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Successful retrieval of a hydrophilic guidewire coating

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Summary

Background:	We present two cases of endovascular retrieval of a hydrophilic guidewire coating, which was stripped off against the needle during coronary angiography.
Case report:	The first coating was 43 centimeters long and it was located at the course of external iliac artery, common femoral artery and its bifurcation and along the deep femoral artery. In the second case, the foreign body was a couple of centimeters long and located in the proximal part of the deep femoral artery. The coating was captured and successfully retrieved in both cases using 0.009" intermingling guidewires, advanced from the contralateral side in so-called cross-over way.
Conclusions:	Percutaneous retrieval techniques of endovascular foreign bodies are very effective and safe. Physicians performing endovascular procedures should be familiar with these retrieval techniques.
Key words:	complication • coronary angiography • percutaneous retrieval • hydrophilic guidewire • detached coating
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Background

Common use of different types of endovascular devices and constantly increasing number of endovascular interventions correspond to the increased risk of many complications, such as loss of different devices inside the vascular lumen. These could be fragments of guidewires or catheters, stents, venous filters, coils, and any other possible devices advanced into the vascular lumen in order to perform either diagnostic or interventional procedures [1, 2, 3]. The incidence rate of this complication is rather low, which is due to greater experience of the physicians performing endovascular procedures and to the improvement in equipment.

There are many methods to retrieve lost endovascular foreign bodies. The following methods can be applied: use of a snare loop, two-wire technique or use of a single guidewire with a crooked tip. Small balloon catheters and endovascular baskets or different types of grasping forceps can be helpful as well. A specific retrieving technique is chosen according to the location and type of the lost device and to the discretion of the physician [1, 2, 3, 4, 5, 6, 7, 8, 9].

We present two cases of successful endovascular retrieval of detached coating of a hydrophilic guidewire.

Case report

Case 1

A 62-year-old man was admitted to the Department of Cardiology in order to perform coronary angiography before scheduled aortic valve replacement because of its significant stenosis (the maximal gradient across the aortic valve was 80 mmHg). Additionally, his medical history presented concomitant typical symptoms of coronary disease, hypertension, insulin-treated type 2 diabetes, persistent atrial fibrillation and chronic obstructive pulmonary disease.

The right common femoral artery was punctured, but crossing the iliac artery with a standard guidewire did not succeed because of excessive tortuosity and significant atherosclerotic lesions within the iliac arteries. The second attempt to pass iliac arteries was done using a CanliZer Standard Angled inter V hydrophilic guidewire (PBN Medicals Denmark A/S). Manipulating with the



Figure 1 a. A foreign body located at the course of the right external iliac, common femoral and deep femoral arteries.

guidewire, and especially its withdrawal contributed to the detachment of its coating by stripping it off against the bevel of the needle. The detached coating was lost in the vascular lumen. The procedure was canceled at this point and the case was discussed by cardiologists, vascular surgeons and a radiologist. An interventional radiologist suggested an attempt to retrieve the guidewire coating using an endovascular technique. On the same day, the presence of the coating was confirmed at the course of right external iliac, common femoral and deep femoral arteries by fluoroscopy (Fig. 1a). The right common iliac artery was catheterized from the contralateral side in so-called cross-over way. Catheterization was assisted with a Tonnelier 5F catheter (Balton, Poland). The catheter was placed near the proximal end of the lost coating and a 0.009" guidewire

with a self-made loop at the end was advanced through the catheter. After the retrieval had not succeeded, two SORCERER 0.009" (Balt, France) guidewires were advanced through the catheter and the coating was finally captured with the help of these two intermingling guidewires. The coating was finally retrieved through the vascular sheath located in the left common femoral artery (Fig. 1b, 1c). The coating measured 43 cm (Fig. 1d). Control fluoroscopy confirmed complete retrieval of the coating. The procedure was performed without any complications. On the following day, coronary angiography was performed from the left femoral access. No significant changes within the coronary arteries were detected.

Case 2

A 70-year-old male patient with coronary disease and hypertension in anamnesis was admitted to the Department of Cardiology because of acute anterior wall myocardial infarction for primary PCI (Percutaneous Coronary Intervention). The patient had already undergone angioplasty and stenting of LAD (Left Anterior Descending Artery) 4 months before.

The procedure was initiated from the puncture of the right common femoral artery. An interventional cardiologist encountered some problems with passing a guidewire through the iliac arteries because of their tortuosity and advanced atherosclerotic lesions. Coronary angiography finally succeeded and revealed an extensive restenosis and thrombosis within the previously stented LAD and disseminated atherosclerotic lesions within the LCX (Circumflex Artery). Angioplasty and stenting was performed in both arteries. The LAD was stented with a drug-eluting stent and a bare-metal stent was implanted in the LCX.

On the third day after the procedure, the patient suffered from recurrent symptoms of angina. He was referred to the control coronary angiography. Initially, the left femoral

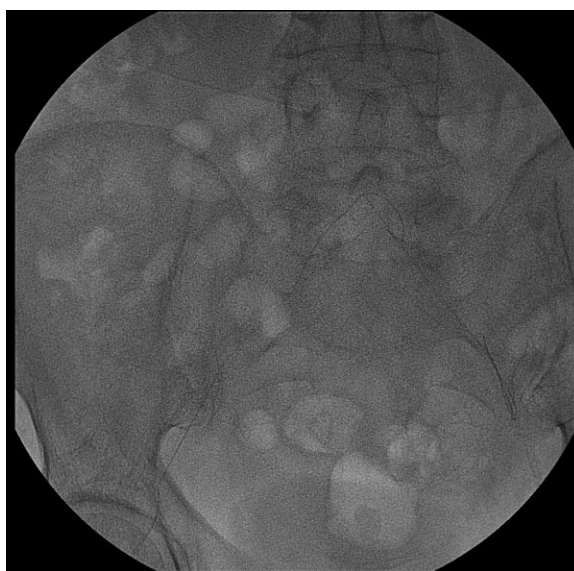


Figure 1 b, c. The coating captured. The foreign body anchored by two guidewires and a catheter withdrawn to the introducing sheath, located in the left common femoral artery.

artery was punctured, but the procedure did not succeed because of significant vessels tortuosity. Secondary, the right common femoral artery was punctured but crossing the iliac arteries with a regular guidewire was impossible because of their tortuosity and significant atherosclerotic lesions. The second attempt to pass the iliac arteries was done using a CanliZer Standard Angled interV hydrophilic guidewire (PBN Medicals Denmark A/S). Manipulating with the guidewire, and especially its withdrawal contributed to the detachment of its coating by stripping it off against the bevel of the needle. The stripped coating was lost in the vascular lumen and retained in the proximal part of the right deep femoral artery. Coronary angiography was continued and finally succeeded. It revealed critical stenosis of the LAD in its proximal segment. Angioplasty was performed and a bare-metal stent was successfully implanted. The case of lost coating of hydrophilic guidewire was discussed with interventional radiologists, who suggested an attempt to retrieve the coating by an endovascular procedure.

The left common femoral artery was punctured by an interventional radiologist and a hydrophilic guidewire (Roadrunner, Cook USA) was advanced to the abdominal aorta. A Tonnelier 5F (Balton, Poland) enabled an access to the right common iliac artery. A 7F introducer (Balkin Up&Over Contralateral Check-Flo Performer) (Cook, USA) was advanced over the guidewire to improve support of the cross-over access through significantly tortuous iliac arteries and to enable manipulation with retrieval devices.

A regular 5F catheter was advanced through the introducer and it was located in the origin of the right deep femoral artery. The coating was initially captured with a help of SORCERER 0.009" guidewire (Balt, France), but during its withdrawal the coating unchained and migrated distally in the deep femoral artery. Foreign body was captured again by the same 0,009" guidewire in the deep femoral artery (Fig. 2a). The 6-7 cm long coating of the hydrophilic



Figure 2 a. Migrated coating captured by the 0.009" guidewire in the lumen of the right deep femoral artery.

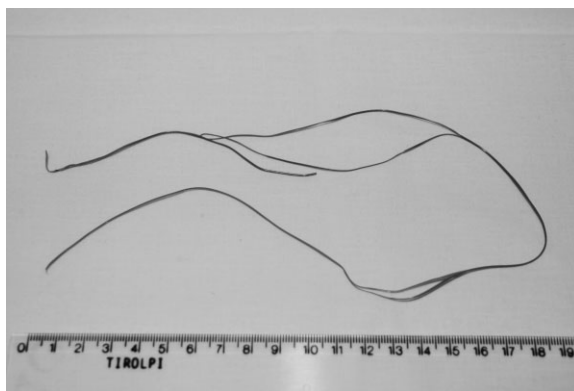


Figure 1 d. 43 cm long coating of the hydrophilic guidewire after its retrieval.

guidewire was retrieved to the introducing sheath together with the guidewire and supporting catheter (Fig. 2b). The procedure was performed without any complications.

Discussion

Stenosed vessels and heavily calcified lesions are significant risk factors for loss of any endovascular device inside the lumen. Furthermore, guidewires, catheters and stents advanced through excessively tortuous vessels predispose to the damage and loss of endovascular devices. Lack of proper accuracy and experience of the operating physician is an additional risk factor [4, 8]. In our cases, physicians accidentally stripped off the coating of the hydrophilic guidewire against the needle when they tried to withdraw the guidewire.

Any manipulation or withdrawal of the hydrophilic guidewire must be avoided if the needle is still in the vessel, because it may cause a damage of the guidewire and loss of its part within the vascular lumen. It is recommended not to advance hydrophilic guidewires until the needle is not withdrawn and the catheter, or the introducing sheath, is not inside the vessel. Insertion of an introducing sheath

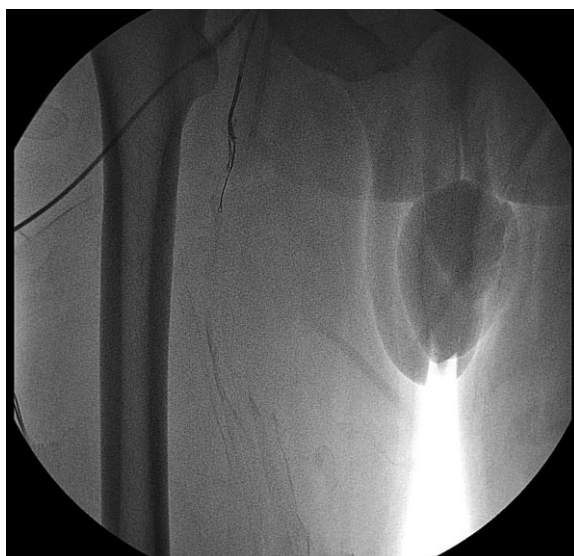


Figure 2 b. Retrieval of the lost foreign body.

can be easily and safely supported by a steel guidewire [10]. If the introduction of a hydrophilic guidewire through the needle is definitely necessary, an operator has to be careful in case of its possible withdrawal. If any resistance is encountered while manipulating the guidewire, it could suggest its damage, risk of coating detachment and loss.

In our cases, the possible complications and difficulties and the necessity of further procedures were considered. According to the rules, it was obligatory to prevent any complications and make an attempt to retrieve the coating with endovascular technique [1, 2, 9]. The absolute indication to evacuate endovascular foreign bodies is their location within the coronary arteries and in any other location threatening with possible migration of the foreign body in the cerebral direction. Peripheral location in the arteries of the lower extremities is accompanied by a lower risk of complications, although intermittent claudication or acute ischemia of the lower extremity may occur [8].

In our first case, the coating was very long (43 cm) and it was located at the course of the external iliac, common femoral and deep femoral arteries. Leaving this coating without retrieval would certainly expose our patient to high risk of thrombosis around the coating and it would probably reduce or essentially limit the blood supply to the right lower extremity. Furthermore, any detachment of a thrombus could embolize the distal arteries of the lower extremity. Therefore, an attempt to retrieve the lost coating was recommended. In the second case, the foreign body was located in the deep femoral artery, where any thrombosis could cause some ischemic symptoms, or more probably

no symptoms. Yet, there seemed to be no contraindications for an experienced team to attempt to perform a successful foreign body retrieval, in order to minimize the possibility of any symptoms of ischemia.

The choice of the retrieval technique should be specific to each case and to the operator's experience. The decision must be taken considering the location and type of lost endovascular device. Many authors, on the basis of their experience, find a snare loop as a very effective and safe retrieving device [1, 2, 3, 5, 7]. In our first case, we did not succeed with a self-made snare loop. Finally two 0.009" SORCERER guidewires were introduced and intermingled with the lost coating, which enabled its retrieval. In the second case, one 0.009" guidewire was sufficient to catch the lost coating.

Conclusions

Percutaneous retrieval techniques of endovascular foreign bodies are very effective and safe at the same time. Therefore, they should be used as an alternative to surgical procedures, which could be performed in case the percutaneous technique did not succeed.

Nowadays, with the dynamic development of intravascular procedures, loss of endovascular devices occurs very rarely. Nevertheless, every catheterization laboratory should be equipped with a set of instruments for intravascular foreign body retrieval and physicians performing endovascular procedures should be familiar with these retrieval techniques.

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