Staged Endovascular Repair of Isolated Bilateral Internal Iliac Artery Aneurysms: A Case Report

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Abstract

Keywords

- bilateral
- internal iliac artery
- aneurysm
- endovascular
- coiling

This report aims to present an unusual case with isolated bilaterally located internal iliac artery aneurysms (IIAAs) that were incidentally detected. Owing to the high surgical risk of the patient and anatomical location of the aneurysms, an endovascular management was preferred. Initially, the patient underwent a percutaneous embolization of the right-sided aneurysm with coiling. A stent-graft deployment covering the orifice of the left-sided internal iliac artery and occluding the ipsilateral aneurysm followed 1 month later. The patient remains asymptomatic after 6 months. Endovascular management has been associated with lower morbidity and hospital stay compared with open repair for IIAAs, although both techniques show satisfying early and mid-term results. Especially for bilaterally located aneurysms, a staged strategy decreases the risk for ischemic complications. Finally, endovascular methods should be preferred when there are no compression symptoms or in cases of higher surgical risk.

Isolated iliac artery aneurysms (IAAs) in the absence of abdominal aortic aneurysms (AAAs) are uncommon, representing 1 to 2% of cases of aortoiliac aneurysms.¹ Isolated internal IAAs (IIAAs) in particular are less frequent, with cases of bilateral IIAAs reported rarely. These aneurysms are frequently asymptomatic, although their natural history portends growth and eventual rupture.²

Currently, the management of bilaterally located IIAAs follows the recommendations for isolated unilateral aneurysms as well as the policy for common IAAs in general. IIAAs smaller than 3 cm could be followed up safely with ultrasound evaluation on annual basis. However, cases of 3.5 cm or larger should be promptly repaired.³ Although open repair has been the golden standard for decades,⁴ endovascular management has been introduced as an alternative of lower surgical risk.⁵

Aim of this report is to present an unusual case of isolated bilaterally located IIAAs that were electively managed with two different endovascular techniques. Indications and potential risks compared with open surgery are discussed as well.

Case Report

A 74-year-old male patient suffering from coronary artery disease, arterial hypertension, and dyslipidemia was referred to our department due to the incidental discovery of bilateral IIAAs during an ultrasound evaluation of the abdomen. His medical history revealed a cholecystectomy and coronary artery bypass grafting 20 years ago as well. His medical therapy included antihypertensive, antiplatelet (clopidogrel), and antihyperlipidemic treatment.

Physical examination revealed two bilaterally located palpable masses in the lower abdomen as well as fully palpable arteries throughout both lower extremities. The patient had undergone an exercise treadmill testing that was negative for residual myocardial ischemia. Echocardiographic evaluation showed a hypokinesia of the basic and lower myocardial walls as well as an ejection fraction of 40%. A computed angiography followed that verified the presence of two bilaterally located saccular aneurysms of the internal iliac arteries (right-sided 4.6 cm and left-sided 4.7 cm in

diameter) (►Fig. 1). Additionally, the angiography revealed a mild stenosis of the left renal artery as well as an intermediate stenosis (50–60%) of the left common iliac artery (CIA). Owing to the high surgical risk of the patient as well as the location of the aneurysms and the CIA stenosis, an endovascular management was preferred.

The patient underwent a percutaneous endovascular coil deployment within the right-sided aneurysm (►Fig. 2) achieving full occlusion of the IIAA. He was discharged and rescheduled for contralateral aneurysm repair. A mild buttock claudication was reported on the right side that lasted almost 2 weeks. One month after the first procedure, the patient underwent an endovascular stent-graft placement (►Fig. 3;

stent-graft Viabahn 13 × 5 mm, Gore and Associates Inc., AZ) reaching from the left CIA to the left external iliac artery, and covering the aforementioned CIA stenosis as well. Final angiography showed an optimal result. The patient was discharged under the same treatment. After 6 months of follow-up, he remains asymptomatic, and without complications.

Discussion

This report describes an unusual asymptomatic case of isolated bilateral IIAAs that were successfully managed through a staged endovascular procedure. The patient underwent percutaneous endovascular coiling to repair the

Fig. 1 Computed angiography showing bilateral internal iliac artery aneurysms (right-sided 4.6 cm and left-sided 4.7 cm in diameter). An intermediate stenosis (50–60%) of the left common iliac artery is present as well (arrow).

Fig. 2 Digital angiography showing the right-sided internal iliac artery aneurysm before treatment (A). After endovascular coil deployment, the aneurysm is occluded and no longer visible (B).

right-sided IIAA, followed by an endovascular stent-graft deployment to repair the contralateral aneurysm 1 month later. Follow-up after 6 months remains unremarkable.

Regarding the typical clinical picture of such cases, symptoms are rare. There have been reports of infected bilateral IIAAs that were treated through open ligation and antibiotic therapy.^{6,7} Moreover, there have been cases presenting with signs or symptoms of compression due to expansion of the aneurysm.^{2,8} Nenezic et al⁸ underline that such cases should be managed with open surgery, considering major limitations of endovascular techniques due to the inability to eliminate problems caused by the compression. According to Dix et al,⁹ rupture occurs in almost

40% of patients with unilateral IIAA leading to rapid death if untreated. As a consequence, this risk increases in bilateral cases. Therefore, close monitoring of small IIAAs when detected should be followed by prompt repair after reaching the indicated size.³

Concerning endovascular treatment, there are two main choices: aneurysm embolization through coil deployment or stent-graft placement covering the ostium of the IIA. Coil embolization is commonly utilized before endovascular repair of AAAs, although no AAA was present in our case and coiling was selected as the main treatment for the right-sided IIAA.¹⁰ In bilateral cases, staged endovascular treatment should be preferred against simultaneous repair as in

Fig. 3 Digital angiography after stent-graft placement reaching from the left common to the left external iliac artery. Coils are visible in the location of the occluded right-sided aneurysm.

our case. As highlighted by Franz and Knapp,¹¹ staged coil embolization of bilateral aneurysms results in exclusion of flow to the aneurysms, although ischemic postoperative complications are avoided. However, in our patient, coiling was followed by stent grafting of the left-sided aneurysm due to a concomitant ipsilateral stenosis of the CIA.

Regarding major outcomes, endovascular treatment has been associated with reduced mortality and blood loss as well as shorter hospital stay compared with open repair.^{12,13} However, both open and endovascular treatments show satisfactory early and midterm results.^{14,15} Buttock claudication and erectile dysfunction due to reduced perfusion of the pelvis are frequent complications of endovascular techniques.¹⁶ Bratby et al¹⁷ reported that claudication postembolization reaches 30% of patients, although this resolves in the majority after 1 year. The same authors report spinal cord ischemia in 3% of patients as well, leading to paraparesis. However, our patient presented a mild claudication lasting only 2 weeks and he remains asymptomatic thereafter.

In conclusion, endovascular management of bilateral IIAs could be performed as the main treating strategy with satisfactory early and mid-term results, especially in patients of higher surgical risk. When ipsilateral atherosclerotic lesions are present, these could be managed at the same time. However, staged repair of bilateral IIAs should be preferred to ameliorate potential ischemic complications.

Open repair should be considered for cases with compression symptoms or inflammatory aneurysms.

References

- 1 Igari K, Kudo T, Toyofuku T, Jibiki M, Inoue Y. Successful endovascular repair of ruptured isolated bilateral internal iliac artery aneurysms. *Eur J Vasc Endovasc Surg* 2013;45(3):218–219
- 2 Sugimoto A, Haga M, Motohashi S, Takahashi Y, Kanazawa H, Nakazawa S. A case of rectal obstruction caused by bilateral internal iliac artery aneurysms. *Ann Vasc Surg* 2011;25(2):267.e15–267.e17
- 3 Santilli SM, Wernsing SE, Lee ES. Expansion rates and outcomes for iliac artery aneurysms. *J Vasc Surg* 2000;31(1, Pt 1):114–121
- 4 Byrne JL, Zaman SN, Meade JW, Aronski WP. Operative management of bilateral internal iliac artery aneurysms. *J Cardiovasc Surg (Torino)* 1989;30(2):241–243
- 5 Pitoulis GA, Donas KP, Schulte S, Horsch S, Papadimitriou DK. Isolated iliac artery aneurysms: endovascular versus open elective repair. *J Vasc Surg* 2007;46(4):648–654
- 6 Shiferson A, Ascher E, Hingorani A, et al. Bilateral internal iliac artery aneurysm infected with *Campylobacter fetus*. *Vascular* 2009;17(4):226–229
- 7 Kretz B, Pagès PB, Loffroy R, et al. Mycotic aneurysm of both internal iliac arteries due to *Candida albicans*. *Ann Vasc Surg* 2014;28(3):738.e11–738.e14
- 8 Nenezic D, Tanaskovic S, Gajin P, Ilijevski N, Novakovic A, Radak D. A rare case of large isolated internal iliac artery aneurysm with ureteral obstruction and hydronephrosis: compression symptoms are limitation for endovascular procedures. *Vascular* 2015;23(2):170–175
- 9 Dix FP, Titi M, Al-Khaffaf H. The isolated internal iliac artery aneurysm—a review. *Eur J Vasc Endovasc Surg* 2005;30(2):119–129
- 10 Kickuth R, Dick F, Triller J, Ludwig K, Schmidli J, Do DD. Internal iliac artery embolization before endovascular repair of aortoiliac aneurysms with a nitinol vascular occlusion plug. *J Vasc Interv Radiol* 2007;18(9):1081–1087
- 11 Franz RW, Knapp ED. Staged endovascular repair of bilateral internal iliac artery aneurysms. *Ann Vasc Surg* 2009;23(1):136–138
- 12 Chandra A, Kansal N. Hybrid repair of isolated internal iliac artery aneurysm. *Vasc Endovascular Surg* 2009;43(6):583–588
- 13 Rana MA, Kalra M, Oderich GS, et al. Outcomes of open and endovascular repair for ruptured and nonruptured internal iliac artery aneurysms. *J Vasc Surg* 2014;59(3):634–644
- 14 Antoniou GA, Nassef AH, Antoniou SA, Loh CY, Turner DR, Beard JD. Endovascular treatment of isolated internal iliac artery aneurysms. *Vascular* 2011;19(6):291–300
- 15 Dorigo W, Pulli R, Troisi N, et al. The treatment of isolated iliac artery aneurysm in patients with non-aneurysmal aorta. *Eur J Vasc Endovasc Surg* 2008;35(5):585–589
- 16 Rayt HS, Bown MJ, Lambert KV, et al. Buttock claudication and erectile dysfunction after internal iliac artery embolization in patients prior to endovascular aortic aneurysm repair. *Cardiovasc Intervent Radiol* 2008;31(4):728–734
- 17 Bratby MJ, Munneke GM, Belli AM, et al. How safe is bilateral internal iliac artery embolization prior to EVAR? *Cardiovasc Intervent Radiol* 2008;31(2):246–253