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Case Report

A Crushed and Totally Migrated Iliac Stent into the Abdominal Aorta: Look More Carefully!

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ABSTRACT

Endovascular interventions are being increasingly used around the world. They are accepted as the primary approach to aortoiliac occlusive disease in most cases. Mainly, balloon-expandable stents are utilized to treat lesions, and some patients may develop complications. Stents may thrombose or migrate due to the force of the bloodstream or their inappropriate dimensions. Sometimes, the operator is to blame.

We herein describe a 67-year-old patient with a history of multiple endovascular interventions presenting to the emergency department with right foot pain. The patient underwent repeated angiography and endovascular intervention. In the last approach, diagnostic angiography revealed a crushed and migrated balloon-expandable stent in the abdominal aorta. The stent was removed surgically, and aorta-femoral bypass grafting was performed.

Endovascular maneuvers could lead to these complications; hence, the operator should exercise caution when working on previously implanted stents. Optimal stent expansion and awareness of this very uncommon complication are essential. ***(Iranian Heart Journal 2022; 23(4): 135-140)***

KEYWORDS: Endovascular intervention, Complication, Peripheral arterial disease, Balloon expandable stent, Stent migration

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Percutaneous stent implantation is an effective and well-accepted primary approach to aortoiliac occlusive diseases.[1,2] Stents may thrombose or migrate due to the force of the bloodstream or their inappropriate dimensions[3]

We describe a 67-year-old man with acute limb ischemia treated with balloon angioplasty and multiple stenting. The procedure was complicated by a completely migrated and crushed endovascular balloon-balloon-expandable stent, presenting 9 months following the procedure. The possible mechanism and management of this complication are discussed below.

Case Report

A 67-year-old man was admitted to our emergency department with right leg pain and paleness in the right leg. His past medical history was coronary artery disease, hypertension, diabetes mellitus, and peripheral artery disease with multiple endovascular interventions. Two years earlier, the patient had been treated with endovascular stenting of the right common

iliac artery using a balloon-expandable stent for stenotic lesions (Omnilink Elite 9.0 × 59 mm, Abbott, USA) (Fig. 1A & 1B). Four months after the first procedure, he was admitted with acute limb ischemia in the right leg, and urgent angiography revealed the total occlusion of the previously implanted stent (Fig. 1C). Consequently, the patient underwent balloon angioplasty with a self-expandable stent (Protégé EverFlex 8.0 × 120 mm, Medtronic, USA) through the external iliac to the common femoral artery. An additional balloon-expandable stent (Omnilink Elite 9.0 × 59 mm, Abbott, USA) was placed between them (Fig. 1D). The patient was free of symptoms during the follow-up, and he used dual antiplatelet therapy for at least 1 year. Approximately 2 years later, the patient was readmitted to the emergency department with recurrent pain in the right leg. Angiography showed the total occlusion of the previously implanted stents. Reintervention with balloon angioplasty was performed through axillary access (Fig. 1E & F). Nine months following the last procedure, the patient was readmitted to the emergency department with critical limb ischemia in the right leg. Physical examination revealed that the right leg was cold and pale, the right femoral pulse was absent, the popliteal pulse was weak, and the left leg arteries were palpable. The patient could not walk due to motor deficits and had ischemic leg pain for 2 days.

Duplex ultrasound showed the total occlusion of the right femoral artery. Urgent catheter-based angiography was performed through left femoral access. The patient underwent urgent catheter-based angiography, which showed complete thrombosis in the iliac-femoral arteries. Upon close examination, a different image attracted our attention. There was a gap between the 2 previously implanted stents, with one of the previously implanted stents appearing just above the bifurcation level of the abdominal aorta (Fig. 2A & B). The stent had been crushed and migrated up into the abdominal aorta (Fig. 2A & B). The patient was advised to have cardiovascular surgery. He underwent open surgical stent removal. The stent was removed from the aorta, and an aorta-femoral bypass with an 8 mm polytetrafluoroethylene graft was implanted under general anesthesia (Fig. 2C, D & E). The postoperative course was uneventful and without signs of lower limb ischemia. The patient was discharged on the third postoperative day without complications and in good condition. A recent angiographic examination showed the normal patency of the aorta-femoral bypass graft, while the common iliac and common femoral arteries appeared occluded (Fig. 2F).

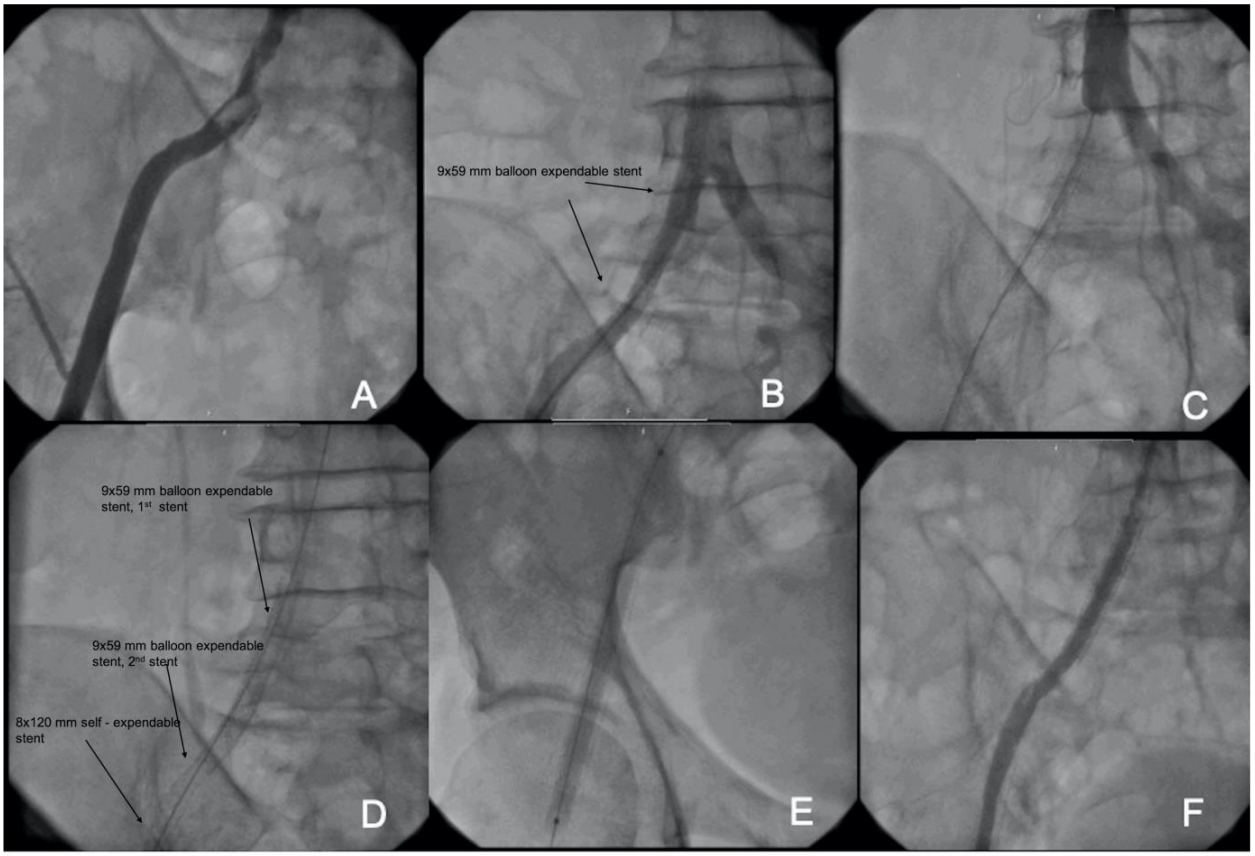

Figure 1: The peripheral angiography shows stenosis in the common iliac artery: (A) after the implantation of a 9 × 59 mm balloon-expandable stent, (B) the total occlusion of the stent after 4 months, and (C) the implantation of a self-expandable stent and a second balloon-expandable stent.

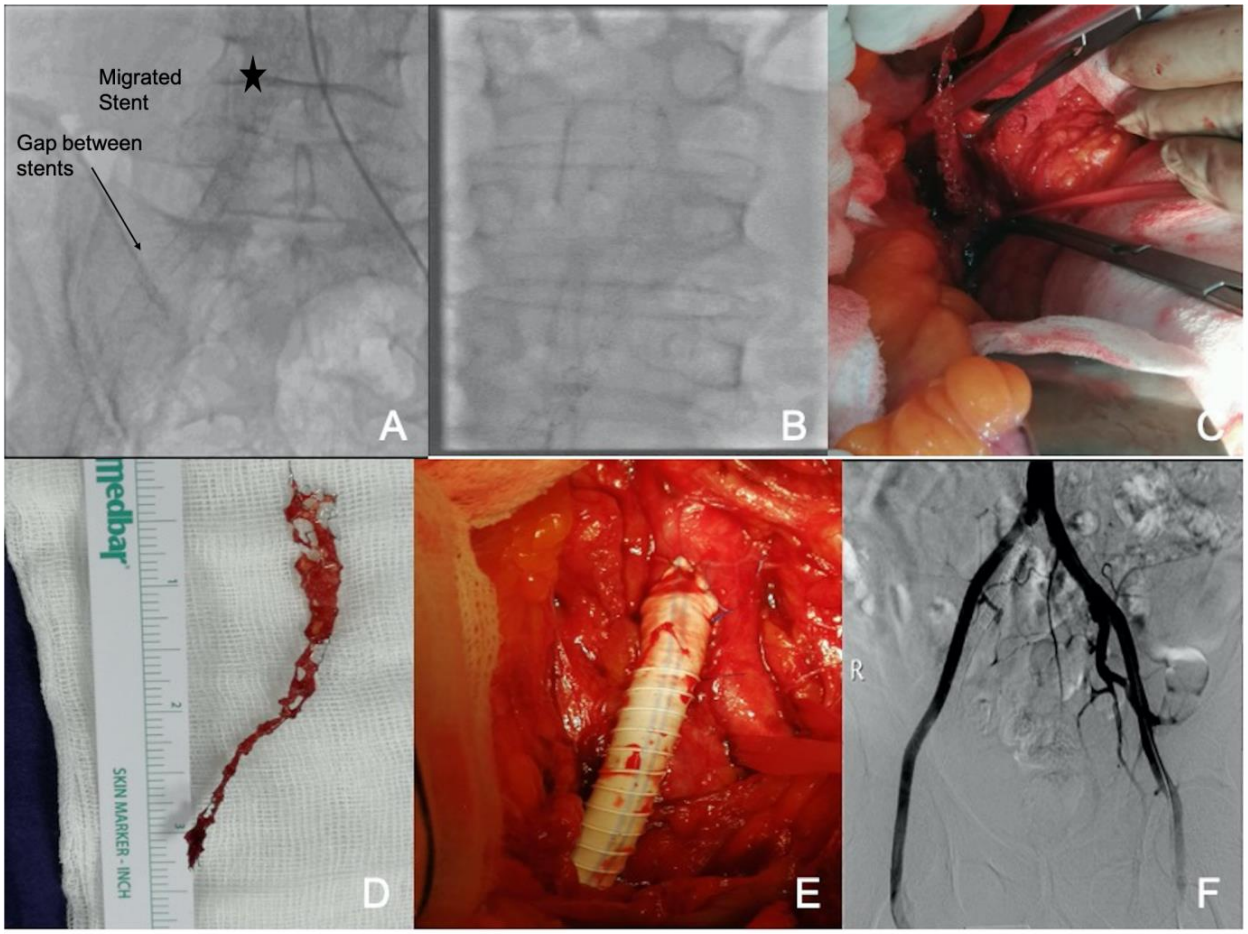

Figure 2: The peripheral angiography through left femoral access shows a gap between 2 stents: (A) a crushed and migrated stent in the aorta, (B) the extraction of the stent surgically from the aorta, (C) the crushed and thrombosed stent, and (D) the aorta-femoral bypass.

DISCUSSION

We herein reported a case of the complete migration of a peripheral balloon-expandable stent into the abdominal aorta. The stent was successfully removed surgically under general anesthesia, and aorta-femoral bypass grafting was performed.

Endovascular procedures are regarded as safe procedures; however, severe complications can occur at a slow rate. They can also lead to severe disability and sometimes limb loss.[4,5] Peripheral stent maldeployment has a 2.5% rate in endovascular complications. The migrated stent may occlude the lumen of the artery and result in thrombus formation and embolization.[6,7]

In this report, because of the presence of a severe peripheral arterial disease, the patient underwent multiple endovascular interventions. Endovascular maneuvers could lead to this complication. The guidewire, the catheter, or the balloon may have entered the subintimal area of the migrated stent in the previous procedure. Nevertheless, in such scenarios, it is not possible to provide vascular patency at the end of the prior procedure. The surgically removed stent was crushed and elongated. Too many balloon procedures were performed in the area where these 3 stents were located, with many catheters inserted

in and out. Catheters or guidewires may have caused the dislodgement of the stent with retraction. During these procedures, the stent may have been pulled up, and the operator may not have noticed it because the stent area was focused upon. Another possible mechanism is spontaneous stent migration, and this seems to be the least possible mechanism. Because the entire stent was in the aorta, and the stent structure was disturbed, spontaneous migration was very unlikely. In our case, the expansion of the migrated stent must have been insufficient.

Civilini et al[1] reported a case where a previously implanted stent had migrated upstream into the aorta and spontaneously deeply inserted into the ostium of the right common iliac artery. In their case report, the stent structure was not disturbed, and the authors claimed that the possible mechanism was the resolution of the spasm in the artery and pulsatile wall motion. Another case which was reported by Siani et al[8] showed that a kissing stent in the aortic bifurcation level had migrated and caused acute limb ischemia. The authors suggested that the overestimation of the stent diameter could lead to progressive expansion and migration. Another mechanism of stent migration is insufficient radial forces of the stent and the detachment of the stent from the arterial wall.[9]

In our case, the migrated stent was not the proximal stent, and it was crushed and elongated. The overlapping area where this stent was implanted was the junction between the common and external iliac arteries. Siani et al[8] suggested that stents at the junction level might become exposed to the pulsatile flow in every cardiac cycle, which could provoke upstream migration. In light of this mechanism, the bending in this area and the underexpansion of the stent may have caused migration in our case.

The most striking finding here was the gap between the previously implanted stents. To avoid these complications, the operator must exercise caution when working with previously implanted stents. Therefore, optimal stent expansion and awareness of this very uncommon complication are essential. Prompt extraction is mandatory to prevent thrombus formation and occlusion in the major branches of arteries. In this case, percutaneous extraction was not suitable, and we selected the surgical method.

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Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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