

## Late common iliac artery aneurysm rupture due to contralateral type IB endoleak after previous EVAR

Georgios Sachsamanis\*; Anastasios Papapetrou; George Galyfos; Christiana Anastasiadou; Chrysostomos Maltezos

### \*Georgios Sachsamanis

Department of Vascular Surgery, General Hospital 'KAT', Athens, Greece.

Email: sachsamani@hotmail.com

### Abstract

Endoleak following EVAR procedures represents a common complication. We present the unusual case of a 75-year old patient who developed a left sided type Ib endoleak 7 years after EVAR for treatment of bilateral iliac artery aneurysmal disease, with the application of an iliac branch device on the right side. Retrograde blood flow from the left sided endoleak led to the development of a right sided iliac artery aneurysm, although the IB device was adequately sealed on its original location. Patient was successfully managed endovascularly with the application of a distal stent-graft on the left external iliac artery.

### Keywords

iliac artery aneurysm; iliac branch device; endovascular aneurysm repair

### Introduction

Iliac arteries represent an uncommon location for the development of intra-abdominal aneurysms, showing prevalence in the general population of approximately 0.5% [1]. They are defined as having a transverse diameter of greater than 18mm and 15mm in men and women respectively. Isolated iliac artery aneurysms are rare, found usually in concomitance with abdominal aortic aneurysms in up to 45% of patients, with a bilateral presentation in up to 70% of cases [2,3]. Due to increased risk of rupture, their prompt treatment is advised [4].

Although a number of open surgical repair methods exist, a paradigm shift in the 21st century has led to the introduction of minimally invasive endovascular techniques for their management. Their aim is the exclusion of the aneurysm through implantation of an endograft, while recently developed Iliac Branched (IB) devices have been manufactured, allowing preservation of blood flow in both the external (EIA) and Internal Iliac Artery (IIA) [5]. Despite excellent technical success, low mortality rates and

reduced hospitalization time, post-operative surveillance is necessary due to late complications, such as endoleak, endograft migration or aneurysmal disease progression. We present a rare case of a patient with an excessive right iliac aneurysm, due to antegrade blood flow from a late developed type Ib endoleak in the contralateral iliac artery, 7 years after he underwent EVAR for bilateral iliac artery aneurysms, with the application of an IB device in the right iliac axis.

## Case Report

A 75-year-old patient was admitted to our vascular surgery department, due to abdominal pain located in the lower right quadrant abdominal region for the past 48 hours. He underwent Endovascular Aneurysm Repair (EVAR) 7 years ago, due to bilateral iliac artery aneurysmal disease, the right sided of which, required the additional implantation of an Iliac Branch Device (IBD) due to proximal extension of the aneurysm. On the left side, an embolism of his internal iliac artery was performed with coils, with the sealing zone of the endograft reaching the external left iliac artery. Although he tolerated surgery well, he was lost to follow-up. His medical history included diabetes mellitus, tobacco abuse, atrial fibrillation under coumadin, obesity and coronary heart disease, for which he underwent Percutaneous Coronary Intervention (PCI) 10 years ago with stent implantation.

Physical examination revealed the presence of a painful pulsating mass on the right iliac region, with no additional findings. Laboratory and biochemistry examinations showed a hematocrit of 33.1% with a hemoglobin of 11.1 g/dL and elevated creatinine and urea levels (1.82 mg/dL and 66 mg/dL respectively). After taking into consideration the impairment of his renal function, our patient initially underwent a duplex color ultrasound scan, which proved significant for a large (>8cm) aneurysm of his right common iliac artery, with flow inside the aneurysmal sac, as well as flow in the left iliac aneurysm, which had an approximate diameter of 3cm. A further CTA scan was performed, showing this excessive, 11cm in diameter, right common iliac artery aneurysm with signs of an imminent rupture (Figure 1). Both the proximal sealing and distal landing zone of the iliac limb extension and IBD seemed to be firmly secured on the arterial wall. On the left side, a type Ib endoleak was detected due to distal progression of his aneurysmal disease. The left iliac extension has lost its distal landing zone, leading to retrograde blood flow in the contralateral side, and thus the enlargement of the right sided aneurysm. An endovascular approach with the implantation of a new stent-graft on the left extremity was considered as the best course of action, so after written consent patient was taken to the operating room.

Under spinal anesthesia, left transfemoral access was obtained, through which a 16 x 60mm balloon expandable stent-graft was deployed inside the previously implanted iliac limb extension and the left external iliac artery, bridging the gap between the two. Final angiography showed exclusion of the left iliac aneurysm, and no sign of endoleak in the right iliac aneurysm even in the delayed images (Figure 2). Physical examination showed cessation of the pulsating mass, while patient reported no further pain. Post-operative period was uneventful for the patient, with color duplex scan showing elimination of the endoleak. He was discharged after 3 days with dual anti-platelet medication.

## Discussion

Endoleak following endovascular procedures represents one of their most common complications, manifesting in approximately 25% of such cases [6,7]. It refers to the persistent blood perfusion of the aneurysmal sac despite implantation of the endograft, and is divided in five types, according to etiology. Type I involves blood perfusion from the proximal or distal ends of the endograft due to inadequate seal, type II refers to blood filling through branch vessels, type III involves leaks through a defect in the endograft fabric, type IV is caused due to increased graft porosity, and lastly type V endoleaks are related to increased endotension. Type Ib endoleaks specifically refer to blood perfusion through the distal part of the endograft, usually due to inadequate seal during device deployment or distal progression of the aneurysmal disease [8]. Up to 20% of type Ib endoleaks after EVAR are diagnosed and management intraoperatively, while half of the patients who develop a late type Ib endoleak are diagnosed 6 months after initial device implantation [9].

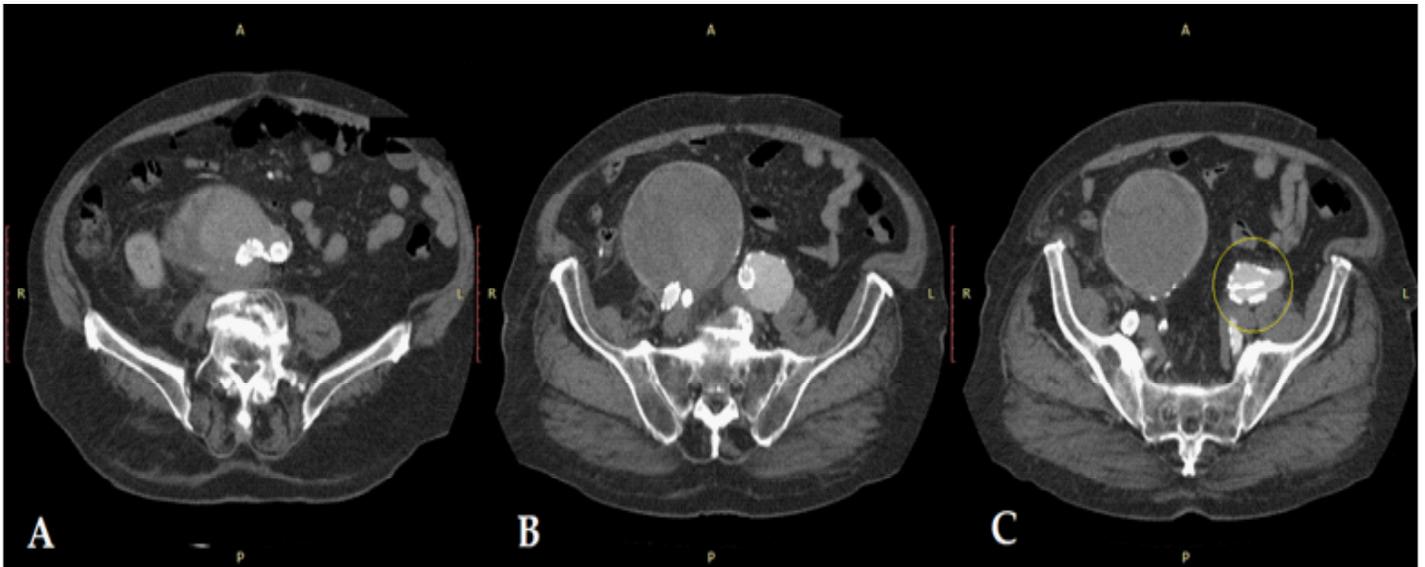
In our case, despite the adequate fixation of the right-sided implanted IB device after 7 years of its deployment, distal progression of the aneurysmal disease in the left iliac artery led the previously deployed iliac extension to lose its affix to the arterial wall and to further enlargement of both previously managed iliac aneurysms. Since our patient was not subject to follow up after the initial EVAR, no data regarding manifestation of the endoleak exist. In a meta-analysis by Zaiem et al, post-EVAR surveillance with at least a doppler US scan is mandatory, although other imaging modalities such as contrast enhanced CT or MRI demonstrate greater diagnostic accuracy [10].

Management of late type Ib endoleaks can be achieved either through open surgery or endovascular techniques. According to a recent review by Massoni et al in 30 patients with late type Ib endoleak after aortoiliac endograft deployment, endovascular management of this complication with the implantation of a distal endograft extension is the most feasible and common treatment modality [9]. Endograft oversizing of approximately 15% during preoperative planning is recommended in order to minimize the development of a late endoleak. In some cases, embolization of the Internal Iliac Artery (IIA) may be required, depending on the length of the extension required to seal the endoleak. Embolization of the IIA has been associated with buttock claudication and erectile dysfunction in up to 25% of patients, while bilateral IIA occlusion may lead to pelvic ischemia [3]. Open surgical options include an aorto-bi-iliac or aorto-bi-femoral bypass or graft interposition, though such procedures come with increased mortality and hospitalization rates, while they may prove technically difficult in obese patients due to required deep pelvic dissection [5].

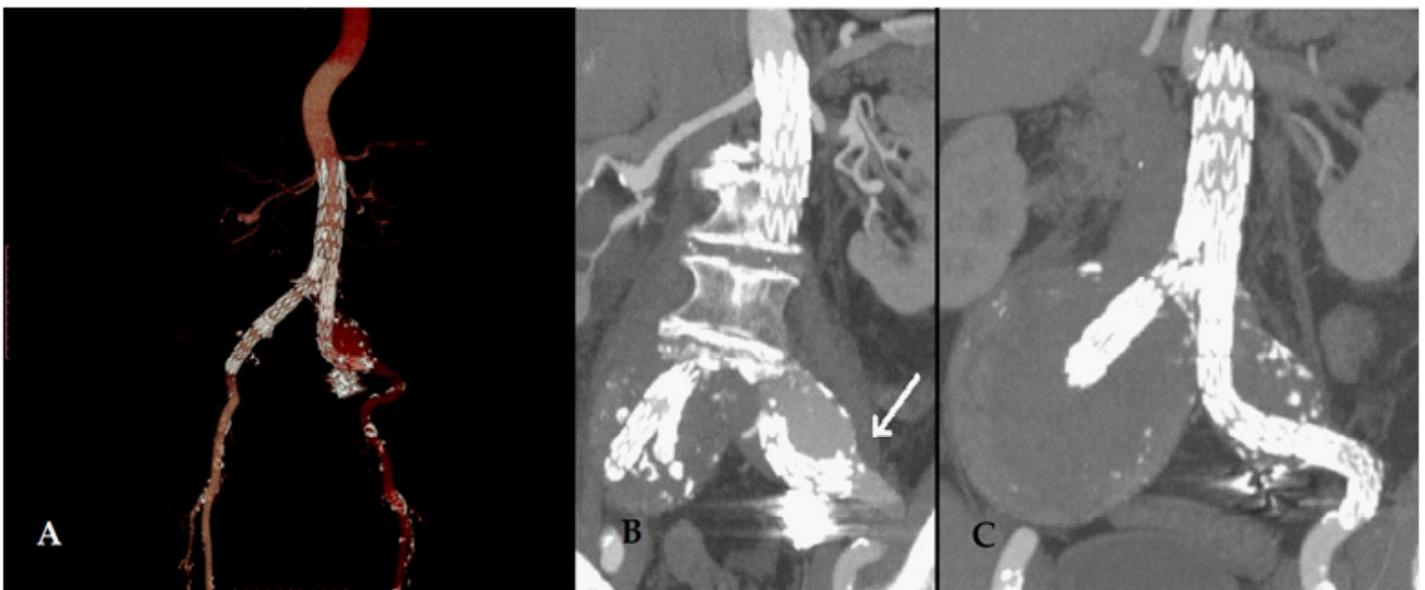
## Conclusion

Delayed type Ib endoleak represents an uncommon complication following EVAR. Regular post-operative surveillance with either doppler US or CTA is mandatory in order to minimize the possibility of a new aneurysmal formation with potential fatal complications.

## Figures



**Figure 1:** Preoperative CT scan depicting bilateral iliac artery aneurysms with a previously implanted IB device on the right iliac artery. (A) Aortic bifurcation showing retrograde blood flow from left CIA to right CIA. (B) Bilateral CIA aneurysms. (C) Dislodged endograft on left CIA due to distal progression of aneurysmal disease (circle).



**Figure 2:** (A), (B) Bilateral iliac artery aneurysms, with previously installed IB device on the right side and embolization of left internal iliac artery. Additionally, distal extension of the aortic disease is depicted, with development of a type IB endoleak (arrow). (C) Post-operative CTA, showing application of an iliac extension into the left external iliac artery, sealing the endoleak.

## References

1. Huang Y, Gloviczki P, Duncan AA, Kalra M, Hoskin TL, Oderich GS, et al. Common iliac artery aneurysm: expansion rate and results of open surgical and endovascular repair. *J Vasc Surg.* 2008; 47: 1203-1210.

2. Griffin CL, Scali ST, Feezor RJ, Chang CK, Giles KA, Fatima J, et al. Fate of aneurysmal common iliac artery landing zones used for endovascular aneurysm repair. *J EndovascTher.* 2015; 22: 748-759.
3. Lepidi S, Piazza M, Scrivere P, Menegolo M, Antonello M, Grego F, et al. Parallel endografts in the treatment of distal aortic and common iliac aneurysms. *Eur J VascEndovasc Surg.* 2014; 48: 29-37.
4. Bacharach JM, Slovut DP. State of the Art: Management of Iliac Artery Aneurysmal Disease. *Catheter Cardiovasc Interv.* 2008; 71: 708-714.
5. Della Schiava N, Arsicot M, Boudjelit T, Feugier P1, Lermusiaux P1, Millon A. Conformability of GORE Excluder Iliac Branch Endoprosthesis and COOK Zenith Bifurcated Iliac Side Branched Iliac Stent Grafts. *Ann Vasc Surg.* 2016 ;36: 139-144.
6. Jongsma H, Bekken JA, Bekkers WJ, Zeebregts CJ, van Herwaarden J, Hoksbergen A, et al. Endovascular Treatment of Common Iliac Artery Aneurysms with an Iliac Branch Device: Multicenter Experience of 140 Patients. *J EndovascTher.* 2017; 24: 239-245.
7. Hiramoto JS, Reilly LM, Schneider DB. Long-term outcome and reintervention after endovascular abdominal aortic aneurysm repair using the Zenith stent graft. *J Vasc Surg.* 2007; 45: 461-465.
8. Chaikof EL, Brewster DC, Dalman RL, Makaroun MS, Illig KA, Sicard GA, et al. SVS practice guidelines for the care of patients with an abdominal aortic aneurysm: executive summary. *J Vasc Surg.* 2009; 50: 880-896.
9. Bianchini Massoni C, Perini P, Tecchio T, Azzarone M1, de Troia A1, Freyrie A. A systematic review of treatment modalities and outcomes of type Ib endoleak after endovascular abdominal aneurysm repair. *Vascular.* 2018; 26: 90-98.
10. Zaiem F, Almasri J, Tello M, Prokop LJ3, Chaikof EL4, Murad MH. A systematic review of surveillance after endovascular aortic repair. *J Vasc Surg.* 2018; 67: 320-331.

**Manuscript Information:** Received: December 06, 2018; Accepted: February 08, 2019; Published: February 28, 2019

**Authors Infomation:** Georgios Sachsamanis\*; Anastasios Papapetrou; George Galyfos; Christiana Anastasiadou; Chrysostomos Maltezos

Department of Vascular Surgery, General Hospital 'KAT', Athens, Greece

**Citation:** Sachsamanis G, Papapetrou A, Galyfos G, Anastasiadou C, Maltezos C. Late common iliac artery aneurysm rupture due to contralateral type IB endoleak after previous EVAR. *Open J Clin Med Case Rep.* 2019; 1511.

**Copy right statement:** Content published in the journal follows Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>). © Sachsamanis G 2019

**About the Journal:** Open Journal of Clinical and Medical Case Reports is an international, open access, peer reviewed Journal focusing exclusively on case reports covering all areas of clinical & medical sciences.

Visit the journal website at [www.jclinmedcasereports.com](http://www.jclinmedcasereports.com)

For reprints and other information, contact [info@jclinmedcasereports.com](mailto:info@jclinmedcasereports.com)