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ORIGINAL ARTICLE

Abdominal Aortic Endoprosthesis as an Iliac Branch Device for the Preservation of Common Iliac and Internal Iliac Arteries in a Patient with a Common and Internal Arteries Aneurysm and a Type B Aortic Dissection

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Abstract

Introduction: An iliac artery aneurysm (IAA) is characterized by an increase in the vessel's diameter of more than 1.5 times that of normal. There are numerous similarities between iliac and aortic aneurysms in terms of their natural histories, risk factors, and key treatment philosophies.

Objectives: To report the use of an abdominal aortic endoprosthesis as an iliac branch device in a patient with a type B aortic dissection, multiple comorbidities, and aneurysm of the abdominal aorta and the right common and internal iliac arteries.

Methods: Male patient, 58, brought to hospital with type B aortic dissection and other comorbidities. The patient was released after a successful TEVAR procedure in which we implanted 1 thoracic endoprosthesis and 2 thoracic segments. A post-TEVAR CT is taken, and EVAR (endovascular aneurysm repair) planning is completed. In order to do the EVAR surgery, we inserted a covered stent and a 23 mm X 14 mm X 18 cm abdominal aortic endoprosthesis into the right common iliac artery to act as an iliac branch device. There are no endoleaks in the final aortography.

Results: The treatment was successful, and there is no sign of any problems in the control CT and improvement in the patient's quality of life.

Conclusion: An aortic abdominal endoprosthesis can work well as an iliac branch device despite the existence of other iliac branch devices. With adequate preparation, the two-stage operation can enhance the results for patients with type B aortic dissection.

Key Words: *Type B aortic dissection; Endoprosthesis; Iliac branch device; Iliac artery aneurysm; Endovascular approach; Two-staged approach*

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Introduction

Iliac and aortic aneurysms frequently occur together presenting many similarities in terms of their natural histories, risk factors and fundamental therapeutic approaches [1]. Only 0.4% to 1.9% of all intra-abdominal aneurysms (estimated prevalence: 0.008%-0.03%) are isolated iliac artery aneurysms. While many people with isolated IAA are asymptomatic, local compression of the iliac vein, sacral plexus, or ureter might cause symptoms [2,3]. Extrapolating from AAA monitoring, suggested observation intervals should be every three years for IIAs with a diameter of 2.0-2.9 cm and yearly for IAAs with a diameter of 3.0-3.4 cm [1]. A cutoff diameter of 30 to 35 mm has been proposed as suggestive of surgical exclusion [2,4]. Although the typical surgical approach was open surgery with graft interposition (OIR), isolated internal iliac aneurysms occasionally required closure or oversewing of the proximal internal iliac artery (AII) and oversewing of outflow branches. Whenever there is anatomic suitability, endovascular treatment (EVAR) is frequently regarded as first-line therapy in vascular centers, as it has gained popularity over the past several years [2,5]. However, the risk of distal sealing-related endoleaks makes the use of iliac branch devices (IBDs) for endovascular aneurysm treatment contraindicated in the presence of a hypogastric aneurysm [6]. Since it provides good short- to mid-term results and low early mortality, endovascular therapy is recommended as the preferable way of treatment in the literature [7]. Manufacturers recommend a proximal aortic endograft implantation in the infrarenal aorta in order to ensure effective proximal sealing of the IBDs. However, in CIAs with adequate neck length, an isolated branch implant might be a suitable treatment option, saving money overall and preventing unnecessary grafting of the healthy infrarenal aorta [4,8]. As to Type B aortic dissection (TBAD) have a 30-day mortality rate of up to 25%. Even in the absence of these complications, a diagnosis of type B dissection is associated with a 10% in-hospital mortality [9]. TBAD is a serious condition that need to be treated if complications such as impending rupture, rapid dilation, intractable pain, hypertension, and, in particular, organ or limb malperfusion are present. Endovascular treatment of acute TBAD is now the first choice when anatomically feasible, due to its lower invasiveness and superior results to open repair [10].

Methods

We are reporting the case of a 58-year-old male patient, with a history of BMI (body mass index) of 37, type 2 diabetes, arterial hypertension, and ischemic heart disease with 26% left ventricular ejection fraction and 10 previous coronary stents in the past 3 years. The patient was admitted to the hospital with an acute type B aortic dissection six months prior. The patient underwent a Thoracic endovascular aortic repair. (Thoracic endovascular aortic repair), (Figure 1). Dissected descending thoracic aorta was managed with deployment of three thoracic endografts/endoprostheses.

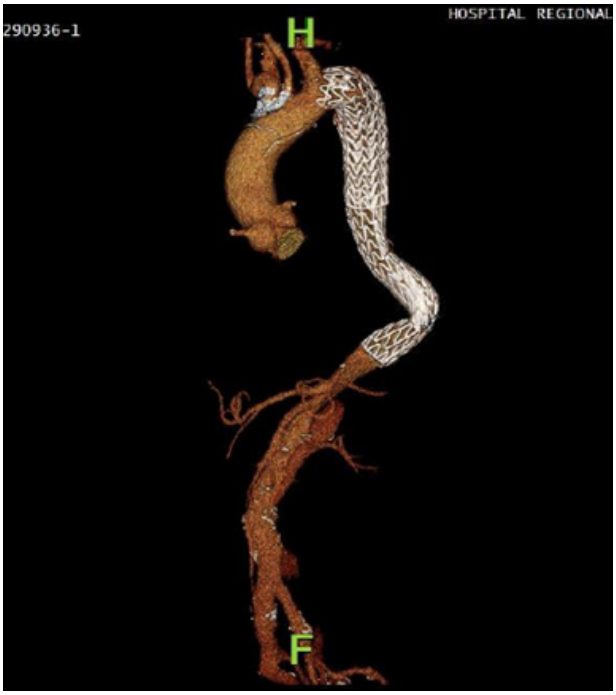

Figure 1) *3D reconstruction of TEVAR.*

With adequate outcomes the patient was kept under surveillance at our office. Patient with adequate post-TEVAR evolution the patient is sent to cardiology department by protocol of ischemic heart disease and the possibility of heart transplant. The heart transplant protocol required exclusion of the rest of the dissection as well as the abdominal aortic aneurysm and the right common and internal iliac arteries before transplantation. A post-TEVAR CT is made, and planning of the EVAR (Endovascular aneurysm repair) is carried out (Figure 2).

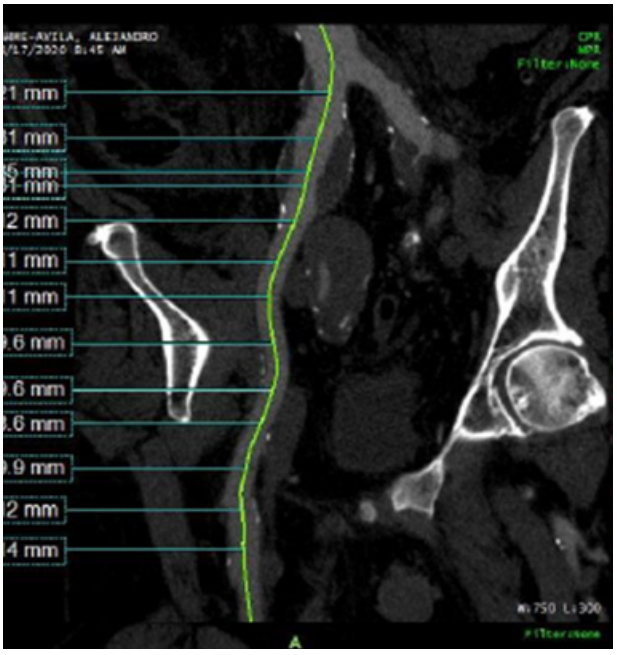

Figure 2) *Planning of EVAR.*

The patient is admitted to the hospital 6 months later after TEVAR procedure, for a scheduled procedure for exclusion of iliac aneurysm as well as previous aortic dissection extending to left internal iliac artery, in basis for heart transplantation requirements and severity of disabling cardiac disease, we obtained consent from the patient.

In the EVAR procedure. The initial digital subtraction angiography (DSA) finds proper positioning of the thoracic endoprosthesis, without endoleaks, presence of true lumen with adequate flow to visceral and renal lumen, decrease in lumen below renal arteries, with the presence of two polar arteries (one on each side) at the level of the right iliac common iliac aneurysm extending to the right internal iliac artery. In the left iliac there was dissection that runs to the left internal iliac artery. We performed the procedure by placing a 23 mm X 14 mm X 12 cm abdominal aortic endoprosthesis (Excluder, Gore) in the right common iliac artery with ipsilateral to the external iliac artery and contralateral gate oriented to internal iliac artery. Cannulation to contralateral gate was performed from above (left brachial artery), and then to internal iliac artery (Figure 3). With stiff wire placed in the internal iliac artery a graft stent 13 mm X 10 mm (Viabahn) is deployed into the internal iliac artery just above the superior gluteal artery. DSA with adequate flow to external and internal iliac arteries.

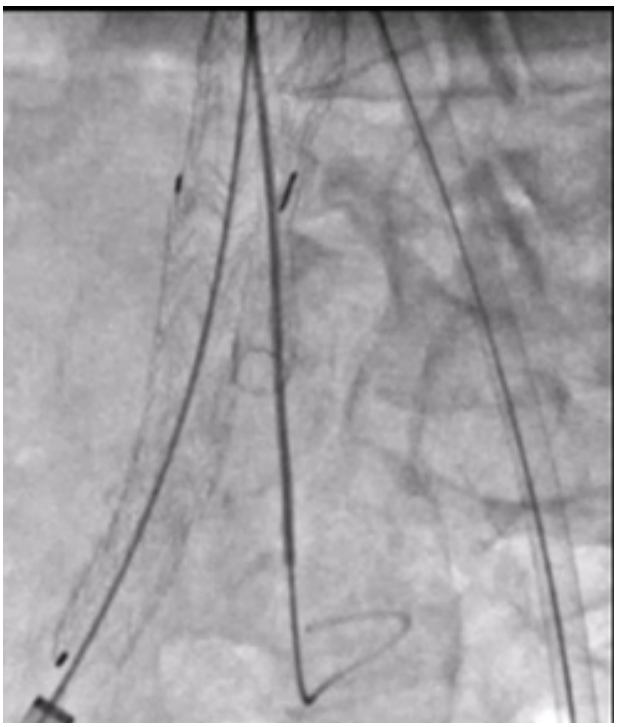

Figure 3) *Abdominal aortic endoprosthesis as iliac branch device already with hypogastric artery cannulation.*

By the left femoral access, the main body of another abdominal aortic endoprosthesis 23 mm X 14 mm X 18 mm (Excluder, Gore) is deployed with the contralateral branch to the right side, cannulation to the contralateral gate

or main body is performed through the right endoprosthesis custom as iliac branch device, once the cannulation is done the two main bodies are bridged with a 27 mm X 10 cm stent graft (Gore extension). Left internal artery is embolized with 2 coils, 1 Coil Interlock 35.6 mm X 20 cm, 1 Coil Interlock 35.6 mm X 40 cm (Boston Scientific) and then an aortic extension stent graft is deployed to left external iliac artery. Final DSA did not reveal any endoleaks or complications (Figure 4).

Figure 4) *Final DSA without any kind of endoleaks and with adequate distal and right hypogastric flow of contrast medium.*

Results

The treatment was successful, and there is no sign of any problems in the control CT (Figure 5) at 1 month after the second procedure, as well as adequate flow to the external and internal right iliac arteries. The patient's quality of life has improved, at this moment the patient continues annually surveillance CT, without any sign of endoleaks. The patient had his heart transplant, and now he has a normal BMI, tolerating ambulation without ischemic symptoms.

Figure 5) *Control 3D CT reconstruction 1 month after the EVAR procedure.*

Discussion

In this case the patient presents with a complex scenario, in which his ischemic heart disease, his type B aortic dissection as well as his multiple comorbidities and aortic and iliac artery aneurysms make a patient difficult to treat based on treatment priority. Since the patient is at high surgical risk, an open approach was ruled out since the planning of the case. In our decision to treat endovascular, and from heart transplantation protocol as for general rule to keep at least one internal iliac artery, by that time we only had the option to place an aortic stent graft to exclude the common and internal iliac aneurysm because the iliac branch device

was not approved in our country. When we performed planning of the case, we considered aortic stent graft placement feasible, according to the measurements made. In this patient the placement resulted in a good result that could possibly lead to an option in places where iliac branch device is not routinely performed or are not approved for use as with us at that time. Preoperative is essential and postoperative computed tomography angiography (CTA) or magnetic resonance imaging (MRI) scan is typically acquired within the first postoperative month, at 12 months, and then yearly after that to detect any problems with procedure. Patients with renal insufficiency and/or a contraindication to CTA or magnetic resonance imaging are often examined with duplex ultrasonography within the first postoperative month and then every six months after that. [5,8,11] Patients with AAA combined with common iliac artery aneurysms may experience differing results from endovascular aneurysm repair since abdominal aortic enlargement is more common than common iliac artery aneurysm enlargement [5,12].

Conclusion

In scenarios like this, patients with multiple comorbidities open approach is almost ruled out since the beginning, CTA is crucial in choosing appropriate treatment and devices that could lead to a good result. Choosing an aortic stent graft in a complicated case like this as iliac branch device in the absence of an approved iliac branch device is an option to treat and preserve at least one internal iliac artery since this patient had extension of type B aortic dissection to left internal iliac artery.

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