Midterm Outcomes following Endovascular Repair of Complex Aortic Aneurysms in Patients with Connective Tissue Disorders

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INTRODUCTION

- Connective tissue disorders (***CTDs***) primarily affecting the aorta and leading to severe cardiovascular manifestations include Marfan syndrome (MFS), Loeys-Dietz syndrome (LDS), vascular Ehlers-Danlos syndrome (vEDS), and Familial Thoracic Aortic Aneurysm and Dissection syndrome (FTAAD).

- There is very scarce literature documenting the use of ***endovascular fenestrated or branched stent-grafts*** for the management of CTDs, including both thoracoabdominal aneurysmal (TAAA) disease and dissection.

Olsson KW et al. JAMA Surg. 2023 Aug 1;158(8):832-839.

OBJECTIVE

The purpose of this study is to describe mid-term outcomes of patients with ***connective tissue disorders (CTDs)*** and thoraco-abdominal aortic aneurysms (TAAA) or dissections after complex endovascular procedures

METHODS

- From 2018 to 2013 we conducted a retrospective review of patients with connective tissue disorders (***CTDs***) who underwent endovascular repair with physician-sponsored investigational device exemption (***PS-IDE***) for treatment of TAAAs and complex aortic dissections, including Fenestrated-Branched endovascular aortic repair (***F-BEVAR***).

- Study participants were prospectively recruited from the Mayo Clinic Institution and Memorial Hermann Hospital at Texas Medical Center.

- We identified ***330 patients*** who underwent aortic reconstruction for aneurysms or dissection of the thoracoabdominal aorta.

METHODS

- ***Follow-up*** was conducted through outpatient physical examinations, stent-graft duplex ultrasounds, laboratory studies, and computed tomography angiograms (CTA) before discharge, as well as at 6- and 12-months post-intervention.

- Starting in 2020, cone-beam computed tomography (***CBCT***) was implemented.

RESULTS

- ***Twelve patients*** with CTDs were treated with a complex endovascular investigational device (ID) stent-graft for aortic dissection or aneurysm affecting the thoracoabdominal aorta.
- ***Median*** age was 72 years (interquartile range [IQR] 63-81).
- Eleven patients (92%) had previously undergone open aortic surgery.
- Eight patients (67%) had undergone prior endovascular aortic procedure.

RESULTS

Table 1. Patient Characteristics

Characteristic	No. (%) Connective Tissue Disorders (CTDs) (n= 12)
Age, (IQR), years	72 (63-81)
Sex	
Male	7 (58.3)
Female	5 (41.7)
Hypertension	11 (92)
Coronary artery disease	2 (17)
Peripheral artery disease	2 (17)
Previous cerebrovascular accident	2 (17)
Respiratory disease	2 (17)
Congestive heart failure	1 (8.3)
Kidney impairment	1 (8.3)
Previous open aortic surgery	11 (92)
Previous endovascular aortic repair	8 (66.6)

IQR: Interquartile range

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RESULTS

Table 2. Endovascular procedure details and device type

Characteristic	Number (%) Connective Tissue Disorders (CTDs) (n= 12)
Cerebrospinal fluid drain	3 (25
Neuromonitoring	12 (10
Device design	
F-BEVAR	5 (41.
Off-the-shelf T-Branch	5 (41.
PMEG	2 (17
IBD	5 (41.
Femoral conduit	4 (33.
Unilateral	3 (75
Bilateral	1 (25
Ilio- femoral conduit	1 (8.3
Unilateral	1 (100
Bilateral	0 (0)
Percutaneous femoral	12 (10
Unilateral	9 (75
Bilateral	3 (25
Sheath size, Fr	20 (18-
Upper extremity approach	6 (50
Right	6 (100)
Left	0 (0)

Table 2. Endovascular procedure details and device type

Characteristic	Number (%) Connective Tissue Disorders (CTDs) (n= 12)
Procedure metrics	
Contrast volume, mL	158 (110- 306)
DAP, Gy-cm^2	703 (82- 676)
EBL, mL	340 (10- 1150)
Fluoroscopy time, minutes	79 (39- 217)
Target vessels per patient	4 (3-5)
Technical success	12 (100)
Total endovascular time, minutes	163 (128- 323)
Total operative time, minutes	220 (193- 327)
Total radiation dose (mGy)	1649 (385- 4756)

DISCUSSION

- Several series have concluded that ***endovascular treatment for CTDs is feasible***, with high primary technical success and low 30-day mortality.

- However, significant gaps remain in data about later clinical and surgical complications and survival.

Roselli EE et al. Ann Thorac Surg. 2016 Mar;101(3):906-12 .

Kölbel T et al. J Endovasc Ther. 2022 Aug;29(4):602-610 .

DISCUSSION

- We found that the rate of acute ***kidney injury was very low (0%*** in our study group), with only one patient (8.3%) presenting with spinal cord ischemia that resolved during the admission after CSF drain placement.

- ***Primary technical success*** has been reported ranging from 96-100%.
- Major complications in the first 30 days, including stroke, myocardial infraction, spinal cord injury, are low (0- 15%), with a low perioperative mortality rate.

- ***Complications*** may arise during the follow up: endoleaks, branch stenosis or occlusion, device migration, re-dissection, and retrograde dissection.

Clough R et al. JAnn Vasc Surg. 2017 Oct;44:158-163.

Oderich GS et al. S, J Vasc Surg. 2005 Jul;42(1):98-106.

CONCLUSIONS

Patients with connective tissue disorders (CTDs) after endovascular interventions of complex TAAAs and dissections have an excellent early outcome.

However, in 40% of cases, minor and major complications could manifest in the early postoperative phase.