

Chimney Grafts for a Juxtarenal Aneurysm in an Octogenarian Patient with Left Main Coronary Artery Disease and Symptomatic Carotid Stenosis: Case Report

Sol Ana Koroner Arter Hastalığı ve Semptomatik Karotis Dar- lığı Olan Seksen Yaş Üzeri Bir Hastada Jukstarenal Anevrizma Nedeniyle Chimney Greftler

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ABSTRACT Patients with juxtarenal aneurysms (JAA) require a complex surgical open repair which is associated with increased mortality and morbidity. The chimney procedure has been developed as an easy-to-use method. We present an octogenarian patient with a JAA, unstable angina with severe stenosis of the left main coronary artery, left iliac artery occlusion and symptomatic carotid artery stenosis. He was treated with staged chimney grafts and aorto-uni-iliac stent-grafting in addition to left axillo-femoral bypass following an urgent combined coronary and carotid procedure. He was discharged from hospital on postoperative day 10 without any complications. Chimney grafts are an attractive alternatives in complex situations due to flexibility of this technique, much shorter procedural durations and lack of requirement for custom-built devices.

Keywords: Juxtarenal aneurysm; chimney grafts; octogenarian

ÖZET Jukstarenal anevrizmalı hastalarda kompleks bir açık cerrahi onarım gerekmektedir ki, bu da mortalite ve morbiditeyi artırır. Kolay uygulanabilir bir metot olarak chimney prosedürü geliştirilmiştir. Seksen bir yaşında, jukstarenal anevrizması, sol ana koroner arterde ciddi darlığı, unstable anjinası, sol iliak arter tıkanıklığı ve semptomatik karotis arter darlığı olan bir erkek hasta sunuyoruz. Hasta acil kombine koroner ve karotis işlemlerinin ardından gerçekleştirilen sol aksillo-femoral bypass'ın yanısıra, aşamalı chimney greftler ve aort-uni-iliak stent-greftleme ile tedavi edildi. Hasta postoperatif 10. günde komplikasyonsuz taburcu edildi. Chimney greftler; tekniğin esnekliği, daha kısa işlem süresi, özel imal edilmesi gereken araçlara gereksinim duyulmaması nedeniyle karmaşık vakalarda cazip bir alternatif olarak görünmektedir.

Anahtar Kelimeler: Jukstarenal anevrizma; chimney greftler; seksen yaş üzeri

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Patients with juxtarenal, pararenal, or thoracoabdominal aneurysms require a complex surgical open repair, which is associated with increased mortality and morbidity.¹ Approximately 20 to 30% of the patients are considered not eligible for standard endovascular aneurysm repair because of aortic neck morphology.² The “chimney graft” or “snorkel” technique has evolved as a potential alternative to fenestrated and side-branched endografts which made endovascular branch preservation possible, but these procedures are time-consuming and expensive.² The chimney

procedure offers a readily available endovascular alternative for treatment in patients with complex aneurysms and challenging anatomy, particularly in those with comorbidities. We present an octogenarian patient with a juxtarenal aneurysm (JAA), unstable angina with severe stenosis of the left main coronary artery, left iliac artery occlusion and symptomatic carotid artery stenosis.

CASE REPORT

An 81-year-old man with abdominal pain, heart-burn on exertion and right hemiparesis was admitted to emergency room with a history of the cerebrovascular event 10 days ago. He had no history of dysrhythmia or cardiac valvular disease. His physical examination revealed hypertension, absence of left lower extremity pulses, audible bruit on his left carotid artery, and a pulsatile abdominal mass. Following stabilization of his medical status, he was transferred to coronary catheterization which revealed severe stenosis of the left main coronary artery, and occlusion of left common iliac artery. Following carotid Doppler ultrasound which revealed severe stenosis of the left internal carotid artery and computerized axial tomography of the abdominal aorta, he was scheduled for a staged surgical approach with endovascular repair of the 62 mm- JAA following an urgent combined coronary artery bypass and left carotid endarterectomy. In the first step, left carotid endarterectomy surgery was performed under local anesthesia. After this procedure, an urgent three-vessel coronary bypass coronary artery bypass graft (CABG) surgery was performed in the same session. Patient was followed in intensive care unit (ICU) for 24 hours after CABG operation. After ICU stay, bilateral femoral artery exploration was made for endovascular repair, and juxtarenal aortic aneurysm was repaired with chimney grafts [7 mm covered-stents (Gore® Viabahn®, W.L. Gore, Flagstaff, AZ) for bilateral renal arteries, and 36 x 12 x 16 mm aorto-uni-iliac Endurant™ stent graft (Medtronic, Inc., Minneapolis, MN)]. After this procedure, as the left common iliac artery was already chronically occluded, left axilo- femoral artery bypass was performed following endografting (Figure 1).³ The

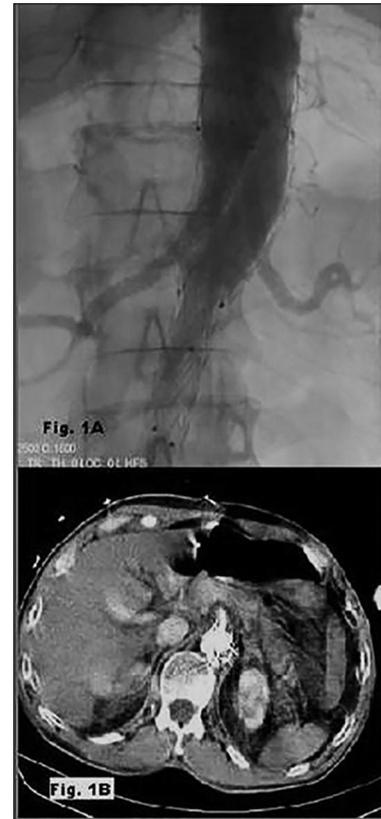


FIGURE 1: Digital subtraction angiography of chimney grafts to bilateral renal arteries and aorto-uni-iliac stent-grafting (A). Patent superior mesenteric artery at proximal attachment site (B).

patient was discharged on day 1 following chimney grafting, and was discharged from the hospital on postoperative day 10 without any complications.

DISCUSSION

Cardiac complications constitute the principal cause of early and late morbidity and mortality after the surgical treatment of abdominal aortic aneurysm (AAA). The incidence of coronary artery disease in patients with AAA ranges from 40% to 60%; a 4.4% to 22.4% of those patients further require CABG.⁴ Reduction of cardiac mortality associated with AAA repair has been an important goal to improve surgical results of AAA repair. Furthermore, it is estimated that 50% of patients with abdominal aortic aneurysms are not candidates for endovascular repair (EVAR) with the use of the currently commercially available devices because of unfavorable anatomy.⁵ The inherent complexity

and risks of open JAA repair are higher than the standard repair of infrarenal aneurysms with a greater concern for renal morbidity postoperatively. Due to the anatomy of JAA, clamping above one or both renal arteries is required. A more proximal control above the visceral vessel(s) may be required if extensive thrombus or calcification is present in the pararenal aorta. Therefore, higher the level of aortic clamping, greater the risks of cardiac stress, renal and visceral ischemia/reperfusion, and distal embolization. Our patient was symptomatic in terms of both carotid artery and left main coronary artery disease, and required surgery. There may be two therapeutic strategies regarding the timing and method of CABG in patients with AAA. One is simultaneous operation for coronary bypass and AAA repair, and the other is a staged operation. When a staged repair is planned, most patients with coronary artery disease and AAA undergo coronary bypass, followed by elective AAA repair. Recent reports favored simultaneous operation, but we currently employ a staged approach in most of the cases, and perform combined operations only when there are unstable coronary disease and a large AAA with increased risk of rupture. Our patient had a diameter of 62 mm at the level of renal arteries; we anticipated a higher

risk with concomitant surgery for carotid and coronary arteries in addition to JAA repair, and we preferred a staged operation with a modified concomitant coronary and carotid surgery, as we described earlier.³ It is noteworthy that our octogenarian patient did not have a mammary artery graft as the left iliac artery was occluded.

Consequently, we continued with a chimney approach for the JAA. This technique provided good results in patients with unfavorable aortic necks and significant comorbidities, as ours. Unilateral iliac occlusion allowed for a aorto-uni-iliac stent-grafting with subsequent axillofemoral bypass grafting. However, long-term endograft durability and proximal fixation remains a significant concern.^{1,2}

Early success with the chimney technique for JAA has made it our procedure of choice for complex short-neck to no-neck EVAR. Although long-term follow-up is needed, the flexibility of this technique, much shorter procedural durations and lack of requirement for custom-built devices may make it more attractive than branched or fenestrated stent grafts.

Conflict of Interest

Authors declared no conflict of interest or financial support.

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