The value of vein covered stent grafts in the treatment of mycotic aorto-iliac aneurysm: Techniques and Results

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Veith Symposium 2016

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Disclosures
Consulting for GE Medical

Mycotic aorto-iliac aneurysms

- Incidence 0.5-1% of all AAA
- High mortality for open prosthetic repair 15-38% and 8%-27.5% graft reinfection rate despite long term antibiotic cover
- Open autologous vein interposition graft mortality 11-28%
- Endovascular treatment with prosthetic stent grafts as low as 4% mortality but up to 19-25% stent graft infections with poor survival (30%)

4. CD Kan Outcome after endovascular stent graft treatment for mycotic aortic aneurysm: a systematic review. JVS 11/2007, 46(%):906-12

Mycotic aorto-iliac aneurysms

- Autologous vein grafts are highly resistant to infection (1-2 %)
- Allograft infection rates better than prosthetic at 4-9 % but thrombosis occurs in 4-9 %


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Measurements for vein-covered stent

- AA above the neck at 17 mm and 16 mm below
- 2 Cordis® Palmaz 5014 with a 1 cm overlap
- The stent nominal diameters are 14 – 25 mm and 4.7 cm to 3.7 cm shortening
- With an overlap of 1 cm this resulted in a length of 5.7 cm and 2 cm overlap each side
- Stent inflation to 20 mm (over sizing of ~15 %)

Case 1

- 73 yr male with back and abdominal pain, unwell
- 4 month prior history of VRE urethral infection with anastomotic leak treated by laparostomy
- MRSA +ve cultured from the abdominal cavity, a Hickman line and septic shoulder arthritis
- CRP 211 U/l, WBC 25.000
- Erythromia transferred to a CCU
- CT newly developed infra-renal mycotic AAA
- Four weeks of pre-op Liposomal and Ciprofloxacin
- Risk of open surgery excessive and enlarging aneurysm
- After board approval we proceeded with a VCSG

4. CD Kan Outcome after endovascular stent graft treatment for mycotic aortic aneurysm: a systematic review. JVS 11/2007, 46(%):906-12
Spiral graft sutured with 5/0 Prolene and tested for water tightness

20 cm long SFV

The vein covered stent graft before crimping onto a 20 mm Ø balloon catheter

Delivery and deployment

- Right femoral cut down
- VCSG too bulky for sheath deployment
- Stent graft inserted into a 20 mm Ø balloon (incised distally)
- Balloon catheter advanced on a Amplatz wire into the descending aorta and retrieved
- Stent graft deployed across neck
- Excluded AAA without endoleak
- Post-op 6 weeks of Linzolide

The excluded aneurysm

- No change over 10 year follow up

Case 2

- Referral of a 75 year old male with worsening lumbar back and abdominal pain, night sweats, rigors, lethargy, anorexia
- CT 2 weeks prior had shown a 4.3 cm AAA
- Past medical history:
  - ? Alcohol induced liver disease
  - Gallstone induced pancreatitis
  - COPD
  - Ischaemic heart disease, PCI 2009
  - Horseshoe kidney

Post op CT 2 weeks prior
Case 2

- Normal aorta 1 year ago
- WBC was 5.46 x 10^9/l and CRP 34mg/l
- Blood cultures -ve
- Treatment as mycotic AAA with Tazocin, Linezolid and Fluconazole
- MDT quoted a 30 – 40 % mortality for open surgery
- After board approval we proceeded with a VCSG

Vein covered stent graft

- SPV vein panel graft covering posterior half of a Cordis® Palmaz 5014
- Platinum tips of V 18 wires as markers
- Crimped onto a 16 mm balloon

Delivery

- Right femoral cut down
- Vein inserted into shuttle balloon *
- Iliac arteries too small despite “cracking and paving”
- Rutherford Morrison and access via proximal CIA

Deployment

- Armadillo balloon
- Vein covered stent with guidewire markers for orientation.

*Vein covered stent graft with guidewire markers for orientation.
Completion angiogram and post-op CT

Post op

- Developed 9 days post-op gallstone induced pancreatitis with worsening liver enzymes which progressed to necrotising pancreatitis on CT from which he died on day 35.
- PM confirmed the diagnosis of extensive pancreatic necrosis and an aortic pseudo-aneurysm, there was a new area of an infarct of segments 6 and 7 of his liver and a small infarct in the spleen. These had been present on his last CT only.
- The VCSG was intact
- Microscopy shows some cocci and bacilli in the aortic wall at the site of the aneurysm (? significance)

CASE 3

- 53 yo male two previous open procedures elsewhere:
  - A repair of a mycotic internal iliac artery aneurysm with accidental ureter damage
  - E. coli cultured from aneurysm sack
  - Diverticular disease
  - 1 month later exploration and drainage of a large ilio-psoas collection and urinoma tracking into the thigh
  - 1 month later frank haematuria and a ilio-ureteric fistula and ilio-psoas collection

Ilio-ureteric fistula

Technique

- SFV harvested from left leg
- Vein tied onto 10 x 37 mm balloon expandable stent with 5/0 Prolene sutures
- Platinum tip wire sutured to the top and bottom as marker

VCSG is introduced via a 18 Fr. GORE® DrySeal sheath percutaneous using 2 Abbott® Perclose ProGlide closure devices
**Case 3**

- He was treated with amoxiclav for 6 weeks
- Patient presents 6 months later with colo-ureteric fistula
- Patient underwent a left nephro-uretrectomy and a sigmoid resection
- The VCSG was found intact
- Patient made a uneventful recovery

**VCSG in the literature**

- VCSG have been used in various locations from carotid\(^1\) to coronary\(^2\), renal\(^3\) and femoral\(^4\) arteries
- A single report of a VCSG in a iliac artery 1996\(^5\)
- A single report of a VCSG used in the infra-renal aorta 2002\(^6\)

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2. C Stefanadis Vein Graft-Coated Stent for Treatment of Coronary Artery Disease Catheterization and Cardiovascular Diagnosis 38:159-170 (1996) Coronary Artery Disease

**Aorto-iliac VCSG experience**

Small number of 5 cases reported
(3 aortic and 2 iliac mycotic aneurysms)

**Results:**

<table>
<thead>
<tr>
<th>Aneurysms were excluded</th>
<th>100 %</th>
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<tr>
<td>No endoleaks early or late</td>
<td>0 %</td>
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<tr>
<td>No graft infections</td>
<td>0 %</td>
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<tr>
<td>VCSG 30 day mortality</td>
<td>0 %</td>
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<td>One in hospital death due to recurrent pancreatitis</td>
<td>20 %</td>
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<tr>
<td>Follow up stent grafts intact and no endoleak (range 35 days to 10 years)</td>
<td>100 %</td>
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Conclusion

- VCSGs may be an alternative to prosthetic stent grafts in mycotic aneurysms
- The bulk and length of available vein may be a limitation in large AAA
- Long-term antibiotic cover is not required
- Up to 10 year follow up may suggest long-term durability

Thank you:

Mr Andrew Brown Vascular and Endovascular surgeon MD FRCS
Mr Shanmugam Vetrivel Vascular surgeon MD FRCS
Dr Simon England Interventional radiologist MD MRCP
Dr Maciej Karasek Interventional radiologist MD PhD
Dr Andrew Berrington Microbiologist MD