Interventional Requirements in Cardiovascular Surgery with a Case Report: Coil Embolization

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ABSTRACT

Endovascular aneurysm repair (EVAR) for abdominal aortic aneurismal disease has increasingly gained widespread application. Aneurysm extends into at least one of the iliac arteries in approximately 20%-30% of patients. The presence of an internal iliac artery aneurysm is one of the most important issues that may dictate a modified approach in EVAR. Herein, we aimed to emphasize the interventional skills that surgeons should have in daily practice in a patient who had abdominal aortic aneurysm concomitantly with an internal iliac artery aneurysm. Coil embolization was performed for the internal iliac artery aneurysm.

Key Words: Abdominal aortic aneurysm; endovascular procedures; iliac aneurysm; peripheral vascular diseases; coil embolization

Bir Olgu Sunumu ile Kardiyovasküler Cerrahide Girişimsel Gereklilikler: Coil Embolizasyon

ÖZET

Abdominal aort anevrizmasının endovasküler onarımı (EVAR) giderek artan oranlarda kullanılmaktadır. Anevrizma, hastaların %20 ila %30'unda iliyak arterlerin en az birini etkilemektedir. İnternal iliyak arter anevrizması, EVAR'da modifikasyona ihtiyaç gösteren en önemli konulardan biridir. Abdominal aort anevrizması ile birlikte internal iliyak arter anevrizması da bulunan ve bu sebepten ötürü internal iliyak artere coil embolizasyonu yapılan bu olgu sunumunda cerrahların günlük pratiklerinde ihtiyaç duyabilecekleri girişimsel ihtiyaçların vurgulanmasını hedefledik.

Anahtar Kelimeler: Abdominal aort anevrizması; endovasküler prosedürler; iliyak anevrizma; periferik vasküler hastalıklar; coil embolizasyon

INTRODUCTION

Endovascular aneurysm repair (EVAR) for abdominal aortic aneurismal disease (AAA) has increasingly gained widespread application. It has been demonstrated to be a safe and effective intervention method compared with open aortic repair and a feasible alternative in patients with prohibitive surgical risks. However, an increasing variety of cases that use EVAR has created new challenges and requirements. EVAR is applied to a large variety of aortic aneurysm configurations. Unilateral and bilateral common iliac artery (CIA) aneurysms are present in 43% and 11% of patients with intact AAA, respectively[(1)]. The presence of an internal iliac artery (IIA) aneurysm is one of the most important issues that may dictate a modified approach in EVAR. Herein, we aim to emphasize the interventional skills that surgeons should have in daily practice.

CASE REPORT

A 63-year-old male patient was admitted to our clinic with a diagnosis of AAA, right IIA, and bilateral common femoral artery (CFA) aneurysm, which was diagnosed incidentally (Figure 1A,B,C). He had a lung nodule and was scheduled for a diagnostic work-up at another hospital for a differential diagnosis of lung cancer. He was scheduled for EVAR. Under local anesthesia and sedation, the bilateral CFA was surgically cannulated (6F-sheath) and the right brachial artery was percutaneously cannulated (5F-sheath). A 0.035-hydrophilic Teflon guidewire and multipurpose catheter were sent via the right brachial artery, the catheter was advanced to the

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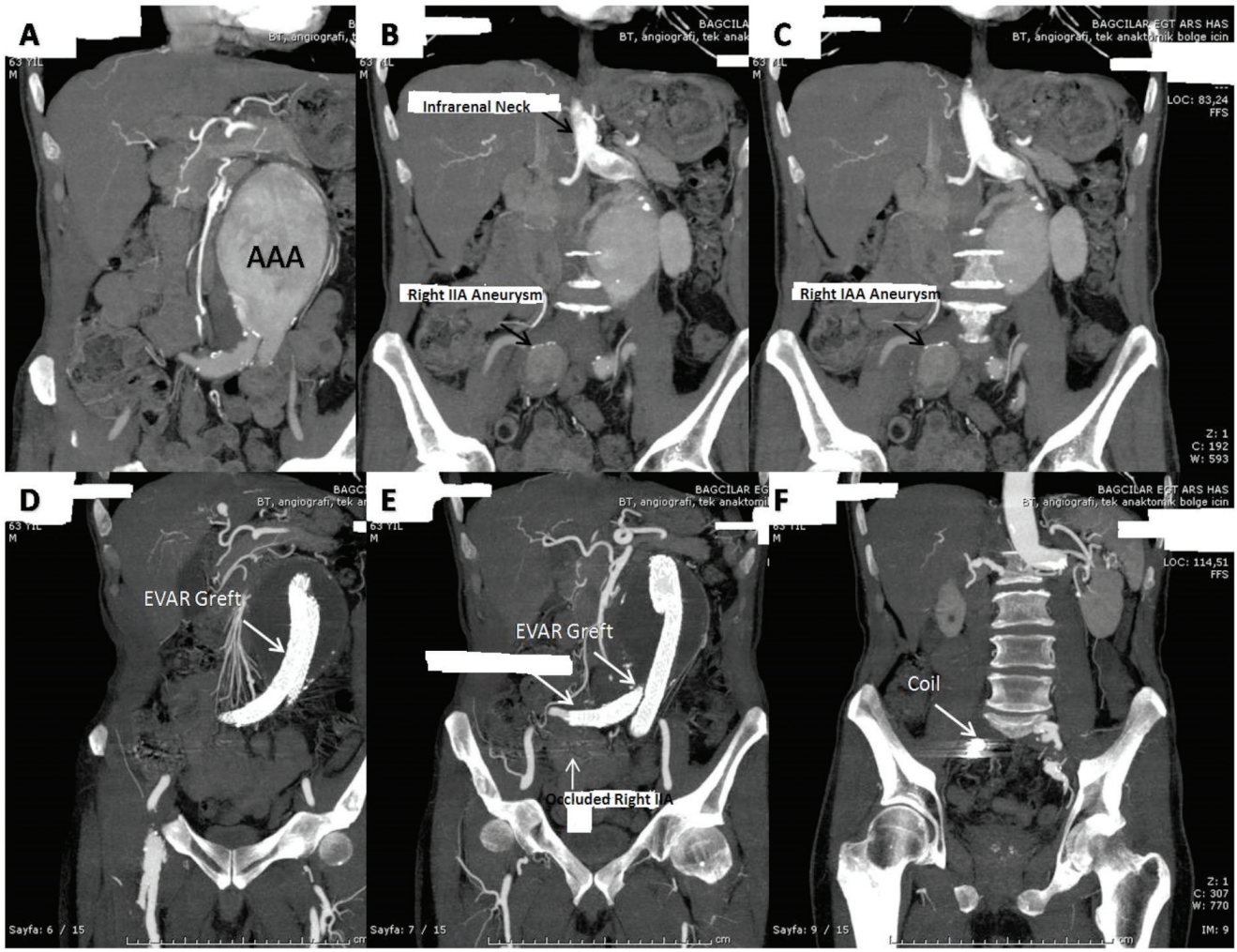

Figure 1. (A,B,C) CT angiography shows abdominal aortic and right internal iliac artery aneurysms, **(D)** Two months after the procedure, the EVAR graft was viewed by CT angiography, with no type of endoleak, **(E,F)** CT angiography shows the completely occluded right internal iliac artery and coil.

orifice of the right IIA, and coil embolization was performed to occlude the terminal branches [4 pieces of 5F, 2D-Helical-35 vs. 2 pieces of 4F, 2D-Helical-35 (Boston Scientific)]. The EVAR procedure was performed with a Gore Dry-Seal graft (26 × 16 × 16). The endograft (14 × 10, Gore) was extended into the external iliac artery, and the orifice of the right IIA was covered. The proximal segment of the EVAR graft and iliac extension site was stabilized with balloon dilatation (Consellation, 46 mm). No endoleak was observed after the completion of angiography. Bilateral CFA aneurysms were plicated with Teflon felts. The patient was discharged at postoperative day 3 uneventfully.

Computed tomography angiography was performed 2 months later, and there was no type of endoleak (Figure 1D,E,F). The right IIA was found to be completely occluded (Figure 1E), and the patient was asymptomatic. He is still alive after 6 months of treatment and continues to receive chemotherapy for his lung problems.

DISCUSSION

EVAR is widely used to treat patients with AAAs. However, patients with aortoiliac aneurysms present a particular therapeutic challenge. The optimal endovascular management of the IIA in aortoiliac aneurysms remains debatable. Although pelvic circulation possesses the rich collateral network, the risk of pelvic ischemia, which may cause buttock claudication, spinal cord ischemia, sexual dysfunction, ischemic colitis, and gluteal necrosis, associated with IIA occlusion is higher in endovascular series than in open surgical series[2]. Pelvic ischemia is particularly encountered in patients with bilateral IIA embolization[3].

Selective coil embolization of IIA unilaterally can usually be accomplished safely during EVAR[4]. The patency of collateral circulation is quite important for a safe procedure. Yano et al. identified 2 unique preoperative angiographic findings that predicted pelvic ischemia: (a) > 70% stenosis of the origin of

the contralateral IIA or non-opacification of 3 or more named IIA branches and (b) diseased or absent ascending deep femoral branches ipsilateral to the side of the IIA occlusion[5]. In our patient, collateral IIA was patent (Figure 1C), and the follow-up was uneventful.

The decision of performing coverage technique without concomitant coil embolization during EVAR in selected patients has been described previously[6]. It was based on the presence of adequate graft oversizing in the most distal 5 mm of the CIA and the most proximal 15 mm of the external iliac artery. The patients with inadequate graft oversizing in the CIA underwent IIA coil embolization. No endoleaks, graft migration, or aneurysm enlargement was encountered in either group[6]. Apart from oversizing, we performed balloon dilatation to the covering stent after deployment.

The potential of endoleak after stent graft coverage of the IIA with or without coil embolization is controversial. Frahmand et.al remarked that coil embolization may not reduce the rate of type 2 endoleaks; however, conversely, Wyers et.al reported no endoleak after coil embolization[6,7]. Moreover, concomitant coil embolization during EVAR may increase the operative time and volume of intravenous contrast given in one setting, which may lead to contrast-induced nephropathy. In our patient, we did not observe increasing creatinine levels, any type of endoleak, or pelvic ischemia.

In conclusion, cardiovascular surgery is rapidly evolving to interventional procedures all around the world. Currently, cardiovascular surgeons should aim to sufficiently improve their skills in imaging and interventional procedures and gain a certain excellence. Finally, in cardiovascular surgery training, the related curriculum should also be completed.

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