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The good, the bad and the ugly: the tale of an ever-growing aneurysm

António Duarte[a,b], **Alice Lopes**[a,b,c], **Ana Luísa Silva**[a], **Pedro Amorim**[a,c], **Luís Mendes Pedro**[a,b,c]

[a] Vascular Surgery, Heart and Vessels Department, Unidade Local de Saúde Santa Maria, Lisbon, Portugal,
[b] CCUL @RISE, Faculty of Medicine, University of Lisbon, Av. Prof. Egas Moniz MB, 1649-028 Lisbon, Portugal
[c] Lisbon Academic Medical Centre, Lisbon, Portugal

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ABSTRACT

BACKGROUND: Aneurysmal sac growth is a major concern regarding follow-up after endovascular aortic repair (EVAR) and the main reason for aortic reintervention. Despite timely diagnostic testing and interventions, some cases of persistent sac growth warrant further investigation, particularly when less frequent etiologies are suspected.

REPORT: We report the case of a 68-year-old male patient referred to the Vascular Surgery outpatient clinic due to an asymptomatic 71mm infrarenal abdominal aortic aneurysm. He hads a history of heavy smoking habits, severe chronic obstructive pulmonary disease and a previous prostatectomy and local radiotherapy. Due to a favourable anatomy and a high surgical risk for open repair, the patient was subjected to an aorto-bi-iliac EVAR endovascular repair in 2019. The procedure was performed under general anaesthesia and bilateral femoral cutdown access, with no complications. One One-year follow-up showed no endoleaks nor sac growth.

At three years, a control computed tomography angiography (CTA) angiography showed a late type II endoleak form persistent lumbar arteries, with a stable sac diameter. Further yearly ultrasound assessment was performed. In At 5 years, due to significant growth of the sac diameter to 91mm, an urgent CTA was performed, revealing loss of proximal sealing in addition to a type 2024, due to a significant sac diameter growth to 91mm, an urgent CT angiogram showed loss of proximal sealing in addition to type II endoleak. Based on these findings, a custom-made fenestrated cuff was designed and implanted in this patient. Despite adequate sealing with this cuff, with no evidence of type I endoleak or target vessel complications, the patient was admitted into the emergency room 5 months after the reintervention with de novo abdominal and lumbar pain. Blood tests showed frank leukocytosis and elevated C-reactive protein levels. Urgent CTA showed a 105mm -mm-diameter sac and periaortic enhancement, with an apparent type II endoleak. Blood cultures were collected, and the patient was put empirically medicated with meropenem and linezolid. An urgent open conversion was performed with graft preservation, thrombus removal, and sac wrapping. Mycoplasma hominis was isolated from the aneurysm sac and thrombus, and the patient was discharged 30 days after the surgery on levofloxacin and doxicyclinedoxycycline. One month follow-up showed no signs of recurrence, and the patient remains asymptomatic.

CONCLUSION: With the advent of EVAR, there is a greater need to develop robust follow-up protocols regraarding endoleaks and sac surveillance. In the absence of clear sources of endoleak, infection may be account for over 20% of occult sac growth. In frail and selected patients, such as this case of infection, sac evacuation and wrapping may be an alternative approach to graft explantation.

Corresponding Author:
António Duarte | antoniomduarte94@gmail.com
Unidade Local de Saúde Santa Maria
Av. Prof. Egas Moniz MB, 1649-028 Lisboa

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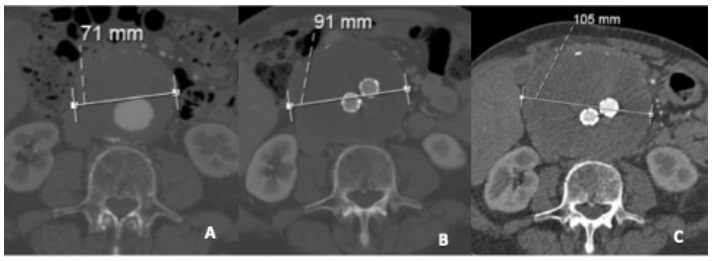
BACKGROUND

The advent of endovascular aortic repair (EVAR) has expanded treatment options for infrarenal abdominal aortic aneurysms (AAA), with superior short-term outcomes and, in the long term, outcomes that are progressively approaching those of surgical open repair.[1-3] Nevertheless, aneurysmal sac growth is a major concern regarding follow-up after EVAR and the main reason for aortic reintervention. Despite timely diagnostic testing and interventions, some cases of persistent sac growth warrant further investigation, particularly when less frequent etiologies are suspected. The following case highlights the need for thorough follow-up and investigation when the cause of sac growth is unclear.

CASE REPORT

This is the clinical case of a 68-year-old male patient referred to the outpatient Vascular Surgery clinic in 2019 due to an asymptomatic infrarenal abdominal aortic aneurysm incidentally identified in a routine ultrasound. He has a previous history of heavy smoking habits (40 pack-years), GOLD 4 chronic pulmonary obstructive disease and a previous prostatectomy and local radiotherapy in 2005. A Computed Tomography Angiography (CTA) was performed, showing a 71 mm-diameter infrarenal aortic aneurysm with a 14mm length and 23mm diameter infrarenal aortic neck, Figure 1A. Due to his comorbidities and high surgical risk for an open repair, as well as a suitable anatomy, an aorto-bi-iliac EVAR was performed in November 2019.

Figure 1. Computed tomography angiography, axial views – evolution over time

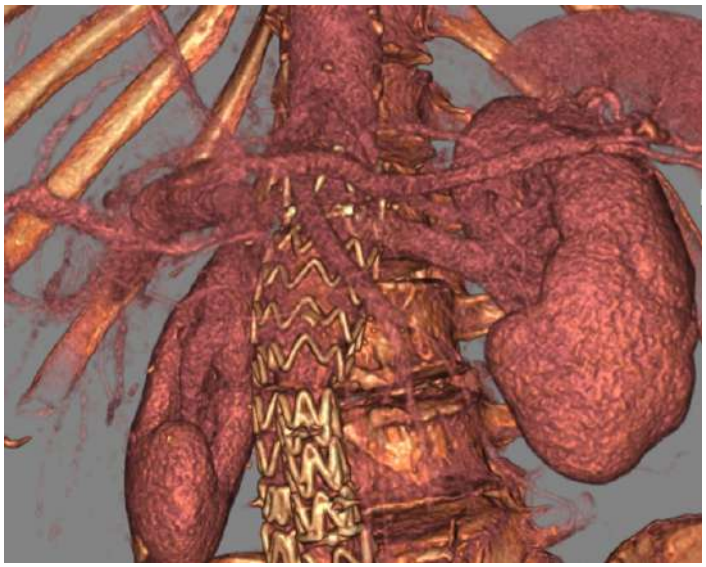


1A: 71-mm diameter aneurysm in 2019; **1B:** aneurysmal sac growth to 91mm diameter in June 2024 due to type IA and II endoleaks; **1C:** 105mm diameter sac due to type II endoleak and Mycoplasma hominis infection

Under general anaesthesia and bilateral femoral cutdown access, an Endurant IIs® (Medtronic, Ireland) 28mm diameter bifurcated graft (15-20% diameter oversizing) and bilateral iliac extensions were deployed. The procedure was uneventful, with minimal blood loss and a complete angiogram with no evidence of endoleak. The patient was discharged three days after the procedure under single antiplatelet therapy and atorvastatin. One-month CTA scan showed no signs of complications.

In 2023, a follow-up ultrasound identified a type II endoleak and a maximum diameter of 80mm (an increase of 10mm over 4 years). In 2024, due to a 10mm sac growth. One year later, a CTA was performed and revealed a type II endoleak as well as a suspected type IA endoleak with due to loss of proximal sealing, in the likely event of distal migration due to a short infrarenal neck in the index procedure (Figures 1B and 2).

Figure 2. Computed tomography angiography 3D reconstruction showing loss of proximal seal



For this reason, a custom-made fenestrated endograft was planned, and an elective fenestrated EVAR (fEVAR) was performed in June 2024. Under general anaesthesia and bilateral femoral cutdown access, the procedure was performed uneventfully, with no complications and patency of all target vessels on the control angiography, (Figure 3). The patient developed no symptoms of spinal cord ischemia during hospitalization, with no visceral complications, and was discharged three days after surgery. He was placed under dual antiplatelet therapy.

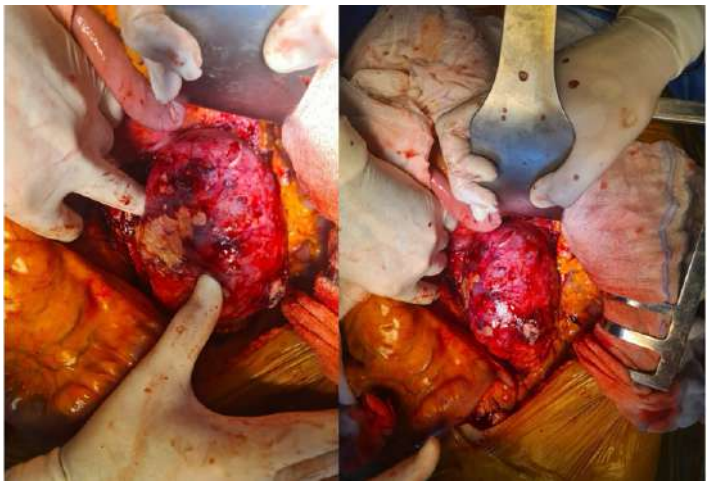
Figure 3. Intra-operative digital subtraction angiography after a custom-made fenestrated endovascular repair

Five months after the reintervention, the patient was readmitted to the emergency room due to *de novo*

abdominal and lumbar pain. Blood tests showed frank leucocytosis and elevated C-reactive protein levels. A CT angiogram was performed showing periaortic densification and a 15mm sac diameter increase (105mm diameter), Figure 1C. Due to a high level of suspicion regarding a secondary infectious aneurysm, blood cultures were collected, and the patient was empirically started on intravenous meropenem and linezolid.

After a multidisciplinary discussion, the patient was deemed at high risk for an explantation surgery. However, with a significant sac increase and high risk of rupture, we performed an open conversion with lumbar artery ligation and sac wrapping. Intraoperatively, the aneurysmal sac was friable with several areas of ulceration with no clear evidence of aorto-enteric fistula, Figure 4.

Figure 4. Intraoperative images of the aneurysm sac, showing several ulcerated areas and no evidence of aorto-enteric fistula



After sac evacuation and wrapping (Figure 5A), an omentoplasty was performed to cover the remaining sac (Figure 5B). After 72 hours in the intensive care unit, the patient was uneventfully transferred to the Vascular Surgery ward. Samples from aneurysmal thrombus and all were collected and revealed an isolate of Mycoplasma hominis.

Figure 5. Intra-operative images of the open conversion procedure.

4A: aneurysm sac evacuation with exposed endograft; **4B:** sac wrapping and omentoplasty

After discussion with the Infectiology department, antibiotic therapy was adjusted to levofloxacin and doxycycline for the remainder of the hospitalisation with adequate clinical and laboratory improvement. He was discharged after 34 days. One-month follow-up was uneventful, with a control CTA showed no evidence of recurrence or endoleaks. The patient will complete a full course of doxycycline and levofloxacin for at least 6 months and will be reassessed thereafter, with further decisions made in consultation with the Infectious Diseases department.

DISCUSSION

The following clinical case reflects the need for further investigation when persistent sac growth occurs, especially after multiple reinterventions. According to the most recent European guidelines and the recommended follow-up protocol, the presence of an occult endoleak warrants additional diagnostic testing. In the most recent European guidelines, along with the recommended follow-up protocol, the presence of occult endoleaks warrants the need for additional diagnostic tests. Indeed, up to 20% of occult endoleaks may be related to an infectious disease, which can be identified by metabolic studies such as 18-FDG-PET scans or by direct sac puncture for microbiological analysis. [1] In our case, due to an aneurysmal sac diameter over 10 cm and the failure of multiple endovascular approaches, we chose an open conversion and direct material collection. Ideally, as highlighted in recent literature, open conversion with endograft excision is associated with increased survival when comparinged with more conservative strategies. [4,5] In this case of a frail patient with multiple recent reinterventions, graft preservation and sac wrapping after sac evacuation wasere deemed more adequate. In a single center study from Japan, a similar strategy was reported with a lower risk of recurrence and sac growth, despite a 21% risk of late mortality.[6]

Regarding the cause for sac growth in this patient, this is the first reported case of Mycoplasma hominis after EVAR. Only 2 cases were reported in other territories, namely in: a patient treated with ascending aorta graft replacement and a 73-year-old male patient who underwent femoropopliteal graft removal and bypass with an allograft.[7,8]

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