Disclosures Dr. Kasprzak (grants, speaker fee, development, patents):
Cook, Gore, Vascutek, Bard, Medtronic, Maquet, UCB

P.M. Kasprzak
Department of Vascular Surgery, Endovascular Surgery, University Hospital Regensburg, Germany

Relevance of MEPs in endovascular TAAA repairs and strategies to decrease paraplegia

TAAA

Risk of paraplegia in extensive coverage of the thoracoabdominal aorta
5 - >20%

MEPs in BEVAR

Branched Stentgraft
“The endograft was implanted successfully, imaging documented an excluded aneurysm and excellent flow through the endograft and all prosthetic branches.”

… but the patient developed Paraplegia on day 2.

Chuter TA, Gordon RL, Reilly UM, Goodman JD, Messina LM.

Endovascular aortic repair: TEVAR and F/BEVAR

Spinal cord ischemia during BEVAR for TAAA
- direct occlusion of intercostal + lumbar arteries
- secondary reduction of spinal cord perfusion by aneurysm sac thrombosis / hypotension decreased perfusion of
  • segmental spinal arteries
  • anterior spinal artery

spinal collateral network

autoregulation
MEPs in BEVAR with / without Temporary Aneurysm Sack Perfusion - TASP

- **MEPs**
  - n = 47

- **SCI**
  - MEPs neg. n = 34
  - 0 % Sensitivity 100 %
  - MEPs pos. n = 13
  - DD: spinal vs peripheral Ischemia

- **Action →**
  - MEPs recovered 0 %
  - MEPs not recovered n = 3 (100 %)

Problem of delayed Paraplegia

- Kasprzak P et al. 2014 Eur J Vasc Endovasc Surg
  - Group: 83 TAAA patients after bEVAR (first patient 2008)
  - Temporary Aneurysm Sack Perfusion (TASP)
  - BEVAR for TAAA: the TASP concept

Open branch/TASP: Perfusion or Preconditioning

- **Perfusion preserved but reduced + compensated ischemia**
- **→** spinal preconditioning

J Vasc Surg 2016 (accepted)

Staged endovascular repair of thoracoabdominal aortic aneurysms limits incidence and severity of spinal cord ischemia

- Two-stage: time interval mean 5 months (1-60 months)
- 2 patients ruptured (7.4 %)

Second effect of MEP’s

- open branch/ TASP concept
- shorter TASP intervals
- side branch occlusion between 5-14 days

Implementation of MEPs monitoring


\[ \text{TASP range (median, days)} \]

- side br. completion < 14 days
- TASP interval (median, days)

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\[ \text{p = 0.025 n=2} \]
**General Perioperative Standards to Prevent Paraplegia in TAAA**

- Spinal Fluid Drainage
- Mean Arterial Pressure >90 mmHg
- Hb > 9 g/dl
- LSA and Hypogastric Arteries Preserved

**Other concept to prevent paraplegia**

**MISACE**

1. Preoperative coiling of the intercostal / lumbar arteries
2. FEVAR / BEVAR for TAAA

**Staged procedure + TASP in BEVAR**

1. Staged procedure with BEVAR + TASP + MEPs
2. Completion in LA

**Pre-Conditioning (Role of Postoperative Hypotension?)**

**Post-Dissection aneurysm**

FEVAR in small true lumen

**Arteriosclerotic Aneurysm BEVAR**

1. surgery
2. surgery
3. surgery?

**Completion**

fenestrated stentgraft ev. not completed distally

TASP completion after balloon branch occlusion

**Fenestrated stentgraft**

ev. not completed distally

**Completion**

TASP completion after balloon branch occlusion

**Staged process**

- TEVAR first
- TEVAR + BEVAR with TASP

**Future opportunities:**

- risk stratification
- role of embolization of intercostal arteries is to be examined

**Conclusions:**

- Intraoperative MEPs analysis detects patients at risk for SCI
- MEPs allow safer early side branch completion with reduction of TASP interval
- staged procedures for extensive endovascular procedures including TASP concept in BEVAR for TAAA are favourable