Stent-graft infection: Conservative treatment, endovascular relining, or conversion?

L. Chiche, J Gaudric, C. Jouhannet, T. Khalife, C. Goulfier, F. Koskas

Department of Vascular Surgery, CHU Pitié-Salpêtrière, Paris, France
Faculty disclosure  Pr Laurent Chiche

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Stent-graft infection: background

• Under-recognized and under-reported event

• Incidence ranges between 0.2% - 3%

• Life threatening disease

• Mortality rates: 25% - 100%
Stent-graft infection: main problems

• Challenging diagnosis based on a combination of clinical symptoms, imaging studies, microbiological cultures

• Wider local extension of the infection:
  – Larger amount of prosthetic material compared to a conventional open repair
  – Regular use of modular bifurcated stent-grafts
  – Frequent use of suprarenal uncovered fixation
Stent-graft infection: presentation

• Chronic low-grade sepsis

• Severe sepsis

• Graft-enteric fistula ± gastrointestinal hemorrhage
Periprosthetic aeric collection
Stent-graft infection: therapeutical options

- Conservative treatment
- Endovascular relining
- Explantation with *in situ* or extra-anatomic revascularization
Conservative treatment

• Limited to systemic administration of antibiotics
• CT or echo-guided percutaneous continuous drainage of the abscess + intrasac antibiotic irrigation
• Surgical debridement of the infected area ± resection of the aneurysmal sac + local irrigation with antibiotics ± omentoplasty
• + lifelong antibiotic therapy and surveillance?
Conservative treatment: results

• Ducasse et al *(Ann Vasc Surg 2004;18:521)*
  
  Mortality rate:  
  . Overall 18%  
  . Conservative group 36.4%

• Settacci et al *(J Cardiovasc Surg 2010;51:33)*
  
  Mortality rates:  
  . Overall 30.1%  
  . Surgical group 28.3%  
  . Conservative group 66.6%

• Cernohorsky et al *(J Vasc Surg 2011;51:33)*
  
  Mortality rates:  
  . Overall 25.0%  
  . Surgical group 25.0%  
  . Conservative group 33.3%
Conservative treatment

- Small number of reported patients and short FU
- Conservative treatment may reduce or resolve sepsis temporarily but it probably cannot eradicate and cure infection of the prosthetic material
- It cannot be considered a definite treatment but it may only represent a bridging solution in selected high-risk patients who cannot tolerate open reconstruction
Endovascular relining

• Secondary EVAR procedure to seal an aortic (proximal) rupture
• Should only be considered as an emergency procedure in selected cases
• Lifelong antibiotic therapy and surveillance?
• No definite conclusions drawn from anecdotal reported cases
Conversion to open repair: principles

• Surgical debridement of the infected perigraft and periaortic tissues and drainage of all infected collections

• Explantation of the stent-graft:
  – Partial removal?
  – Total removal?

• Direct or indirect restoration of aortic flow
Total explantation vs partial removal
Periaortie inflammation at the upper neck level
Management of the proximal hooks
Management of the proximal hooks
Stent-graft explantation for infection

- **Arya et al** (*Ann Vasc Surg 2013;27:865*)
  - 39 aortic stent-graft explantation
  - Mortality rates @ 30d:
    - Endoleak group (n = 27) 0.0%
    - Infection group (n = 12) 17.0%  \( p = 0.09 \)
  - Major morbidity rates @ 30d:
    - Endoleak group (n = 27) 11.0%
    - Infection group (n = 12) 75.0%  \( p = 0.001 \)
  - Postop abscess/deep infection
    - Endoleak group (n = 27) 3.7%
    - Infection group (n = 12) 25.0%  \( p = 0.08 \)
Conversion to open repair: principles

• Surgical debridement of the infected surrounding tissues and drainage of all infected collections

• Explantation of the stent-graft:
  – Partial removal?
  – Total removal?

• Direct or indirect restoration of aortic flow
Conversion to open repair: aortic reconstruction

- *In situ* revascularization:
  - Cryopreserved homograft
  - Autologous deep vein reconstruction
  - Silver–coated or rifampin-soaked polyester prosthesis

- Extra-anatomic (axillobifemoral) bypass
Conversion to open repair: aortic in situ reconstruction with cryopreserved homograft.

Allograft replacement for infrarenal aortic graft infection: Early and late results in 179 patients

Edouard Kleffer, MD, Dominique Gomes, MD, Laurent Chiche, MD, Marie-Hélène Fléron, MD, Fabien Koskas, MD, and Amine Bahnini, MD, Paris, France

Conclusions: Early and long-term results of allograft replacement are at least similar to those of other methods to manage infrarenal aortic graft infections. Rare specific complications include early or late allograft rupture and late aortic dilatation. The more frequent late iliofemoral complications may be easily managed through the groin. These complications are significantly reduced by using cryopreserved allografts rather than fresh allografts and by not using allografts obtained from the descending thoracic aorta. (J Vasc Surg 2004;39:1009-17.)
Conversion to open repair: aortic in situ reconstruction with cryopreserved homograft

- Expedient technique
- Avoids creation of an aortic stump with the potential for blowout
- Good short- and long-term results
  - Mortality rate: 12.5%
  - Freedom from reintervention > 80% @ 5y
  - Freedom from major amputation > 95% @ 5y
- AEFs remain a major concern
AEF, stent-graft infection, secondary rupture

20/09/11
Conversion to open repair: aortic in situ reconstruction with cryopreserved homograft

- **Phade et al** *(Surgery 2011;150:788)*
- 16 explantations for:
  - Device failure 9
  - Infection 6
  - Aneurysm enlargement 1
- **Mortality rates**
  - Aneurysm rupture 25%
  - Infection 17%
  - Other presentations 0%
- No recurrent infections after *in situ* allograft reconstruction (1 after axillofem bypass)
Conclusions

• Diagnosis of a stent-graft infection may be challenging
• Endovascular relining is a rescue method for ruptured cases
• Conservative treatment, which carries high mortality rates, is not advocated as the best therapeutic approach. However, it may be justified as a bridging (or definite?) therapy to avoid the use of suprarenal or supraceliac aortic clamping in high-risk patients
Conclusions

• Consensus is that infected material graft should always be removed

• Based on our personal good long-term results in cases of conventional prosthetic infection, we advocate the use of cryopreserved allografts for aortic flow restoration

• Familiarity with complex aortic reconstruction is clearly needed in the setting of suspected stent-graft infection: referral to tertiary vascular centers