire from the left popliteal artery during elective coronary angiography

Uspešno izvlačenje odljuštenog spoljašnjeg sloja dijagnostičke koronarne žice J-tipa iz leve poplitealne arterije tokom elektivne koronarne angiografije

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Abstract

Introduction. Entrapment and fracture of diagnostic or therapeutic devices within the coronary circulatory system are a rare, but increasing problem. **Case report.** A 70-year-old man was admitted in our clinic for coronary angiography before the planned aortic valve replacement. An arterial sheath was inserted in the right common femoral artery. After introducing a J-tip diagnostic coronary guidewire into the aorta and advancing a left Judkins diagnostic catheter over it, suddenly occurred peeling off of the wire's hydrophilic coating at the aortic arch level. Very soon, this outer coating of guidewire carried by the blood stream was entered into the left femoral artery, then into the left popliteal artery. This stripped part of guidewire was successfully caught and extracted out by using a goose-neck snare catheter. **Conclusion.** A sudden stripping of outer coating of a J-tip diagnostic hydrophilic coronary guidewire during coronary angiography is possible to manage quickly and successfully by the use of a simple catheter.

Key words:

coronary angiography; intraoperative complications; treatment outcome.

Apstrakt

Uvod. Blokiranje i fraktura dijagnostičkih ili terapijskih sredstava unutar koronarne cirkulacije je redak, ali rastući problem. **Prikaz bolesnika.** Muškarac, star 70 godina, primljen je u našu kliniku zbog koronarne angiografije pre planirane zamene aortnog zaliska. Arterijski uvodnik je najpre postavljen u desnu zajedničku femoralnu arteriju. Posle uvođenja J-tipa dijagnostičke koronarne žice vodiča u aortu i navlačenja levog Judkins dijagnostičkog katetera preko žice, iznenada je došlo do odljuštenja hidrofilnog sloja žice na nivou aortnog luka. Vrlo brzo ovaj spoljni omotač žice nošen krvnom strujom ušao je u levu femoralnu arteriju, a onda u levu poplitealnu arteriju. Odljušteni deo koronarne žice je uspešno uhvaćen i izvučen napolje korišćenjem katetera u obliku gusčjeg vrata. **Zaključak.** Iznenadno odljuštenje spoljašnjeg sloja dijagnostičke hidrofilne koronarne žice sa J-vrhom tokom koronarne angiografije moguće je rešiti brzo i uspešno pomoću običnog katetera.

Ključne reči:

angiografija koronarnih arterija; intraoperativne komplikacije; lečenje, ishod.

Introduction

Entrapment and fracture of diagnostic or therapeutic devices within the coronary circulatory system are a rare, but increasing problem. These complications can occur in 0.2–0.8% of patients during interventional procedures in coronary arteries^{1, 2}. Removing of the entrapped guidewire should be made as soon as possible after confirming such a case.

We report unusual case of stripping of the outer coating of a J-tip diagnostic hydrophilic coronary guidewire during elective coronary angiography.

Case report

A 70-year-old man was admitted to our clinic for coronary angiography before the planned aortic valve replacement. After a puncture of the right common femoral artery by the single-wall needle and placement a femoral sheath, a 0.035-inch J-tip Terumo diagnostic coronary guidewire was introduced and advanced into the aorta. A left Judkins diagnostic catheter advanced over the guidewire to the aortic root level. Suddenly, of the wire's hydrophilic coating peeled off. We withdrew the catheter and the wire together, but the outer coating of the wire,

forming a loop, remained in the descending aorta. The looped stripped part of guidewire was immediately tried to catch by the other J-tip guidewire, but unsuccessfully. Very soon, this outer coating of the guidewire carried by the blood stream was entered into the left femoral artery, then into the left popliteal artery. The other arterial sheath was inserted after antegrade arterial puncture into the left femoral artery. The stripped part of the outer coating of the guidewire travelled into the left popliteal artery to the knee level during that time (Figure 1).

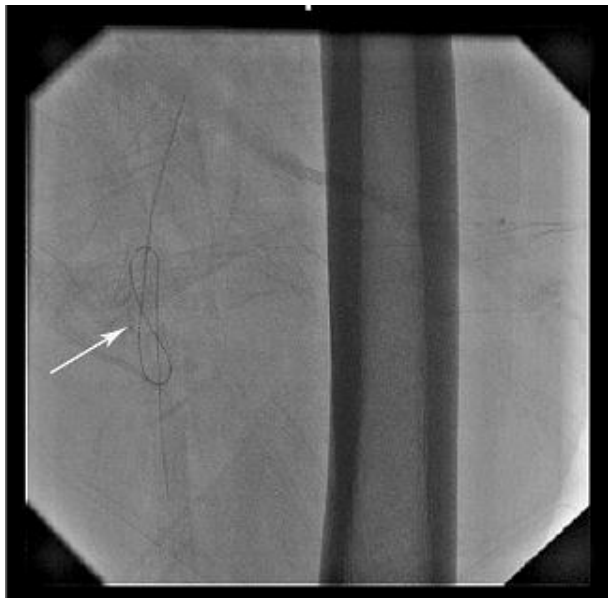


Fig. 1 – The stripped part of outer coating of diagnostic J-tip guidewire in the left popliteal artery just at the knee level (arrow).

Then a goose neck snare catheter was introduced into the sheath and advanced it into the left femoral artery. After bypassing this stripped part of the guidewire we caught it and extracted it out (Figure 2).



Fig. 2 – The left popliteal artery without outer coating of guidewire.

This outer coating was 18 cm in length (Figure 3).

The patient was without any symptoms, ECG and hemodynamic disturbances all the time.



Fig. 3 – Outer coating of guidewire 18 cm in length.

A parenteral antibiotic and 5,000 IU unfractionated heparin were added and the patient transferred to the coronary care unit for continuous monitoring. There were no symptoms or complications and he was discharged on the day 5.

A second admission and successful coronary angiography of this patient was made after 16 days. It was done by the right brachial approach without any problems. Coronary arteries were without any stenosis.

Discussion

There are 3 main components of guidewire structure: core, distal tip and outer covering. The inner part of the guidewire is referred to as the core. It extends through the shaft of the wire from the proximal to the distal part where it begins to taper. It is the stiffest part of the wire that gives the stability and steerability to the guidewire from its proximal end to the distal tip. The most popular core materials are stainless steel and nitinol. The coating is the outer covering on the core that keeps the overall diameter consistent and influences the wire performance. The type and length of coating may vary. Most often coating is applied to the distal 30 cm of the wire. Two types of coatings are used: hydrophilic coatings attract water and are applied over the entire working length of the wire, including tip coils. Hydrophobic coatings are silicone based coatings which repel water and are applied on the working length of the wire, with the exception of the distal tip³.

In 63 (0.8%) of the 7,412 diagnostic coronary angiographies analyzed by some authors, periprocedural complications were observed. Periprocedural complications were divided into major and minor. Major complications included stroke, perforation of cardiac chamber, dissection or occlusion of coronary artery, dissection or hematoma of peripheral vessel, while the others were minor. The incidence of major and minor complications was 0.3% and 0.5%, respectively. Several risk factors associated with the occurrence of complications were noticed. Multivariate analysis showed that the size of catheters, combined left and right catheterization and the lack of experience of the physician were the most important⁴.

It also describes the patient with the entrapped guidewire in the side branch after stent deployment in the main branch. The entrapped guidewire was surgically removed followed by coronary artery bypass grafting⁵. The retained guidewire was the reason for emergency coronary artery bypass in only one patient in the group of 118 patients⁶ or in 15–20% of patients with failed percutaneous attempt to retrieve these remnants⁷.

Hydrophilic coated guidewires are widely used in coronary interventions. Although they perform excellently in crossing tight and complex lesions, there is some risk of complications. The biggest potential complication is subintimal movement and dissection and perforation of coronary vessels. Another infrequent complication is fragmentation and entrapment of the guidewires. It can lead to an acute ischemic event due to thromboembolic occlusion. Retained guidewire fragments in the coronary tree cause complications such as emboli, thrombosis, dissection and rupture. The best management of an entrapped guidewire is still unclear. Surgical management, percutaneous extraction of a guidewire, stent implantation over the guidewire remnants and conservative follow-up can be chosen as a treatment⁸.

The single-wall needle is preferred by most interventionists; its beveled leading point, advanced toward the vessel, finding the lumen on the way in. It represents the most important potential disadvantage of this needle type, as the long bevel can be partially placed within the vessel wall itself, while still obtaining adequate pulsatile blood return. If not recognized, this can lead to subintimal dissection of the punctured vessel. The second potential risk relates to the possible peeling off of the wire's plastic or hydrophilic coating by the sharp needle point⁹.

There are several methods for removal a broken diagnostic wire, including hook-tip catheters, snare loops, tip deflecting wires, balloon catheters, or grasping forceps. The Dormia basket is also used for successful retrieval of intravascular foreign body objects in 96% of cases¹⁰. Using these techniques is successful and safe, providing avoiding traumatic surgical removing these foreign objects.

Conclusion

A sudden stripping of the outer coating of a J-tip diagnostic hydrophilic coronary guidewire during angiography is possible to manage quickly and successfully by the use of a simple catheter. Our experienced physician used the single-wall needle and many times utilized and resterilized guidewire, what allowed stripping of the outer coating of the guidewire. The single-wall needle was already described as a possible cause of peeling off of the wire's hydrophilic coating. In our opinion, these are the most important issues in this complication. Fortunately, this case was terminated without any consequences.

R E F E R E N C E S

1. Kaplan S, Kaplan ST, Kutlu M. An unusual case of guide wire fractured during primary percutaneous coronary intervention, and two year follow-up. *Kardiol Pol* 2010; 68(11): 1291–3.
2. Goksin I, Baltalarlı A, Semiz E, Gurses E, Sacar M, Ozcan V, et al. Catheter entrapment during balloon angioplasty in patient with in-stent restenosis: an unusual complication and its surgical management. *J Card Surg* 2007; 22(2): 160–2.
3. Erglis A, Narbutė I, Sondore D, Grube A, Jegere S. Tools and techniques: coronary guidewires. *Euro Intervention* 2010; 6: 1–8.
4. Ammann P, Brunner-la RH, Angebrn W, Roelli H, Sagmeister M, Rickli H. Procedural Complications Following Diagnostic Coronary Angiography Are Related to the Operator's Experience and the Catheter Size. *Catheter Cardiovasc Interv* 2003; 59(1): 13–8.
5. Hosokawa K, Nakajima Y, Matsuyama H, Shibasaki M. Intraoperative monitoring of movement of an entrapped coronary guidewire by transesophageal echocardiography. *Anesth Analg* 2008; 107(4): 1158–60.
6. Chang TM, Pellegrini D, Ostrovsky A, Marrangoni AG. Surgical management of entrapped percutaneous transluminal coronary angioplasty hardware. *Tex Heart Inst J* 2002; 29(4): 329–32.

7. *Alexiou K, Kappert U, Knaut M, Matschke K, Tugtekin SM.* Entrapped coronary catheter remnants and stents: must they be surgically removed. *Tex Heart Inst J* 2006; 33(2): 139–42.
8. *Karabulut A, Daglar E, Cakmak M.* Entrapment of hydrophilic coated coronary guidewire tips: which form of management is best. *Cardiol J* 2010; 17(1): 104–8.
9. *Criado FJ.* Percutaneous arterial puncture and endoluminal access techniques. In: *Criado FJ*, editor. *Endovascular Intervention: basic concepts and techniques*. 1st ed. Oxford: Wiley-Blackwell; 1999. p. 21–9.
10. *Sheth R, Someshwar V, Warawdekar G.* Percutaneous retrieval of misplaced intravascular foreign objects with the Dormia basket: an effective solution. *Cardiovasc Intervent Radiol* 2007; 30(1): 48–53.

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