3-Year Results With The CERAB Procedure For Stent-Graft Reconstruction Of The Occluded Aortic Bifurcation: Technical Precautions, Advantages And Limitations

Michel M.P.J. Reijnen
Erik Groot Jebbink

Rijnstate Hospital, Arnhem, The Netherlands

Disclosures
• Consultancy and/or Research Funding:
  • Atrium Maquet Getinge Group
  • Endologix, Inc.
  • W.L. Gore and associates
  • Vascular Insights LLC

Lesions of the aortic bifurcation and Kissing Stents
• Wide range in patency results of kissing stents, but inferior compared to isolated stents in iliac artery or the aorta
• Patency affected by:
  - Radial mismatch; aortic lumen dead space around the protruding segment of the stents
  - Differences in stent conformation
  - The overlap of the free proximal stent ends
    - Re-circulation, turbulence and stasis
    - Mesenchymal tissue, thrombus and intimal hyperplasia


Covered Endovascular Reconstruction of the Aortic Bifurcation - CERAB

CERAB related to:
• Lowest radial mismatch
• High conformation ratio (‘double-D’ configuration)

CERAB and BM kissing stents; Mostly laminar flow throughout the cardiac cycle

CERAB and BM kissing stents; turbulence and recirculation at phases B and C

Copyright UPM-Kymmene Group
Clinical results of CERAB

Initial results from first in man
- February 2009 – March 2014
- 103 elective patients in two centers
- CLI 37%
- TASC-D lesions 86%
- Technical success 95%
- Mortality 0%
- Major complications 2%
- One year patency:
  - Primary 87%
  - Secondary 95%
- Limb salvage 100%

Clinical results of CERAB

Midterm outcome
- October 2010 – July 2016
- 95 elective patients, one single center
- Age 60 (36-79) years
- Chimney procedures excluded
- Rutherford classification:
  - 1 (n=1) 1.1%
  - 2 (n=0) 0.0%
  - 3 (n=72) 75.8%
  - 4 (n=10) 10.5%
  - 5 (n=11) 11.6%
  - 6 (n=1) 1.1%

Clinical results of CERAB

Midterm outcome
- Technical success 95.7%
- 30-day minor complication rate 26.3%
  - Infection (n=7)
  - Pseudoaneurysm (n=3)
  - Dissection (n=2)
  - Femoral artery dissection (n=3)
  - Stent thrombosis (n=2)
  - Dislocation (n=1)
  - Partial stent collapse (n=3)
  - Fever (n=3)
- 30-day major complication rate 3.2%
  - Renal failure (n=1)
  - Multiorgan failure (n=1)
  - Pneumonia (n=1)
- 30-day mortality 0%
- ABI 0.94 ± 0.16 (0.71 ± 0.21)
- Admission 2 days (1-76 days)

Clinical results of CERAB

Midterm outcome
- Median follow-up 24 months
- Primary patency
  - 12 months 93%
  - 24 months 87%
  - 36 months 79%
- Secondary patency
  - 12 months 97.3%
  - 24 months 95.8%
  - 36 months 95.8%
- Limb salvage 98.9%

Clinical results of CERAB

Chimney-CERAB
- Stenting thrombosed aortic segment
- Risk of embolization
- Risk of occlusion visceral arteries
- Primary visceral stenosis
- Visceral artery obstruction caused by:
  - Embolization of plaque fragments,
  - Coral reef encroachment of the ostium
  - Flow obstruction by overstenting
Clinical results of CERAB Chimney-CERAB

- 14 consecutive patients in three centers
- 11 male with mean age 61.2±8.9 years
- 12/14 TASC D lesions
- 15 chimney grafts
  - inferior mesenteric artery (n=8)
  - right renal artery (n=4)
  - left renal artery (n=3)
- Technical success 100%
- Mean follow-up was 12 months (range 6–24)
- Patency
  - CERAB 100%
  - Chimney 93%

Conclusions

- Covered endovascular reconstruction of the aortic bifurcation (CERAB) feasible in extensive AIOD
- The technique is related to a good midterm outcome and as such proofs to be a valid alternative for surgery in complex lesions
- Exploration of chimney-CERAB may further expand the indications of this technique

3-Year Results With The CERAB Procedure For Stent-Graft Reconstruction Of The Occluded Aortic Bifurcation: Technical Precautions, Advantages And Limitations

Michel M.P.J. Reijnen
Erik Groot Jebbink

Rijnstate Hospital, Arnhem, The Netherlands