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Case Report

CASE REPORT

A rare manifestation of severe critical limb ischemia caused by solitary aorto-iliac occlusive disease

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Abstract

Currently, there are more opportunities to treat patients complicated with critical limb ischemia (CLI), which is a very dismal medical condition associated with a high risk of major amputation, disability and death. Because CLI is usually caused by multi-level occlusive atherosclerotic disease, the condition of CLI induced by aorto-iliac occlusive disease (AIOD) alone is thought to be a rare pathological entity. We encountered a patient with severe CLI caused by solitary AIOD. Three vascular access routes were established and stiff guidewires retrogradely passed the occluded arteries on both sides. We deployed two self-expandable bare metal stents and complete revascularization led to wound healing. Recent improvements of catheter devices and procedural techniques related to endovascular treatment (EVT) have enabled us to safely recanalize complex vascular lesions of the lower extremities. Therefore, an EVT strategy is one of the favorable treatment options for CLI patients who are contraindicated for surgical treatments.

INTRODUCTION

Critical limb ischemia (CLI) is usually accompanied by atherosclerotic stenoses or occlusions in multiple segments of arteries in the lower extremities. For such lesions, a revascularization procedure such as endovascular treatment (EVT) or bypass surgery is essential for limb salvage. However, due to various factors such as complex lesion characteristics, complicated anatomy of diseased arteries, patient's background and comorbidities, decision-making about the revascularization strategy is often difficult.

CASE REPORT

An 85-year-old female was transferred to our hospital for the treatment of refractory skin ulcers on the right knee and heel and a necrotic right first toe, which corresponded to the grade of Rutherford class 5 (Fig. 1). Her ankle brachial pressure index (ABI) was 0.34 and 0.36 on the right and left sides, respectively. The WIfI classification of the right lower extremity was Wound 2 Ischemia 3 Foot Infection 1, which corresponded to Stage 4 [1]. Computed tomography (CT) angiography showed occlusion around the aorto-iliac bifurcation with severe calcification which was classified as TASC D aorto-iliac lesion (Fig. 2). We firstly recommended surgical revascularization, but she firmly rejected undergoing surgery. Therefore, we decided to perform EVT for the aorto-iliac occlusive disease (AIOD).

We established bidirectional vascular access sites from the left brachial and bilateral femoral arteries. First, we started retrograde wiring on the right side. We gradually escalated guidewire selection, and could pass an Astato9-40 (ASAHI INTECC Co., Ltd., Aichi,

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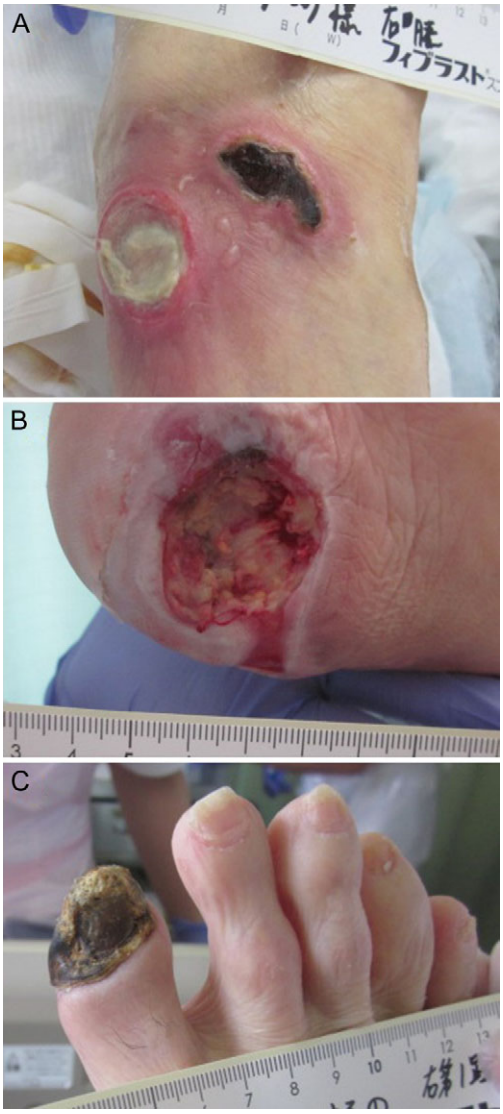

Figure 1: Refractory ulcers at the right knee (**A**) and heel (**B**). (**C**) Necrosis of the tip of the first toe on the right foot.

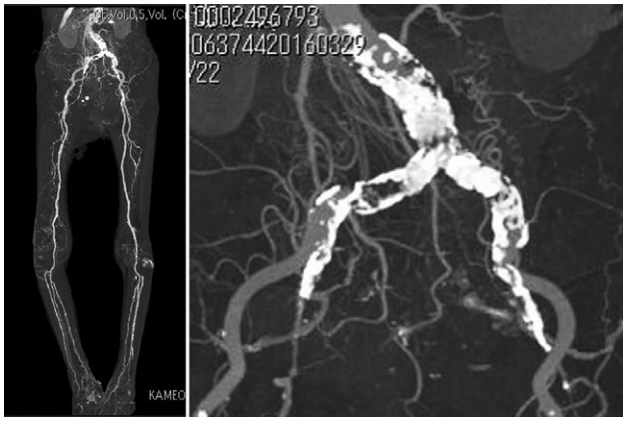

Figure 2: CT angiography showing total occlusion around the aorto-iliac bifurcation with severe calcification. The right side is the magnified image of the lesion.

Japan) guidewire through the calcified lesion at the proximal common iliac artery and reached the terminal aorta. We attempted further advancement of the guidewire retrogradely. However, we could not effectively control the guidewire manipulation due to marked resistance. Then, we switched to antegrade wiring, and could successfully penetrate the proximal hard cap with an Astato9-40 guidewire with the support of a microcatheter. No device except for the guidewire could pass the proximal cap. Therefore, we could not advance the guidewire further due to its poor maneuverability. After difficult bidirectional guidewire negotiation, we could finally pass a Chevalier tapered 35 (Cordis Corp., CA, USA) guidewire retrogradely. Next, we punctured the left groin and approached the occluded left common iliac artery. Also, we could pass a Naveed Hard 30 (Terumo Corp., Tokyo, Japan) guidewire to the abdominal aorta. We deployed two self-expandable SMART CONTROL stents (8.0/100 mm) (Cordis Corp., CA, USA) and achieved favorable dilation of the occluded arteries (Fig. 3).

Because there was no significant stenosis or occlusion distally from the external iliac arteries, favorable blood flow as far as the pedal arteries was achieved by this successful revascularization (Fig. 4). Thereby, the value of ABI was completely normalized on both sides (right: 0.97, left: 0.90). Oral dual antiplatelet therapy and statin was prescribed, and intravenous infusion of PGI was continued every day. Arterial ultrasound and ABI were examined every month, and neither finding of arterial stenosis nor occlusion was observed after EVT. We finally achieved complete wound healing 3 months later without any amputations (Fig. 5).

DISCUSSION

The lesion of AIOD is categorized as a type D aorto-iliac lesion in the TASCII classification [2], which is thought to be principally suitable for surgical treatment. However, the safety and high initial success rate of EVT for TASC D lesions has now been realized, and the TASCII guideline conditionally advocates the possibility of an EVT strategy for TASC D lesions.

Previous papers reported that the rates of both primary and secondary patency for open bypass surgery were superior to those for EVT in patients with AIOD. However, it was associated with a higher risk of perioperative complications and 30-day mortality than EVT [3]. On the other hand, a favorable secondary patency rate (94% at 3 years) after EVT for AIOD in Japanese patients [4] and a feasible primary patency rate (87% at 1 year and 73% at 5 years) in Japanese patients with aorto-iliac bifurcation lesions included in the real-AI registry were reported [5]. Recently, there is a tendency that the treatment strategy of vascular reconstruction is determined based on the more patient-oriented approach rather than disease-oriented one. That is, clinicians should make a careful consideration of the various factors such as the lesion characteristics, patients' comorbidities and wishes.

With the advent of an aging society and increasing morbidity due to lifestyle-related diseases, there have been more opportunities to treat patients complicated with CLI. CLI is associated with a dismal prognosis: a high risk of major amputation, disability and death. A total of 30% of CLI patients are reported to undergo major amputation of the lower extremities, and 25% of them are fatal within 1 year [2]. CLI represents the end stage of PAD, in which macrovascular lesions induce such a reduction of the distal perfusion pressure that microcirculation and nutrient blood flow to the tissues are severely disrupted. One of the most important therapeutic goals for such CLI patients is limb salvage, and limb ischemia is one of the

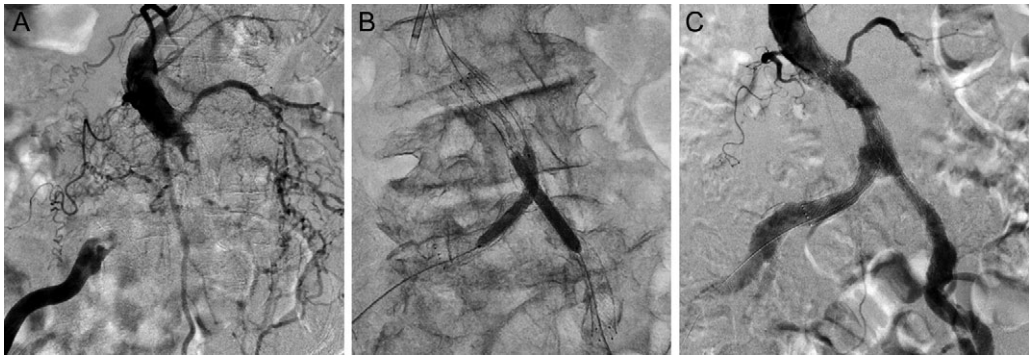

Figure 3: (**A**) A control angiographical image showing total occlusion of the aorto-iliac bifurcation. (**B**) Kissing balloon inflation after the deployment of two self-expandable SMART CONTROL stents. (**C**) A final angiographical image showing good dilation of the treated arteries and favorable blood flow.

Figure 4: An angiographical image of the arteries distally from the groin showing good patency.

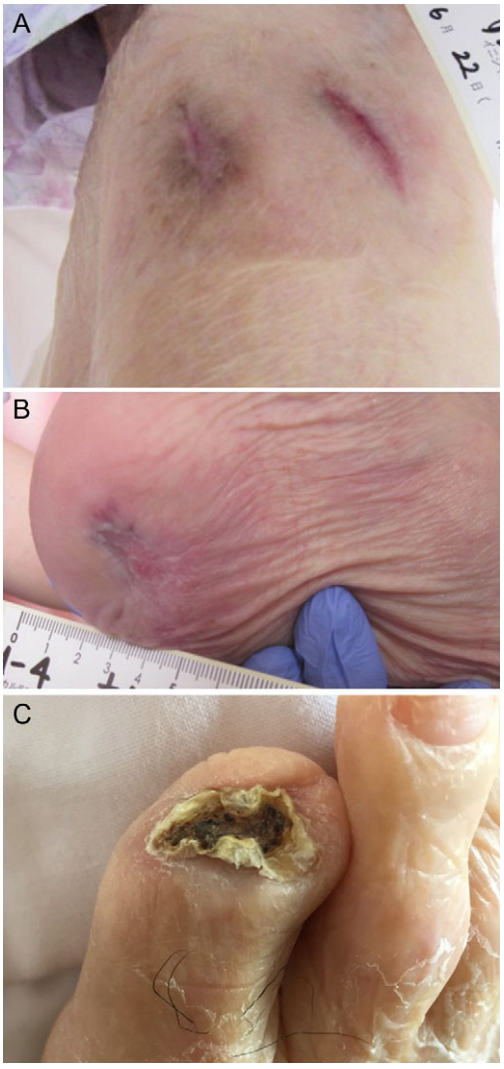

Figure 5: Complete wound healing at the right knee (**A**), heel (**B**) and first toe (**C**).

most critical risk factors that hamper wound healing. In the vast majority of CLI cases, limb ischemia is caused by multi-level occlusive atherosclerotic disease [6, 7]. Therefore, CLI induced by solitary AIOD, as described in this article, is thought to be a rare pathological entity.

There are several reports about optimal stent reconstruction of the aorto-iliac bifurcation. Sharafuddin *et al.* [8] demonstrated that radial mismatch of kissing stents and prior occluded lesions are significant determinants of restenosis. Nowadays, covered endovascular reconstruction of the aortic bifurcation has been shown to be a promising method offering a minimally invasive revascularization approach for AIOD [9, 10]. Covered versus balloon expandable stent trial (COBEST) for the treatment of AIOD showed that the covered stent has an enduring patency advantage over the bare metal stent in both the short and long terms [11]. Although covered stents definitely show enduring patency benefit especially in complex aorto-iliac lesions, applying covered stents in the aorto-iliac lesion in our country is only permitted for sealing aneurysm or bail-out procedure in vascular rupture. Therefore, we had no choice except for bare metal stents when treating AIOD.

Here, we encountered a patient with severe CLI caused by solitary AIOD. The recent improvements of catheter devices and procedural techniques related to EVT enabled us to safely recanalize the complex vascular lesions of the lower extremities. Therefore, an EVT strategy is one of the favorable treatment options for CLI patients who are contraindicated for surgical treatments.

CONFLICT OF INTEREST STATEMENT

None declared.

FUNDING

None.

ETHICAL APPROVAL

None required.

CONSENT

Informed consent was taken from the patient.

GUARANTOR

T.N. is the guarantor of this work.

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