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Case Report

Bilateral Iliac Arteries Stent Compression Following Pelvic Surgery: A Case Report and Review of Literature

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Abstract:

Extrinsic compression of iliac arteries stents has been reported from different causes, such as uterine fibroids and orthopedic surgery. Although extrinsic compression of stents in the iliac veins has been widely studied, stent compression in the iliac arteries is less common. Here we presented a case with bilateral common iliac arteries stent compression following pelvic surgery. A patient (65-year-old woman) presented with acute critical right limb ischemia. Computed tomography angiography (CTA) showed occlusion of the right common and external iliac artery, and severe stenosis in the left common iliac artery. In addition, there was evidence of a Brenner tumor originating from the left ovary. The patient underwent endovascular recanalization of the right iliac arteries and bilateral balloon-expandable stent deployment, and the ovarian tumor was removed after three weeks. The control CTA scan showed asymmetric bilateral iliac arteries stent compression more prominent on the right side, then self-expanding stents were implanted bilaterally. In Conclusion although iatrogenic compression of the stent in the iliac artery is rare despite scarcity, it is important to maintain a high index of suspicion in selected cases and choose the proper stent accordingly.

Key words: stent; extrinsic compression; common iliac artery; pelvic surgery

Introduction

The problem related to common iliac arteries like occlusive atherosclerotic is generally treated endovascularly [1]. Currently, stent implantations are considered the main treatment method for iliac arteries. However, occlusion and/or stent compression, affecting the patency of the stent, are the main disadvantages of endovascular treatment of iliac arteries [2-4].

Although extrinsic compression of stents in the iliac veins has been widely reported [5-7], stent compression in the iliac arteries is less common. To the best of our knowledge, this is the first report presenting a case with bilateral common iliac artery stent compression following pelvic surgery.

Case Presentation

A 65-year-old woman presented to the emergency department with acute critical right limb ischemia. Abdominal computed tomography angiography (CTA), performed using a multidetector CT scanner showed occlusion of the right common and external iliac artery, and severe stenosis in the left common iliac artery. (Figure 1A). There was also evidence of an incidental large multilobulated tumor mass originating from the left ovary, which was later confirmed as a Brenner tumor (Figure 1B).

According to her presentation and the clinical setting, she underwent endovascular recanalization of the right iliac arteries and bilateral stent deployment (balloon-expandable stent) (Figures 1 C and D). The patient underwent an elective laparotomy for ovarian tumor removal three weeks later. Subsequent control CTA showed asymmetric bilateral iliac arteries balloon-expandable stents compression more prominent on the right side without any evidence of fractures (Figure 2). Afterward, self-expanding stents (10×91 mm, Easy Wallstent, Boston Scientific, Watertown, MA) were implanted bilaterally for iliac arteries. Diagnostic digital subtraction angiography (DSA) confirmed that the self-expanding stents placement reduced the bilateral iliac arteries compression (Figure 2E).

The signed informed consent was obtained from the patient for publishing her anonymised data. The requirement for ethics approval was waived because this study was the report of a case and not an interventional study (i.e., no intervention or experimentation was conducted for the purpose of the study). The reporting of this study conforms to CARE guidelines [8].

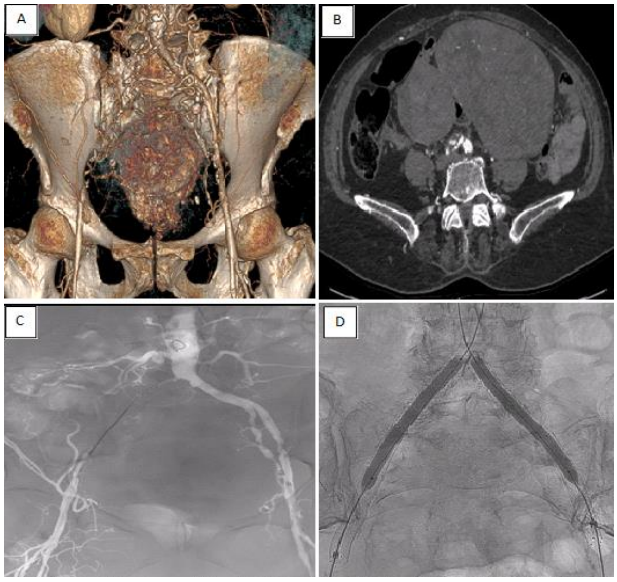

Figure 1: (A): CTA showed complete occlusion of the right common and external iliac arteries and severe stenosis on the left side. (B): There was also evidence of incidental abdominal and pelvic mass with left ovary origin, later confirmed as a Brenner tumor. (C and D): The patient underwent bilateral common and external iliac artery balloon-expandable stents (kissing technique).

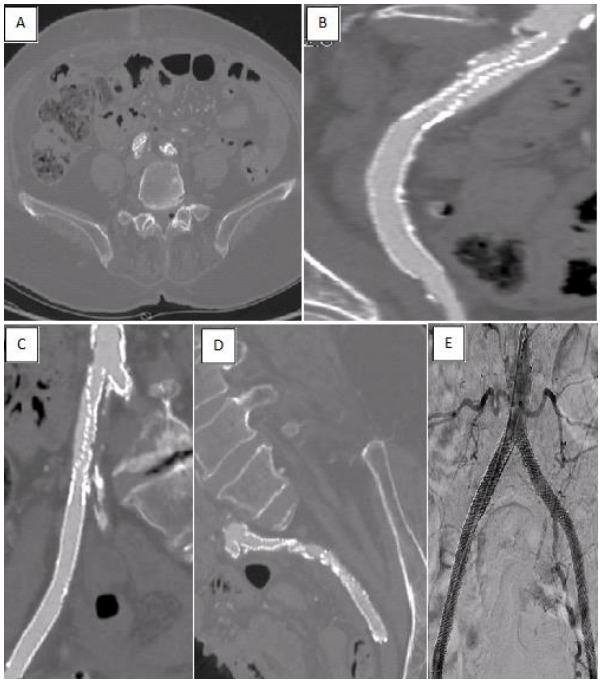

Figure 2: (A and B): Post-operational control CTA showed evidence of bilateral balloon-expandable stents compression, (C and D): which was more prominent on the right side. (E): DSA of bilateral iliac arteries following implantation of self-expanding stents.

Discussion

Stent compression during pelvic surgery especially orthopedic surgery is becoming more widely recognized, which may result from aggressive retraction of the vessels, direct injury, or extrinsic compression [6,9,10].

It should be noted that iliac artery conformation, particularly the external iliac artery, is changed by bending the hip joint, so stents placed in the iliac arteries could be mechanically stressed. However, symptomatic extrinsic compression of the iliac artery has rarely been documented. The purpose of the current case report study was to address the stent compression in bilateral iliac arteries after pelvic surgery. Based on our search, there are no reports of common iliac artery stent compression following pelvic surgery manipulation; however, some studies assessed the symptomatic compression of the iliac vein after stent placement. For instance, Young et al. 6 and Hermany et al., [11]. evaluated the extrinsic compression of the common iliac vein after iliac artery stenting. They reported that acute external compression cause edema and venous occlusion, but the exact factors that may predispose to venous compression after arterial stenting were unclear. The compression of the right-sided vein is rare due to the fewer vessels confined than on the left-sided [12-13].

In Table 1, we reported/summarized several similar studies that assessed the stent compression based on the type of study, procedures, standard method, problem observed (clinical evaluation), type of stent compressed, and symptoms for various arteries and veins.

Stent migration and stent fracture were not found in our patient, demonstrating that the stent used in our patient (balloon-expandable stent) possesses sufficient fatigue resistance. The placement of overlapping stents and the repeated arterial interventions caused the iatrogenic stent compression. Previous investigations reported that venous compression could occur after spinal fusion, endovascular aneurysm repair, arterial stents, vertebral pedicle screws, etc., which cause new-onset lower extremity edema and venous thrombosis [6,14,15].

Author	Type of study	Procedures	Standard method	Problem observed (clinical evaluation)	Type of stent compressed	Symptoms
Present study	Case report (a 65-year-old female)	Pelvic surgery	CTA and DSA	Bilateral iliac arteries stent compression	Balloon-expandable	None
Cho et al. 7	Retrospective	Stent compression in iliac vein compression syndrome	CT venography	Compression of the left common iliac vein	Self-expanding	Acute ilio-femoral deep vein thrombosis
Fujita et al. 16	Case report (a 67-year-old man)	Spinal spur	CTA	Stent compression in the left common iliac artery	Balloon-expandable	Ischemia
Young et al. 6	Case report (a 60-year-old man)	Right iliac artery stent placement	Intravenous ultrasound and CT venography	Compression of right iliac vein	-	Right leg edema
Bekken et al. 1	Retrospective	Common iliac artery stent placement	Duplex ultrasound, CTA, and DSA	Compression of the stents vs. angioplasty	Covered Balloon-expandable stents	Intermittent claudication or critical ischemia
Chakhtoura et al. 17	Retrospective	Carotid angioplasty stenting	Duplex ultrasound and angiography	In-stent restenosis	Self-expanding	-
Hermany et al 11	Case report (a 75-year-old woman)	Bilateral common iliac artery stenting	Intravascular ultrasound	Extrinsic compression of the common iliac vein	-	Left leg discomfort and edema
Pandit et al. 14	Case report (a 65-year-old man)	Aortic stent graft for aneurysm repair	CTA	Compression of the left iliac vein	-	Unilateral limb swelling
Woo et al. 15	Case report (a 65-year-old woman)	Left iliac vein stent placement	Magnetic resonance angiography	Compression of the left common iliac vein due to a pedicle screw in the spinal	Balloon-expandable	Left lower extremity pain and swelling
Jayaraj et al. 18	Retrospective	Unilateral iliofemoral venous stents	Duplex ultrasound	In-stent restenosis and stent compression	-	Lower extremity swelling

Table 1: Studies expressed stent compression for various arteries and veins.

CTA: *Computed tomography angiography;* ***DSA:*** *Diagnostic digital subtraction angiography*

Balloon-expandable stents are commonly used as the treatment modality for symptomatic artery stenosis [2- 4]. Self-expanding stents have enhanced radial expanding force, which are higher resistive force and greater flexibility compared to balloon-expandable [20]. Although both stents have excellent long-term patency with good clinical outcomes, occlusion and/or stent compression of balloon-expandable stents are more probable during endovascular treatment of the iliac arteries [2-4]. Several studies assessed the rate of self-expanding and balloon-expandable stent fractures or occlusions [16,21-24].

For instance, Higashiura et al., [22]. reviewed 353 patients with occlusive diseases of the iliac artery who underwent self-expanding stents between 1997 and 2007. The prevalence, factors, and clinical impact of the stent fracture were evaluated, and it was found that fracture of self-expanding stent is rare in iliac arteries, which rarely affect patency. In another case report study by Higashiura et al., [21], they expressed the possibility of self-expanding stent fracture with reocclusion following the common iliac artery treatment. Ichihashi et al., [24], in their case report study, assessed the balloon-expandable stent fracture and collapsed in the bilateral common iliac arteries. After five months, the pelvis x-ray showed a collapse of the stents. The patient history showed that daily shiatsu therapy in the abdomen region might cause the stent's collapse. The patient should be careful and avoid compression of the abdominal wall after placing a stent in the iliac artery. Fujita et al., [16] reported that although the fracture rate of self-expandable stents in the iliac region is rare (5.1%), they revealed the stent fracture placed in the left common iliac artery in a patient secondary to spinal spur. In Shah et al., [12] case report study, the patient revealed multiple injuries, including symphysis pubis and pelvic fractures. The patient underwent CTA scanning of the

abdomen and pelvis, showing a left common iliac artery intimal tear, treated using a covered expandable endovascular stent.

The exact cause of stent occlusion is not always identified; however, several factors might influence stent patency, such as the stent's location and the amount of vascular inflow [25].

In our patient initial follow-up CTA showed bilateral stent compression. Based on her medical history most likely contributing factor is excessive and improper arteries compression during the pelvic surgery. In such a case with large pelvic mass and planned major surgery, however, in the first place, self-expandable stent because of more flexibility was better choice.

Conclusion

Despite the rarity of iatrogenic iliac artery stent compression, it is essential to maintain a high index of suspicion in selected cases and choose the proper stent accordingly.

Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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