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CASE REPORT

A case of successful use of microsnare to hold and pull the retrograde guidewire for the intervention to peripheral chronic total occlusion

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Abstract A basket-shaped microsnare has various uses such as the pull through technique during coronary intervention to chronic total occlusion (CTO). A 79-year-old man underwent angioplasty for the femoral artery occlusion. We performed a controlled antegrade and retrograde tracking (CART) with dilatation of a balloon on the antegrade guidewire. The retrograde guidewire partly ran in the true lumen but could not pass through the CTO lesion because of inadequate CART. Eventually, we successfully gripped the top of the retrograde guidewire in the CTO lesion using the basket-shaped microsnare (Soutenir®). The microsnare may be useful for bidirectional approach in peripheral CTO lesions.

Keywords Microsnare · Chronic total occlusions · Peripheral intervention

Introduction

A basket-shaped microsnare has various uses. It has been used to disrupt or retrieve thrombus in the carotid artery [1]. It also has been used to grip and pull a retrograde guidewire through chronic total occlusion (CTO) during percutaneous coronary intervention [2]. In such cases, this microsnare is generally used in the proximal vessel lumen of the CTO lesion. However, there has been no reported case using this microsnare to pull through the retrograde guidewire in peripheral CTO lesions. Using this novel microsnare, we successfully pulled through the retrograde guidewire in a peripheral CTO lesion.

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Case report

A 79-year-old man was referred to our hospital with intermittent claudication. An angiogram showed occlusion of the left superficial femoral artery (SFA) (Fig. 1). We decided to perform percutaneous transluminal angioplasty (PTA) and the patient was administered antiplatelet agents.

A 6 French (Fr) sheathless guide catheter was advanced into the SFA via the right femoral artery and a 4 Fr short sheath was inserted via the left popliteal artery. It was hard to introduce the antegrade guidewire into the CTO lesion, but the retrograde guidewire (Treasure XS 12®, Asahi-Intecc, Nagoya, Japan) was partly advanced into the CTO lesion. Antegrade intravascular ultrasound (IVUS) was performed to evaluate whether both guidewires were inside the vessel or not. The antegrade guidewire was in the true lumen, as was almost all of the retrograde guidewire (Fig. 2a–c). Nevertheless, the retrograde guidewire could not pass through the lesion completely, so we performed controlled antegrade and retrograde tracking (CART) procedures with dilatation of a balloon (4 × 40 mm) on the antegrade guidewire (Fig. 2d). After the CART technique, antegrade IVUS restudy was performed. While the body of the retrograde guidewire partly ran in the true lumen, which was dilated by CART, it was difficult to lead the top of the retrograde guidewire to the true lumen because of inadequate dilatation of the antegrade true lumen (Fig. 2e–h).

Thus, we selected the basket-shaped microsnare (Soutenir® 5 × 7 mm, Asahi-Intecc, Nagoya, Japan,

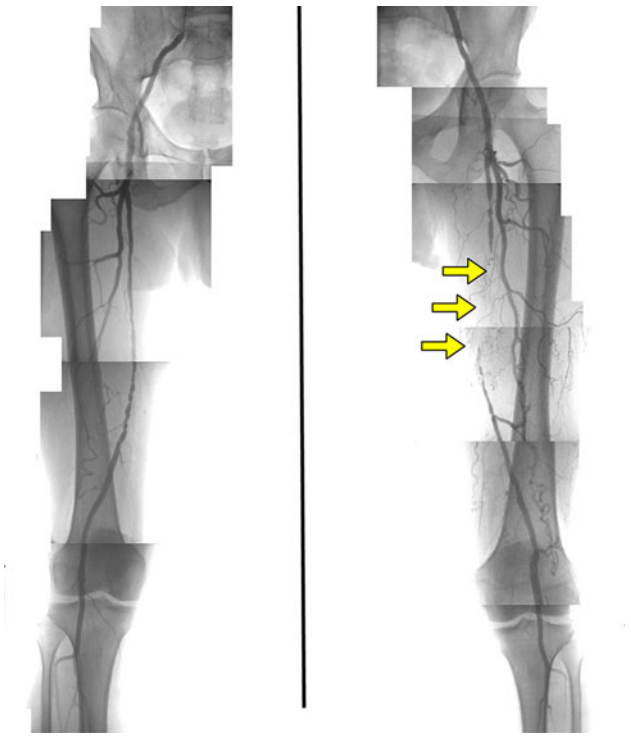


Fig. 1 An angiogram showing occlusion of the left superficial femoral artery (SFA)

Fig. 3a, b) to grip and pull the retrograde guidewire. Firstly, the microcatheter, which has a 0.021 inch lumen, was advanced into the left SFA on the antegrade guidewire. The Soutenir easily passed through the microcatheter and reached the true lumen dilated by CART procedures. The Soutenir basket remained in the microcatheter during its advancement through the lesion. We pulled back the retrograde guidewire until its top came back in the true lumen. After that, we very gently protruded out the basket snares. It had successfully captured the top of the retrograde guidewire, and the Soutenir, along with the microcatheter, was easily pulled through the CTO lesion (Fig. 3c, d).

After that, balloon dilatation and stent implantation were performed and recanalization was achieved (Fig. 4). The following day, the patient was discharged from the hospital.

Discussion

In this case report, we introduce the use of the novel microsnare, Soutenir®, for peripheral arterial interventions to grip and pull a retrograde guidewire in the CTO lesion. During recent years, a retrograde wire approach has been proposed as a very important technique to treat occluded coronary arteries [3] and peripheral arteries [4]. In the coronary artery, Soutenir was used to grip the retrograde

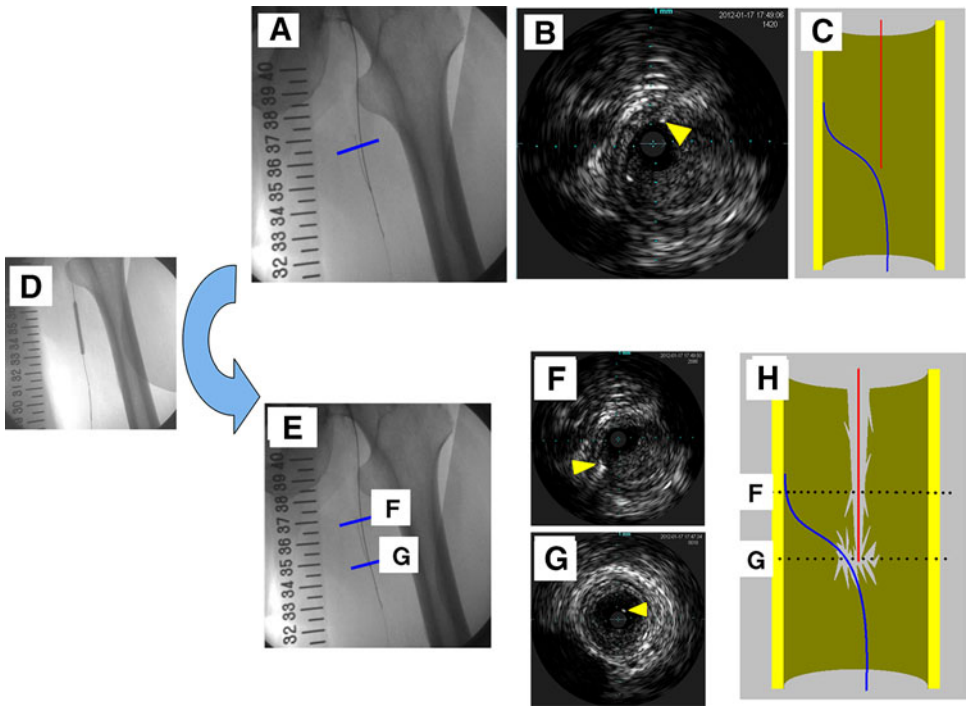
Fig. 2 Bidirectional approach to CTO of the left SFA. **a** It was hard to introduce the antegrade guidewire into the CTO lesion, but the retrograde guidewire was partly advanced into the CTO lesion of the left SFA. **b** Antegrade intravascular ultrasound (IVUS) view at the level of **a** (*blue bar*). The *top* of the retrograde guidewire was in the subintimal area (*arrowhead*). **c**: Schematic model of the bidirectional approach. The *red line* indicates the antegrade guidewire and the *blue one* indicates the retrograde guidewire in the CTO lesion. **d** A controlled antegrade and retrograde tracking (CART) procedure was performed with dilatations of a balloon on the antegrade guidewire. **e** After the CART technique, antegrade IVUS restudy was performed. **f** Antegrade IVUS view at the level of **e** (*bar* "*F*"). The *top* of the retrograde guidewire (*arrowhead*) was still in the subintimal space. **g** Antegrade IVUS view at the level of **e** (*bar* "*G*"). The body of the retrograde guidewire (*arrowhead*) partly ran in the true lumen. **h** We suggest that the difficulty in leading the retrograde guidewire to the true lumen was due to inadequate dilatation of the antegrade true lumen

guidewire in the proximal vessel lumen to the CTO lesion and pull into the guide catheter [2]. However, there has been no reported case using this microsnare in peripheral CTO lesions.

Soutenir® (Asahi-Intecc, Nagoya, Japan), a basket-shaped microsnare, has various uses. Soutenir can pass through a microcatheter with a 0.020 in. lumen. This device has a long tip of almost the same structure as standard 0.014 in. coronary guidewires. Due to these structural features, it can easily be advanced through specific vessels. It has a small stainless-steel wire basket that connects the tip to the body. The basket is extended when the microsnare is protruded completely from the microcatheter, and is closed appropriately when partially withdrawn into the microcatheter. We can select the size of the basket (3, 5, or 7 mm) according to the size of the selected vessels. Hence, the Soutenir is better able to pull the guidewire than other retrieval devices. For all these reasons, this microsnare is preferred in our presented situation.

In this case, we did not select loop snare catheters or grasping forceps. Loop snare catheters such as the gooseneck snare and Curry's loop snare are widely used. Loop snare catheters have the advantage of being flexible, allowing them to follow the intravascular configuration. However, their disadvantage is weak gripping and difficulty grasping in a narrow lumen such as our presented case. Grasping forceps can reach into small vessels, and their gripping power is advantageous for withdrawing strongly. However, it is difficult to control this catheter head. Moreover, this device is stiff and may cause vessel injuries.

When we had used the larger balloon for the CART technique, the retrograde guidewire may have passed through the CTO lesion completely. But it carries a higher risk for vessel injuries. In our presented case, we successfully pulled through the retrograde guidewire



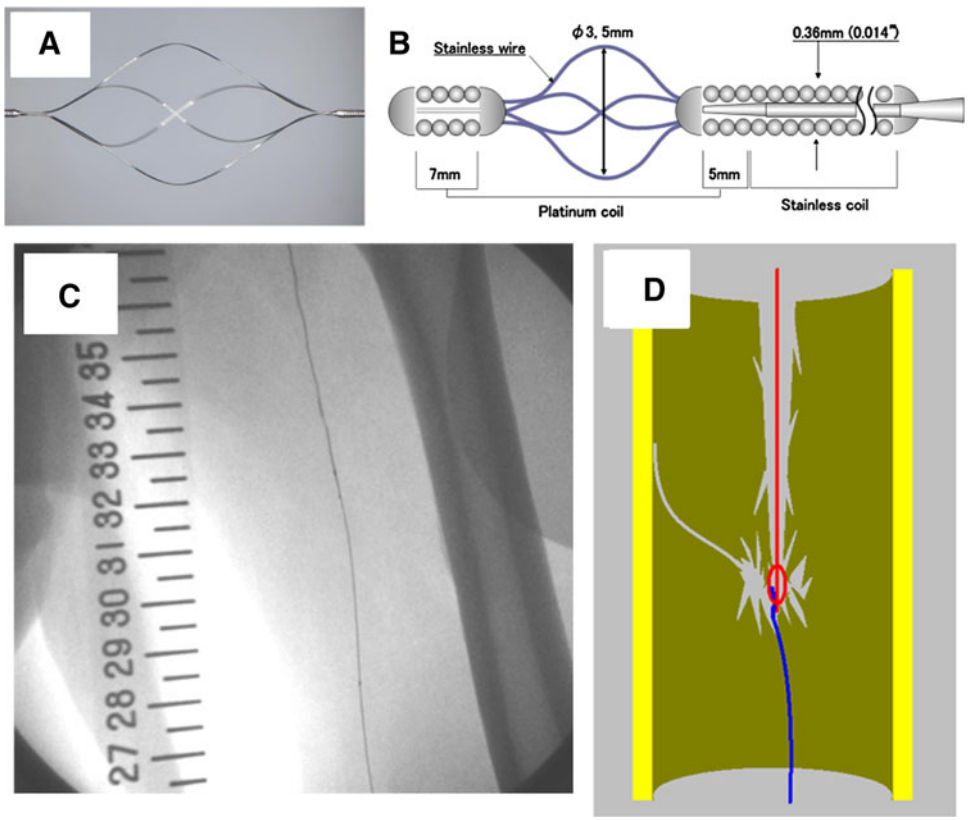


Fig. 3 **a**, **b** Photograph and schema of the basket-type microsnare (Soutenir®). This microsnare has a long tip of almost the same structure as the standard 0.014 in. guidewire. It has a basket comprising 4 stainless-steel wires that connect the tip to the body. This microsnare can pass through a microcatheter with a 0.020 in. lumen. Drawing this microsnare back into the microcatheter, its basket grips the target. **c**, **d** We pulled back the retrograde guidewire until its top came back in the true lumen. After that, we used the basket-shaped microsnare and successfully captured the top of the retrograde guidewire

using the microsnare without the use of a larger balloon. We suggest that it may carry a lower risk for vessel injuries.

In conclusion, we successfully used the novel microsnare, Soutenir®, for peripheral arterial interventions to grip and pull through a retrograde guidewire in a CTO lesion. Thus, a

Fig. 4 Balloon dilatation and stent implantation were performed and recanalization of the left SFA was achieved

basket-shaped microsnare should also be considered as an option for a bidirectional approach in peripheral CTO lesions.

Conflict of interest None.

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