



# A technique to rescue a damaged and unravelled bare metal iliac artery stent from the distal aorta

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## Abstract

**Purpose:** Endovascular stent placement in the iliac arteries is an effective method of treating occlusive and stenotic disease with reduced morbidity when compared to a surgical bypass however complications of stent placement can occur. We describe a technique for managing the inadvertent 'unravelling' of a stent where the proximal end lies within the distal aorta.

**Technique:** Both cases involved balloon mounted uncovered stent placement within the Common Iliac Artery (CIA) via a retrograde common femoral artery approach. During passage of a sheath or catheter for completion angiography the stent had unravelled and been pushed into the distal aorta. On both occasions the unravelled section of stent had been gently pulled back into the CIA using an angioplasty balloon inflated within it. The damaged stent was then relined with a covered balloon mounted stent.

**Conclusion:** Although successful in small numbers, as such complications are rare, we believe that gentle traction, withdrawal and relining of the stent with a covered stent is a safe and effective method of managing the unravelled stent.

A technique to rescue a damaged and unravelled bare metal iliac artery stent from the distal aorta.

## Introduction

Endovascular stenting for occlusive and stenotic disease of the iliac arteries is a well-established technique in revascularisation. The risks of surgical bypass are significantly greater than those of endovascular approaches in terms of mortality, major morbidity and a return to normal activity [1]. Frequently, more extensive and multifocal iliac lesions are being treated with the introduction of new stent technology with good long-term patency [2-4].

During stent deployment complications can however, occur. Complications described in the literature include iliac artery rupture, dissection and embolism [5]. Stent unravelling and misplacement within the distal aorta has hitherto not been described. We describe a technique for repositioning an unravelled stent back into the iliac artery. The technique was carried out on two occasions and resulted in successful repositioning.



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## Case presentation

### Case 1

The first case involved a 54-year-old male patient with right lower limb claudication. A CT angiogram demonstrated a tight right Common Iliac Artery (CIA) stenosis. The non-diseased portion of right CIA measured 8mm in maximal diameter. The asymptomatic left CIA was ectatic at 14mm.

Under local anaesthetic a right retrograde common femoral artery puncture was performed and 6Fr vascular sheath inserted. The right CIA stenosis was confirmed fluoroscopically, the lesion was crossed and a 9x59mm balloon mounted stent (Omnalink, Abbott UK) was successfully deployed across the lesion (Figure 1a). A 4Fr pigtail catheter was then advanced over the wire into the distal aorta. At no point was wire position lost and there was no resistance to the catheters advancement. On the subsequent check DSA it was apparent that although the stenosis was now relieved, the proximal end of the stent had unravelled and was now stretched out into the distal abdominal aorta (Figure 1b).

A Mustang 8x40mm, followed by 9x40mm balloon was dilated within the unravelled stent and used, under fluoroscopy, to gently pull down into the CIA (Figure 2a). This was successful and no stent was left within the aorta. An 8x59mm covered balloon mounted stent was then used (Atrium, Advanta V12) to reline the bare metal stent successfully (Figure 2b). The patient was then commenced on dual antiplatelet therapy for 6 months.

### Case 2

A 68-year-old female short distance claudicant had a long left CIA stenosis demonstrated on CT angiogram. The non-diseased CIA measured maximally 9mm in diameter on CT.

Under local anaesthetic a retrograde left common femoral artery puncture was performed and a 5Fr vascular sheath inserted. A pigtail catheter was used for aortoiliac imaging which confirmed the CT findings. A long 7Fr catheter (Destination, Terumo Europe) was then placed across the stenosis and a 10x39mm and 10x59mm balloon mounted stent (Omnalink, Abbott UK) was positioned and deployed followed the drawing back of the sheath (Figure 3a). Good position was confirmed fluoroscopically. The sheath was then re-advanced into the distal aorta with the dilator for completion angiography. Again, the sheath was advanced over the wire and under fluoroscopic guidance and no resistance was felt. Subsequent DSA revealed that although the stenoses were treated, that the stent had unravelled and was partly within the distal aorta (Figure 3b). Since the previous occasion when this had occurred was successfully managed using gentle traction on an inflated balloon, it was decided to attempt this again.

A 8x80mm and 8x40mm Mustang balloon was used to dilate the unravelled section of stent and, together with gentle traction, repositioned into the CIA (Figure 4a). This was successful and the CIA was then relined with a 10x59mm covered balloon mounted stent (Atrium, Advanta V12) (Figure 4b). The patient was discharged on dual antiplatelet therapy for 6 months.

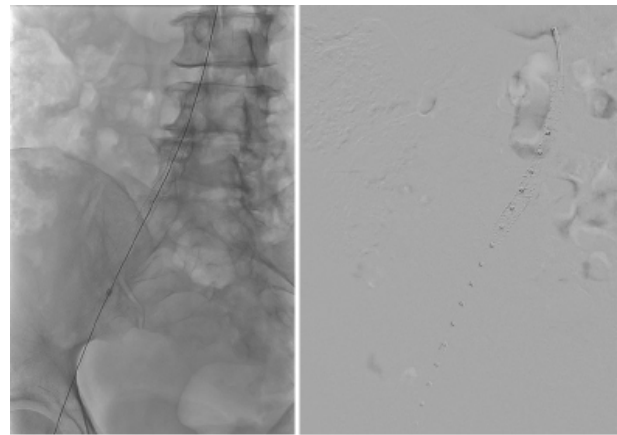


Figure 1a & b

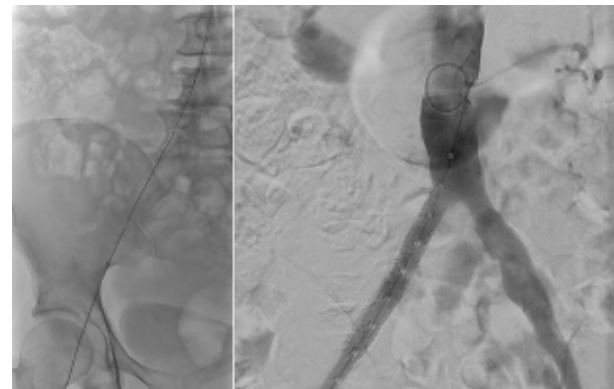


Figure 2a & b

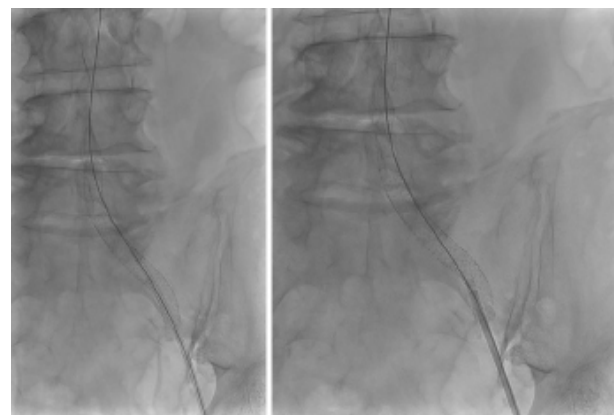


Figure 3a & b



Figure 4a & 4b

## Discussion

We discuss the management of inadvertent stent unravelling following deployment in the iliac arteries using two examples. This has hitherto never been described. We propose that on both occasions that the unravelling occurred during the passage of the pigtail catheter and sheath with dilator despite care being made to avoid stent damage. The slight edge between the wire passing through the stent and the dilator/sheath or catheter must have caught the stent, pushing it up into the aorta in transit.

On both occasions it was possible to place gentle traction on the unravelled segment of stent and withdraw it back into the iliac artery. Because of the damage done to the stent we propose that the stent would have been ineffective at maintaining radial force to the iliac artery. In addition, the loss of normal stent weave and structure may have led to platelet aggregation and stent thrombosis. We therefore decided to place a balloon mounted covered stent in an attempt to counteract these potential complications.

If the technique of gentle traction and withdrawal was unsuccessful in repositioning the stent then we had planned to place bilateral covered iliac stents in the CIAs in a 'kissing conformation' into the aorta in an attempt to preserve flow dynamics. This would have required further retrograde access from the contralateral common femoral artery. During the first case this was not possible since the asymptomatic left CIA was ectatic at 14mm and a suitably sized covered stent was not available at the time hence the only real option was to attempt to reposition the unravelled stent.

In conclusion, whilst attempts are made to prevent complications relating to stent placement, sometimes these occur and techniques to rectify the complications are needed. Although successful in small numbers, as such complications are rare, we believe that gentle traction, withdrawal and relining of the stent with a covered stent is a safe and effective method of managing the unravelled stent.

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