

## OPEN SURGICAL REPAIR AFTER EARLY ENDOGRAFT THROMBOSIS FOLLOWING EVAR- CASE REPORT

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**Abstract:** Introduction: Abdominal aortic aneurysm (AAA) is a common problem of the community and it is associated with a high risk of mortality in case of complications. However, there are discussions regarding the efficiency of endovascular or open surgery repair of that. Case presentation: In our case, an early endograft thrombosis (3 weeks) causing limb ischaemia required a completely endograft explantation and an interposition of bifurcated prosthetic graft from the infrarenal aortic neck to the femoral arteries in a 56-year-old female patient. Conclusions: Endoluminal repair of abdominal aortic aneurysm has many advantages, but many complications also occur. Open surgical repair after complicated endovascular aneurysm repair (EVAR) needs complete endograft removal and revascularization with a prosthetic surgical graft.

### INTRODUCTION

Abdominal aortic aneurysm (AAA) is a common problem of the community and it is associated with a high risk of mortality in case of complications, rupture. Due to the development of different screening methods the annual incidences of the AAA have been shown an increasing tendency, and from 2010 an annual mortality over 10,000 cases due to AAA has been reported in the United States. For these reasons, screening and early intervention are very important to prevent the complications of AAA.

Freeman and Leeds were the first who successfully performed open surgical repair for AAA in 1951, after that open surgery has become a popular treatment for AAA.

The first endovascular aneurysm repair (EVAR) was published in 1991, by Parodi et al. Since then, EVAR has undergone rapid technical, as well as quantitative, developments. EVAR has many advantages: less invasive, faster recovery of the patient and shorter hospitalization period.(1)

### CASE PRESENTATION

A 56-year-old female patient was admitted to the Emergency Department (ED) of our clinic with right lower limb rest pain, paresthesia, coldness. She was known with Endovascular Aneurysm Repair (EVAR) performed 3 weeks ago in the United States of America (USA). Furthermore, the patient had a history of right ureteral stent placement for an ureteral stenosis and ureterohydronephrosis, arterial hypertension, dyslipidemia. As postoperative treatment, we mention antiplatelet, antihypertensive therapy and lipid-lowering drugs.

The clinical examination showed a normostenic, conscious, cooperative patient with cold and pale skin, absence of right femoral pulse, decreased left femoral pulse.

Computed Tomography Angiography (CTA) revealed a positive intra-stent graft blood flow but lumen-reduction with 50 % in the level of aorta, and no colour flow signal in the

lumen of right common- and external iliac artery. The other distal arteries were permeable.

Preoperative surgical planning included evaluation of aneurysm morphology, position of the endograft.

**Figure no. 1. No color signal in the lumen of right common iliac artery**



In the previous debate with the colleague from the USA together with our colleague from the radiology department, we established that there was no indication of another endovascular intervention. So, an open surgery procedure with laparotomy, endograft-explantation and an interposition of a bifurcated prosthetic (Dacron) graft from the infrarenal aortic neck to the femoral arteries was performed, thereby a successfully revascularization of the limbs was realized.

#### Surgical approach

After exposing of the aorta and iliac arteries through an abdominal transperitoneal approach under general endotracheal anesthesia, the infrarenal aorta was cross-clamped

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## CLINICAL ASPECTS

just below the renal arteries after systemic heparinization, then the aneurysm sac and endograft opened. A fully intra-stent graft thrombosis was found with extension in the iliac limbs of the endograft without back-bleeding from iliac arteries.

**Figure no. 2. Intra-stent graft thrombosis in the level of the body**



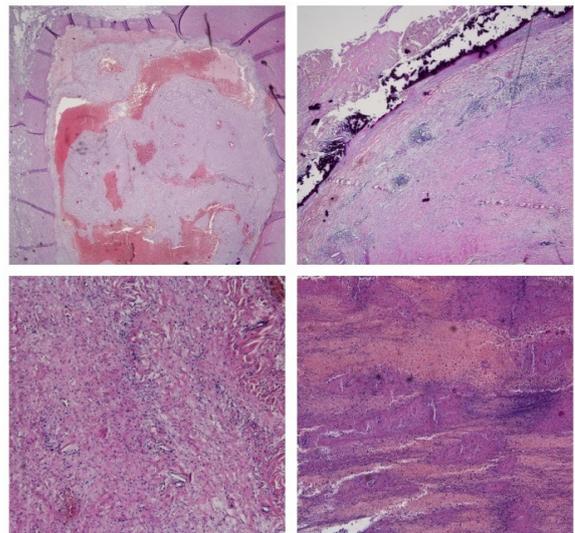
A completely graft-removal was necessary, firstly the body of the endograft than the two iliac limbs. Back-bleeding lumbar vessels were suture-ligated from within the aneurysm sac. A bifurcated prosthetic Dacron graft was selected, and the proximal portion was sutured end-to-end to the infrarenal aorta. The distal end-to-side anastomosis of the Dacron graft was performed to the femoral arteries after tunnelling. The clamp was open and after an adequate hemostasis the aneurysm sac was sutured over the aortic graft.

**Figure no. 3. End-to-end anastomosis of bifurcated Dacron-graft to infrarenal aorta**



The removed endograft and a resected aorta wall was sent to the histological examination.

**Figure no. 4.A. On the aortic transverse section, advanced atherosclerosis and parietal thrombus causing lumen obstruction was observed. Hematoxylin eosin (H&E) stain, 4X magnification. B. Histological section of the AO wall showing large fibrocalcific atherosclerotic plaque with extracellular lipid deposits and extensive nodular calcification associated with thinning and ulceration of fibrous cap. The underlying media exhibits mononuclear inflammatory infiltration. Hematoxylin eosin stain (H&E), 10X magnification. C. The thickened media showing loss of elastic tissue and presence of inflammatory infiltrate. Hematoxylin eosin stain (H&E), 20X magnification. D. The parietal thrombus shows classic structure of mixed layered thrombus. Hematoxylin eosin stain (H&E), 20X magnification.**



### *Follow up*

Postoperatively, the patient was observed in the intensive care unit, with transfer to the standard surgical unit on the second postoperative day. The patient was seen monthly after discharge. As late postoperative complication, we can mention a minimal suture dehiscence at inguinal level with cloudy secretion without bacterial growth. Postoperative follow up and imaging consisted of physical examination, computed tomography (CT) angiography.

**Figure no. 5. Positive intra-prosthetic blood flow in the level of aorta**



### DISCUSSIONS

Since endovascular aneurysm repair (EVAR) was first introduced in 1991, it has undergone rapid technical and quantitative developments. This is due to increased screening and to the extended life expectancy. While long-term durability is still uncertain, EVAR has many early advantages: decrease in postoperative morbidity, shorter hospital stays, better short-term quality of life and less blood transfusion. Nevertheless, besides advantages, EVAR has frequently unexpected complications. Graft occlusion causing limb ischemia is one of these adverse events. Ischemic complication in postoperative period after EVAR occurs in 3% to 10% of cases.(2,3)

The particularity of our case is the early occurrence of endograft thrombosis. Three weeks after the intervention the patient came to the ED with lower extremity ischemia and an occluded endograft. The etiologic factors in similar cases are very important to know.

In January, 2007 in France, a retrospective clinical analysis was published. There were analysed near 450 AAA patients between 1995 and 2005, which were electively treated with EVAR. They showed that the type of stent-graft, the age of the patient and arterial diseases are the most frequently causes of early graft-thrombosis. In this trial, limb occlusions occurred with any type of stent-graft (Vanguard, EVT, Stentor, Stenford, Gore, Zenith, and Talent) except for the AneurX device. This means that the first-generation grafts had a higher incidence of complications including occlusion than the currently commercially available stent-grafts.(4) In our case, it was an Endologix afx used. Furthermore, patients who developed graft limb thrombosis were significantly younger as compared with patients without graft limb occlusion (mean age: 68.5 versus 72.6;  $p = .007$ ). Our patient belongs the younger category. The third possible etiologic factors are the arterial diseases. Atherosclerosis, as it is well known, is a systemic disease, influencing the outflow of endograft, causing thrombosis inside the graft.(3)

Regarding the treatment option, we choose the open surgery technique, with an initial intention of mechanical thrombectomy, eventually partial graft preservation. Because total body and limb graft occlusion was not feasible, a completely graft-removal and an interposition of bifurcated prosthetic graft from infrarenal aortic neck to femoral arteries was performed.(5)

Thrombolysis and stenting are an alternative treatment. Our choice was an agreement between radiologists and surgeons. The benefits and disadvantages of the different treatment methods were taken into consideration.

To summarize, the choice between thrombolysis and open surgery depends on patient's condition, severity of ischemia, symptomatology onset and institutional possibilities.

### CONCLUSIONS

Despite the many advantages of endoluminal repair of abdominal aortic aneurysms, we often encounter complications and technical problems which must be resolved by open surgery. In some cases, partial endograft preservation is possible, but if not, complete endograft removal is necessary for the completely limb revascularization and limb salvage.

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