THE IMPORTANCE OF OPTIMIZATION OF BLOOD PRESSURE AND CARDIAC FUNCTION IN PREVENTING SCI WITH TAA REPAIRS

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SCI IN TAA REPAIR

- **COMMON complication**
  - 22% of type II open repairs
  - 30% of all endovascular repairs

- **Most dreaded complication for SURGEONS**

- **Devastating for PATIENTS**
  - Dramatic life changes
  - Often leads to early mortality
SCI IN TAA REPAIR - ANATOMY

• SPINAL CORD is nourished by 3 main arteries:
  • Anterior spinal artery (ASA) - 1
  • Posterior spinal arteries (PSA) - 2

• Their flow depends on branches of the intercostal and lumbar arteries (Segmental arteries - SA’s):
  • Anterior radicular-medullary arteries
  • Posterior radicular-medullary arteries
Many attempts were made to preserve this vessel intra-operatively:

- Pre-operative identification of the vessel in high-resolution CTA
- Intra-operative re-implantation
Imaging of vascular remodeling after simulated thoracoabdominal aneurysm repair

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Randall B. Griepp, MD,§ and Gabriele Di Luozzo, MD§

There is NO UNIQUE SA whose INTERRUPTION
results in cord ischemia

Thoracic and Thoracoabdominal Aneurysm Repair: Is Reimplantation of Spinal Cord Arteries a Waste of Time?

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• Blood supply to the spinal cord is part of an **EXTENSIVE NETWORK** of vessels.

• Extends into the **para-spinous muscles**

• Multiple connections between major arteries:
  • Intercostal
  • Lumbar
  • Subclavian
  • Hypogastric
  • Internal thoracic

In “Endovascular Aortic Repair”, Oderich et al
• Several animal studies were performed in order to explain the SCI pathophysiology.
SCI IN TAA REPAIR - PATHOPHYSIOLOGY

- Following extensive SA occlusion, SCBF and CNP drop dramatically.

- What's the importance of optimization of blood pressure and cardiac function in preventing SCI with TAA repairs?

- Vulnerability to spinal cord ischemia seems to peak at 5 hours post-operatively and extends for the first 72 hours after the operation.
By optimizing MAP, one can increase SCBP and avoid spinal cord ischemic lesions during the period in which proper collateralization installs (5h – 72h)
The significant drop in the cardiac index in patients with deficits compared with patients without deficits may reflect the important contribution of cardiac function to the collateralized circulation of the spinal cord during and after aortic occlusion.
Interventions for Reversing Delayed-Onset Postoperative Paraplegia After Thoracic Aortic Reconstruction

Albert T. Cheung, MD, Stuart J. Weiss, MD, PhD, Michael L. McGarvey, MD, Mark M. Stecker, MD, PhD, Michael S. Hogan, BS, Alison Escherich, MPH, and Joseph E. Bavaria, MD

Strategies to Manage Paraplegia Risk After Endovascular Stent Repair of Descending Thoracic Aortic Aneurysms

Albert T. Cheung, MD, Alberto Pochettino, MD, Michael L. McGarvey, MD, Jehangir J. Appoo, MD, Ronald M. Fairman, MD, Jeffrey P. Carpenter, MD, William G. Moser, RN, Edward Y. Woo, MD, and Joseph E. Bavaria, MD

Prevention of spinal cord injury during endovascular thoracic aortic repair

Emanuel R. TENORIO 1, Matthew J. EAGLETON 2, Jussi M. KÄRKKÄINEN 1, Gustavo S. ODERICH 1

Successful reversal of recurrent spinal cord ischemia following endovascular repair of a descending thoracic aortic aneurysm

J. J. Appoo, 1, 2 H. D. Gregory, 2 H. D. Toeg, 3 C. A. Prusinkiewicz, 2 W. D. T. Kent, 1 A. Ferrando, 4 and D. V. Ha 2

- MAP was maintained from 75 - 85 mmHg
- If SCI: MAP was increased to 85 - 100 mmHg
- The goal MAP is targeted at ≥ 80 mmHg
- MAP was maintained from > 90 mmHg
• VULNERABILITY TO SCI seems to PEAK AT 5 HOURS post-op and EXTENDS FOR THE FIRST 72 HOURS

• During this time, especially during the first 24h, it is IMPERATIVE to keep MAP at HIGH NORMAL LEVELS

• In patients with PREVIOUS KNOWN HYPERTENSION:
  • MAP may need to be at HIGHER LEVELS THAN NORMOTENSIVE PATIENTS
  • Function – by means of motor evoked potentials or neurological examination - should be watched
• Blood pressure and cardiac function optimization are important factors in SCI prevention during TAA repairs.

• Successful prevention of SCI requires an extensive multidisciplinary approach.

Blood pressure and cardiac function optimization represent ONLY A PART OF IT!!
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