Low risk of spinal cord ischemia after endovascular repair for suprarenal and thoracoabdominal aortic aneurysms using parallel stent graft implantation.


University Hospital Zurich, Switzerland
no disclosures
Thoracoabdominal aortic aneurysms (TAAA)

- risk of spinal cord ischemia
  5 - 20 %

Strategies for prevention of SCI
- normotension MAP > 80 mm Hg
- hemoglobin > 90 mg/dl
- CSFD < 12 mm Hg
- early iliac reperfusion
- staged procedures

Extended endovascular aortic repair

Spinal cord ischemia during bEVAR for TAAA

- direct occlusion of intercostal + lumbar arteries
- secondary reduction of spinal cord perfusion by aneurysm sac thrombosis

→ spinal collateral network

• staged procedures
• temporary aneurysm sac perfusion (TASP)
• segmental artery coil embolisation

Moritz S et al. Persp Vasc Surg Endovasc Ther 2011; 23(3) 214–222.
Parallel stent grafts for juxtarenal AA and TAAA repair

*gutter* endoleak 10-25 %
Prevention of spinal cord ischemia during TAAA repair

**Aim of the study**

analyze the risk of SCI after endovascular suprarenal and thoracoabdominal aortic repair using the Chimney/Periscope technique

Chimney/Periscope technique

+ SCI prevention strategy

n = 125

juxta/pararenal AA 81

TAAA 44
concept of SCI prevention @ USZ

- PG-EVAR
- awake patient – local anesthesia
- staged procedures
  - normotension, normal hemoglobin levels
  - no CSF drainage
  - early iliac reperfusion

Autoregulation of spinal perfusion
Chimney / Periscope grafts for suprarenal AA and TAAA repair

Adjuncts for SCI prevention
- normotension MAP > 80 mm Hg
- hemoglobin > 90 mg/dl
- supraa./iliac revascularization
- early iliac reperfusion
- no CSFD (option: secondary)
- staged procedures
- local anesthesia
- post op: steroids; option: mannitol

Table 1. Demographics, comorbidities, and operative details.

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<thead>
<tr>
<th>Aortic aneurysm type</th>
<th>Pararenal</th>
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<tbody>
<tr>
<td>Suprarenal</td>
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<td>Thoraco-abdominal</td>
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<td>Arch to visceral</td>
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<th>Operation</th>
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<td>Non-elective</td>
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<td>Symptomatic</td>
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<td>Ruptured</td>
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<th>Number of CPG</th>
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<th>2</th>
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<td>21</td>
<td>47</td>
<td>19</td>
<td>13</td>
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n = 100
perioperative mortality 2 / 100 2 %
reinterventions 22 / 100 22 %
EL rate: gutter 23; 15 treated, 4 low flow) 23 / 100 23 %
persistent gutter EL type II 4 4 / 100 4 %
Chimney / Periscope grafts for TAAA repair

Adjuncts for SCI prevention
- normotension MAP > 80 mm Hg
- hemoglobin > 90 mg/dl
- supraa./iliac revascularization
- early iliac reperfusion
- no CSFD (option: secondary)
- staged procedures
- local anesthesia
- post op: steroids; option: mannitol

n = 125
perioperative mortality 2 / 125 1.6 %
reinterventions 29 /125 23 %
SCI
temporary 4 / 72 5.5 %*
permanent 2 / 72 2.7 %*
overall permanent 2 / 125 1.6 %
EL rate (gutter 26; 18 treated, 5 low flow) type II 6
26 / 125 21 %

* delayed/late SCI
TAAA repair with parallelgraft technique

**Temporary permissive endoleak perfusion**

- Spinal perfusion
- TASP open/perfusion branch
- gutter endoleak

*Images showing SMA chimney and permissive endoleak (gutter).*

*Images showing lumbar/spinal segmental artery.*
TAAA repair using Parallelgrafts

Temporary gutter endoleak
- > spinal perfusion (TGSP)

pararenal/TAAA  n = 72
gutter EL  26
gutter EL spinal perf. (TGSP)  14
Prevention of spinal cord ischemia during TAAA repair

Strategies for SCI prevention

Single step procedures, ITN + adjuncts, CSFD, normotension, n/hemoglobin,

Staged procedures, ITN, + adjuncts, CSFD, MEPs, TASP
normotension, n/hemoglobin, iliac perfusion

Parallel stent graft, local anesthesia, staged temp. gutter spinal perfusion (TGSP)
+ few adjuncts normotension, n/hemoglobin
iliac perfusion, CSFD, MEPs

Immediate delayed late SCI

SCI 10-20 %
SCI 4-6 %
SCI 2 - 4 %
Prevention of spinal cord ischemia during TAAA repair

Conclusions

• low rates of SCI after PG EVAR with center specific strategies for SCI prevention
• awake patients allow best neurological monitoring to document spinal cord integrity with preserved autoregulation of spinal cord perfusion
• temporary gutter spinal perfusion (TGSP) might contribute to prevention of SCI
Low risk of spinal cord ischemia after endovascular repair for suprarenal and thoracoabdominal aortic aneurysms using parallel stent graft implantation.


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