

Hybrid Procedure for a Descending Thoracic and Subclavian Artery Aneurysm in a Patient with Previous Abdominal Aortic Surgery: Case Report

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SUMMARY

Introduction Hybrid procedures represent staged or simultaneous endovascular and open surgical techniques in the treatment of complex pathologies of the thoracic and abdominal aorta. We are presenting a patient with previous abdominal aortic surgery in whom hybrid vascular procedure for descending aorta and left subclavian artery aneurysm was performed.

Case Outline A 63-year-old female patient was admitted for computed tomography angiography. Descending aorta aneurysm (7.6 cm) as well as aneurysm of the left subclavian artery (LSA) was noted. Eight years ago she underwent abdominal aortic aneurysm resection and aortoiliac bypass. Standard TEVAR (thoracic endovascular aortic repair) procedure couldn't be done due to small dimensions of previous "Y" graft (12×6 mm), so first we did LSA transposition and after three days hybrid procedure. After "Y" graft exposure, anastomosis between the corps of "Y" graft and tubular graft 10 mm was created and through this conduit thoracic stent-graft was placed followed by complete "Y" graft replacement. After 6 months angiography showed regular postoperative findings.

Conclusion Combined surgical and endovascular procedures in thoracic aorta pathology treatment could be useful solutions with favorable outcome.

Keywords: thoracic endovascular aortic repair (TEVAR); hybrid procedure; thoracic aorta aneurysm

INTRODUCTION

Over the past decade, thoracic endovascular aortic repair (TEVAR) has emerged as a less invasive alternative to the conventional open surgical repair with significant reduction in the morbidity and mortality rate [1, 2]. Hybrid procedures, on the other hand, represent simultaneous or staged open surgical and endovascular procedures that reduce perioperative risk when compared to the open surgical treatment alone [3-7]. We present a patient with previous abdominal aortic surgery in whom we did a hybrid vascular procedure for descending aorta and left subclavian artery aneurysm.

CASE REPORT

A 63-year-old female patient was admitted to our institute for CT angiography. On admission she complained on frequent chest pain and dysphagia, eight years ago she underwent abdominal aorta aneurysm resection and aortoiliac bypass reconstruction. Risk factors included diabetes, hypertension, hyperlipidemia, smoking and family history. Internal carotid arteries were narrowed 20%, right renal artery was occluded.

Computed tomography (CT) angiography showed large descending aorta aneurysm, 7.6 cm

in diameter as well as left subclavian artery (LSA) origin aneurysm 2.2 cm in diameter (Figures 1 and 2).

Likewise, thrombotic cavities on both anterior and posterior aortic wall (Figure 2) were noted, as well as aneurismal sac compression on the esophagus and trachea. Likewise, juxtarenal aneurysm was noted as well, 4.3 cm in diameter.

TEVAR alone was not an option for technical reasons because of small dimension of previous "Y" graft (12×6 mm), so we indicated a hybrid procedure. Because of short proximal landing zone and LSA origin aneurysm in the first stage we did LSA transposition and after three days hybrid procedure.

The procedure was done in combined general/epidural anesthesia. First we opened the abdominal cavity and after "Y" graft exposure we clamped the aorta and iliac arteries. Following the clamping we created end-to-side anastomosis between the body of "Y" graft and Dacron tubular graft 10 mm (Figure 3).

Through this conduit we placed thoracic endograft in the descending aorta and afterwards we did a complete "Y" graft replacement in order to prevent infection. In the postoperative course left brachial artery exploration was done for suspected thrombosis that was not verified intraoperatively. Low-molecular-weight heparin was administered for the first two postoper-

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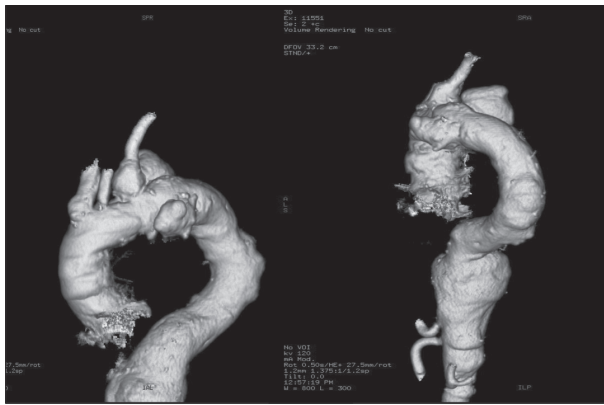


Figure 1. CT angiography: descending aorta and left subclavian artery aneurysm

ative days and later on aspirin and clopidogrel. The patient was discharged on the seventh postoperative day. After six months CT angiography showed satisfactory results, with no endoleak and regular graft patency (Figure 4).

DISCUSSION

TEVAR is known as less invasive alternative to open surgical repair of thoracic aorta disease with low rate of postoperative morbidity and mortality, though spinal cord ischemia remains a problem (incidence 3–6%) [1, 2].

Hybrid approach, on the other hand, consists of combined open surgical extra-anatomical bypass procedures and provides adequate proximal and distal landing zone for staged or simultaneous thoracic endovascular aortic repair [3-7]. These procedures could be of great importance since thoracotomy is avoided, there are no ischemia complications due to aorta and visceral artery clamping and postoperative complications (cardiac, respiratory, renal) are much less common [3-7].

Patients with previous abdominal aorta aneurysm (AAA) repair may have decreased collateral circulation to the spinal cord, which could increase risk of postoperative paraplegia in both open surgery and TEVAR [8]. Schlösser et al. [8] reviewed 72 patients undergoing TEVAR after previous AAA repair and demonstrated a relative risk of 7.2% (95% CI 2.6–19.6, $p < 0.0001$) for developing postoperative spinal cord injury.

In our case, there was a high risk of open surgical repair of descending aorta and LSA aneurysm due to previous AAA surgery, right renal artery occlusion and associated risk factors. The limitation of our case is that juxtarenal aneurysm was left untreated, since, due to mentioned associated comorbidities, this repair would be of very high risk and we believed that the presented hybrid procedure would be an adequate and purposeful procedure. During the follow-up, aneurysm increase was not noted and the patient didn't complain on any pain.

In the case presented and in all hybrid procedures done so far at the Institute, prior to endograft placement we perform LSA transposition to prevent cerebral and spinal cord ischemic events [9]. Careful strategy of combined

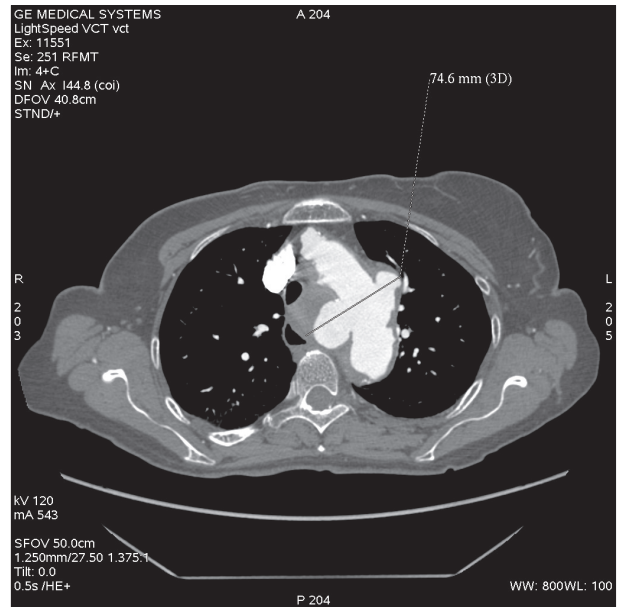


Figure 2. CT angiography: thrombotic cavities at the level of the aortic arch just after left subclavian artery origin

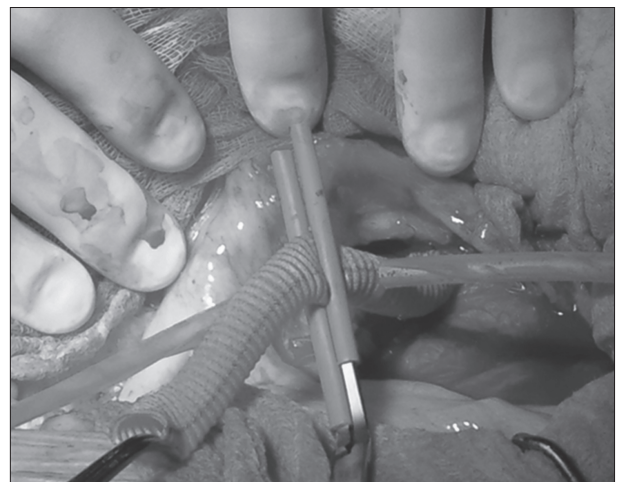


Figure 3. End-to-side anastomosis creation between the “Y” graft and Dacron tubular graft, 10 mm



Figure 4. CT angiography: postoperative findings after left subclavian artery transposition, thoracic endograft implantation and “Y” graft replacement

surgical and endovascular procedures in our case showed satisfactory results.

Combined surgical and endovascular procedures in complex thoracic aorta pathology disease treatment could be very useful solutions with favorable outcome.

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Хибридна процедура у збрињавању анеуризме нисходне аорте и леве поткључне артерије код болеснице која је оперисала трбушну аорту

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КРАТАК САДРЖАЈ

Увод Хибридне процедуре су етапни или симултани ендоваскуларни и отворени хируршки захвати у збрињавању сложене патологије грудне и трбушне аорте. Приказујемо болесницу која је претходно оперисала трбушну аорту код које је примењена хибридна процедура због анеуризматске болести нисходне (десцендентне) аорте и леве поткључне артерије.

Приказ болесника Жена стара 63 године примљена је ради СТ ангиографије. Откривена је анеуризма десцендентне аорте пречника од 7,6 cm, као и анеуризма леве поткључне артерије. Осам година раније болесница је била подвргнута ресекцији анеуризматске болести трбушне аорте и реконструкцији аортобилијачним бајпасом. Стандардна процедура TEVAR (енгл. *thoracic endovascular aortic repair*) није била

могућа због малих димензија претходне Y-протезе (12×6 mm), те је стога прво учињена транспозиција леве поткључне артерије, а након три дана примењена је и хибридна процедура. Након препаратације претходне Y-протезе креирана је анастомоза између тела Y-протезе и тубуларног графта од 10 mm, кроз који је пласиран торакални стент-графт, након чега је урађена потпуна замена Y-протезе. После шест месеци ангиографски снимак је показао нормалан постоперациони налаз.

Закључак Комбиноване хируршке и ендоваскуларне процедуре у лечењу патолошких промена грудне аорте могу бити веома корисна решења са задовољавајућим исходом.

Кључне речи: TEVAR; хибридна процедура; анеуризма грудне аорте

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