CUSTOM-MADE SCALLOPED THORACIC ENDOGRAFTS IN DIFFERENT HOSTILE AORTIC ANATOMIES

— A SERIES OF THREE CASE REPORTS

Joel Sousa

Department of Department of Angiology and Vascular Surgery
Hospital S. João, Porto, Portugal
Disclosure

Speaker name: **Joel Sousa**

I have the following potential conflicts of interest to report:

- [ ] Consulting
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [x] I do not have any potential conflict of interest
INTRODUCTION

• Thoracic endovascular aortic aneurysm repair (TEVAR) is an established treatment of thoracic aortic disease in both the acute and elective setting.

• TEVAR has become the preferred approach for treatment of thoracic aortic pathology since the approval of the first endograft device by the U.S. Food and Drug Administration (FDA) in 2005.¹

• Stent grafting of the thoracic aorta is responsible for almost 50% of thoracic aortic surgery in Europe.²

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Nonetheless...

The feasibility of TEVAR is determined by several anatomic factors, including landing zones.
“In about 40% of patients, the required proximal position of the stentgraft interferes with either the ostium of the LSCA (++) and/or left LCCA and/or brachiocephalic trunk.”

Of 126 patients with thoracic aortic aneurysms, 5.5% presented with a short distal neck for conventional thoracic endografting.
SHORT NECK ISSUES

- Hybrid arch repair
- Deliberate occlusion of the LSCA or celiac trunk
- Branches
- Chimneys
- Fenestrations
CUSTOM-MADE SCALLOPED TEVAR

- First reported in the literature in 2003 as a homemade device, in an emergency case.\(^3\)
- Widespread use in recent years for hostile proximal or distal sealing zones.

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CUSTOM-MADE SCALLOPED TEVAR

- Proximal scallop

Increases the proximal landing zone in the inner curvature of the arch without compromising supra aortic trunk (SAT) patency, thereby reinforcing proximal sealing at its weakest point.
CUSTOM-MADE SCALLOPVED TEVAR

• Distal scallop

Increases distal sealing and fixation, without the need of any adjunct procedure to increase landing zone.

When the para-diaphragmatic aspect of the descending thoracic aorta is not dilated, the crura can act as an external wrapping, helping endograft fixation over time.
The authors present three cases of thoracic aortic aneurysm (TAA), with three different hostile anatomies, successfully treated with custom-made scalloped thoracic stentgrafts.
CASE 1
CASE 1

• Male, 46 years old
• No relevant medical history
• High speed trauma 10 years before (car accident)
CASE 1
CASE 1

- Short proximal landing zone, even with LSCA exclusion
CASE 1

Custom-made TEVAR with scallop to the LCCA was planned
PROCEDURE

1. Carotid-subclavian bypass with ligation of the LSCA origin

2. Custom-made TEVAR with scallop to the LCCA
CASE 1

POST-OPERATIVE CTA
CASE 1
CASE 1

- Proper sealing in Ishimaru Zone 2 was granted
- Normal perfusion of all supra-aortic trunks.
- The procedure was uneventful, with no neurological complications.

- No reported complications at 12 months follow-up.
CASE 2
CASE 2

• Male, 76 years old
• Multiple CV risk factors:
  • Hypertension
  • Dyslipidemia
  • Obesity
• Severe Obstructive Sleep Apnea
• Hypothyroidism
• Former smoker
Due to chronic cough, a thoracic CTA was performed.
CASE 2

Length: 6.520 cm
CASE 2

- Also, a bovine trunk was noted
CASE 2
PROCEDURE

1. Carotid-subclavian bypass

2. Custom-made TEVAR with scallop to the bovine trunk
Occlusion of the carotid-subclavian bypass was noted intra-operatively

- Origin of the LSCA was not effectively ligated
- Retrograde coil embolization of the LSCA origin
- Final angio revealed no endoleaks

- No reported neurological complications
- No evidence of upper limb ischemia
POST-OPERATIVE CTA
CASE 2

- Proper sealing in Ishimaru Zone 2 was granted
- Normal perfusion of all supra-aortic trunks
- The procedure was uneventful, with no neurological complications

- No reported complications at 8 months follow-up.
CASE 3
CASE 3

- Male, 77 years old
- Multiple CV risk factors:
  - Hypertension
  - Dyslipidemia
  - Type II DM
  - Severe aortic stenosis
- Kidney transplant in 2003 (Right external iliac artery)
- AAA accidently discovered during a renal Doppler US
CASE 3
Leucoscan excluded an infectious cause
CASE 3

How to treat?
Standard TEVAR + EVAR ?
Synchronous correction via 4 Fen FEVAR?

- Renal graft implanted in the right external iliac artery
- Transient iliac occlusion by the sheats was predictable

Risk of jeopardizing renal graft
Scalloped TEVAR to the SMA

- Saccular aneurysm of the anterior wall
- Healthy posterior wall
A staged approach was planned

1. TEVAR with a distal scallop to the SMA

2. Standard EVAR
Celiac occlusion test
EVAR for the infra-renal saccular aneurysm was performed one month after the TEVAR to reduce the risk of spinal ischemia.

POST-OPERATIVE CTA
CASE 3

- Proper distal seal was granted.
- Normal perfusion of the SMA, with no foregut ischemia.
- Both the procedures were uneventful.
- There were no acute neurological complications.

- No reported complications at 12 months follow-up.
CONCLUSION

• The suitability of the proximal and distal landing zones remains one of the main limitations to thoracic endovascular aortic repair.

• Hybrid, branched, chimney and fenestrated interventions have been proposed.
  • Complex interventions
  • Longer surgical times; higher radiation exposure
  • Higher morbidity

• In the endovascular era, custom-made scalloped thoracic stentgrafts widened the endovascular options in some challenging anatomies.
  • Simplicity of deployment with limited endovascular maneuvers
  • Shorter surgical times; less potential for complications
CONCLUSION

Custom-made scalloped thoracic stentgrafts are an accessible, reproducible and safe therapeutic option when dealing with hostile descending thoracic anatomies, and should be considered as a minimally-invasive effective solution in selected cases.
Thank you.
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