Aneurysm sac volume and spinal cord ischemia in patients with thoracoabdominal aortic aneurysms treated with branched stent-grafts using the temporary aneurysm sac perfusion - technique

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BEVAR

+ Mortality: 6 – 9%
+ Paraplegia: 4 – 25%
  + Preventive measures
    + Cerebrospinal fluid (CSF) drainage
    + Haemoglobin >9 g/dl
    + Mean arterial pressure (MAP) > 80 mm Hg
Temporary aneurysm sac perfusion (TASP)

- 2- staged therapy
- Open branch concept
- Paraplegia rate: 21% vs. 5%
- Non-completion → maintain spinal cord perfusion
  - Prevent aneurysm sac thrombosis
  - Patent intercostal and/or lumbar arteries
Aneurysm sac volume

- The changes of the sac volume during the endovascular therapy and its influence on neurologic outcome.

- Sac volume measurements in patients with TAAA treated with BEVAR in a single step compared with patients treated with the TASP-technique.
  - Analysis of pre- and post-operative CTAs of all patients with TAAA that underwent BEVAR
  - period April 2010 – September 2015 in our department.
Evaluated outcomes included:

- total aneurysm volume (TAV),
- contrasted aneurysm volume (CAV) preoperatively, during the TASP interval and postoperatively,
- rate of severe spinal cord ischemia (SCI).

Measurements were carried out by two independent investigators using dedicated software (Osirix®)
Results

- 82 patients were treated with BEVAR for TAAA
  - 45 patients in the TASP group and 37 in the group receiving single step treatment.
  - 52 men; median age 69.6 years, range 31-92.
- The groups were comparable regarding preoperative comorbidities, aneurysm type and the extent of the endovascular procedure.
Results

- 11 patients developed severe SCI postoperatively, classified according to a modified Tarlov’s scale.
- The use of the TASP technique was associated with significantly lower rates of postoperative SCI
  - 8 in single step group vs. 3 in open branch group; p=.049
- In both groups total aneurysm volume (TAV) was dependent on the type of TAAA (p=.001).
Results

- Contrasted Aneurysm Volume (CAV) during the TASP interval was significantly lower in comparison to the preoperative CAV: 67 vs. 327 ml; P<0.001.

- Endoleak was observed in 23 patients (9 in single step vs. 14 in open branch).
  - Mean endoleak volume was 9.7 ml.

- Even in the presence of endoleak, CAV after TASP completion was significantly lower in comparison to the TASP interval.

- Neither the presence of endoleak nor its volume was correlated with the prevention of severe SCI.
Conclusion

According to volumetry:

- CAV during the TASP interval is significantly reduced in comparison to the preoperative CAV
- but also significantly higher in comparison to the CAV after treatment completion.

- This can possibly explain the preventive role of TASP in SCI, through a reduced but preserved aneurysm perfusion during the TASP interval, preconditioning collateral pathways to the spinal cord.

- Endoleak plays no role in the prevention of severe SCI.