Late Conversion of a Distally Migrated Abdominal Aortic Endograft in a Symptomatic Patient

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Graft migration is still an issue during the follow-up of patients undergoing Endo Vascular Aneurysm Repair (EVAR) for Abdominal Aortic Aneurysm (AAA). Open surgical conversion still represents the treatment of choice in patients fit for open surgery. We herein describe the case of a 73-year-old man with abdominal pain, pararenal AAA, and complete migration of an Anaconda stent-graft previously implanted 10 years earlier. The patient was urgently treated with open surgical conversion. Postoperative course was uneventful.

Keywords: aortic endograft; graft migration; surgical conversion; case report

Introduction

Anaconda stent-graft (Vascutek, Terumo, Inchinnan, UK) is one of the available devices on the market for the EndoVascular Aneurysm Repair (EVAR) of Abdominal Aortic Aneurysm (AAA). It is a three-piece device consisting of two proximal independent nitinol self-expandable rings with hook fixation, zero body support, and vacuum-cleaner tube leg design, completely designed for an infrarenal fixation [1,2].

Early and late outcomes are comparable with those obtained with other devices on the market with 3-year freedom from reintervention of 85%, and freedom from type I endoleak of 98.9%, respectively [2].

However, as previously demonstrated by Vukovic *et al.* [3], the main body of this endograft slowly but continuously migrates towards the aortic bifurcation. In literature is well-known that endograft migration could be an issue during the follow-up of patients undergoing EVAR [4]. Open surgical conversion still represents the treatment of choice in patients not treatable with standard/complex endovascular procedures, and in patients fit for open repair [5].

We herein describe the case of a 73-year-old man with abdominal pain, pararenal AAA, and complete migration of an Anaconda stent-graft previously implanted 10 years earlier (**Supplementary Material**).

The patient gave his written consent to the current publication.

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Report

A 73-year-old man was admitted at Emergency Department of a peripheral hospital with left plank pain. Clinical examination found a pulsatile abdominal mass. Clinical history was notable for smoking, hypertension, hyperlipidemia, and previous implantation of a bifurcated aortic endograft (Anaconda) for AAA performed in a peripheral hospital 10 years earlier.

Preoperative electrocardiography (ECG) excluded acute cardiac disease. There were no signs of hemodynamic instability with standard blood pressure values (145/80 mmHg). Blood exams did not detect any kidney or liver diseases; in addition, hemoglobin value was normal (14.5 g/dL).

Computed Tomography Angiography (CTA) detected a complete distal migration of the Anaconda stent-graft very close to the aortic bifurcation (Fig. 1). There was no sealing of the endograft to the aortic wall. The distal fixation of the limbs to the common iliac arteries was regular with no signs of type Ib endoleak. However, abdominal aneurysmal sac was not excluded from the blood flow with a maximum diameter of 78 mm. Computed tomography (CT)-scan detected proximal extension of the aneurysmal disease up to the Ostia of the renal arteries with the configuration of a pararenal AAA. No sign of rupture/fissuration/graft thrombosis was described.

After teleconsultation, the patient was immediately transferred with helicopter to our referral hospital.

Patient underwent open surgical conversion throughout a midline open laparotomy, suprarenal aortic clamping, endograft removal (Fig. 2), ligation of inferior mesenteric and lumbar arteries, and aortic reconstruction with a bifurcated Dacron graft (Gelweave 22 × 11 mm, ref 732211E; Vascutek, Inchinnan, UK). All anastomoses were performed in

Fig. 1. Preoperative computed tomography (CT)-scan: blue arrow indicates the lowermost renal artery with progression of the aneurysmal disease at pararenal level; red arrow indicates the endograft migrated towards the aortic bifurcation.

an end-to-end way with 3/0 polypropylene monofilament suture. Total renal ischemia time was 23 minutes. No renal perfusion was needed. Endograft removal was possible after surgical dissection of both common iliac arteries immediately above the iliac bifurcations in order to place vascular clamps, and to avoid bleeding from the back-flow.

Patient was transferred to Intensive Care Unit (ICU) for 24 hours, and then admitted at our Department. Postoperative course was uneventful (Fig. 3). Cultures of the endograft were negative. Postoperative CT-scan performed on 3rd postoperative day detected no complication (Fig. 4).

Patient was discharged on 6th postoperative day without complications. Postoperative medical therapy was unchanged. At 6 months patient was still alive, and in well clinical conditions. Patient has been included in our follow-up protocol with 1-year follow-up CT-scan, and then Duplex Ultrasound Scan (DUS) every 6 months.

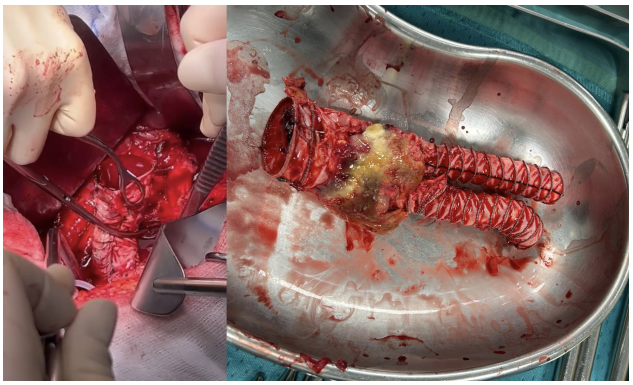

Fig. 2. Endograft removal: intraoperative details.

Fig. 3. Patient at our department during the immediate post-operative period.

Discussion

It was unclear why Anaconda stent-graft migrated distally. Certainly, the patient did not stop smoking, and this risk factor could contribute to proximal progression of the aortic disease with loss of proximal sealing of the endograft to the aortic wall.

In the current literature female gender, aneurysm diameter >65 mm, neck length <10 mm, neck diameter >30 mm, neck angulation >60°, and aortic curvature are considered potential risk factors for late type I endoleak, and endograft migration [6–8].

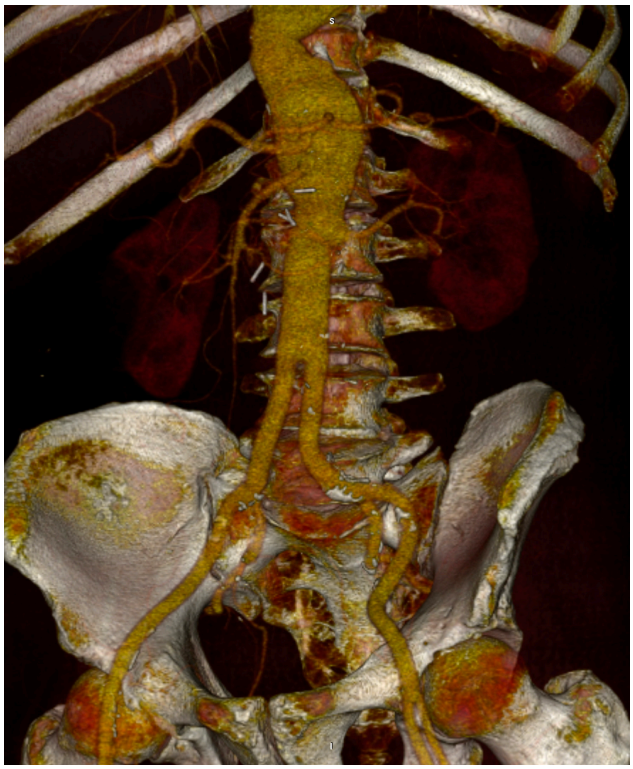

Fig. 4. Postoperative CT-scan.

Unfortunately, we did not have access to the first CTA, and to the first-month follow-up CTA performed 10 years before our urgent surgical intervention. For this reason, we have no data about the potential risk factors that could cause the endograft migration.

As a consequence, our hypothesis was the proximal extension of the aneurysmal disease up to the Ostia of the renal arteries with subsequent proximal neck dilatation. As a result, there was a complete lack of sealing of the endograft to the aortic wall with endograft migration towards the aortic bifurcation. Endograft collapse was not complete. For this reason, perfusion of both iliac axes was adequate.

A recent study [3] suggested that Anaconda main body ring system in its proximal portion flattens within the first year after EVAR, leading to an increase of 2 to 4 mm in the proximal landing zone's aortic diameter; therefore, main body migrates slowly but continuously down towards the aortic bifurcation.

More recently, a systematic review of literature reported a rate of migration of Anaconda stent-graft during follow-up of 1.7% [9]. Therefore, this event is not so rare, above all in young patients undergoing EVAR with a long life-expectancy.

When an endograft migration occurred, redo endovascular treatment could be considered an option. Redo standard EVAR with bifurcated endograft has been reported in literature as a valuable option [10]. In addition, a single proximal aortic cuff could be sometimes considered a good therapeutic alternative [11].

However, in the case herein reported the patient had a symptomatic pararenal aortic aneurysm; for this reason, standard EVAR was not a viable solution. The patient was relatively young and fit, and we decided for open surgery. Our decisional algorithm was successful, even if a recent multicenter experience [5] on late open conversions after EVAR reported an overall 30-day mortality rate of 11.2%; in addition, early mortality seemed to be affected by urgent/emergent setting, suprarenal aortic clamping, and pre-existing chronic renal failure.

Finally, we should consider two topic key points. First, the patient was firstly treated with EVAR in a peripheral hospital when he was 63 years old. Second, he was not followed with a strict protocol nevertheless the young age. For this reason, open surgical repair should be still considered the "first-line" strategy for young patients with AAA fit for open surgery [12], and patients undergoing EVAR should be always included in a strict follow-up protocol as recommended by the most recent guidelines [13] in order to early detect type I endoleak/endograft migration.

Conclusions

Abdominal endograft migration is a potential life-threatening complication after EVAR. Strict follow-up protocol is mandatory to early diagnose type I endoleak with aneurysmal sac reperfusion in order to promptly treat it. Open surgery still remains a valid option in young and fit patients.

Availability of Data and Materials

The data analyzed are available from the corresponding author upon reasonable request.

Author Contributions

RB, VA, VM, and NT—writing, data analysis, data interpretation, final revision, and final approval. GB and DA—data analysis, data interpretation, final revision, and final approval. All authors have been involved in revising it critically for important intellectual content. All authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

Ethics Approval was waived because the paper is a case report. Patient gave his consent to the publication. The paper has been written according to the Declaration of Helsinki.

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Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.62713/aic.3976.

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