How to Use Motor Evoked Potentials (MEPs) to Decrease the Incidence of SCI after Open and Endo TAAA Repairs: What Else is Important?

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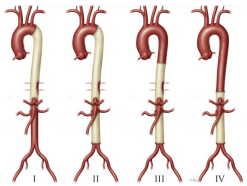
Conflicts of Interest

- None

Introduction

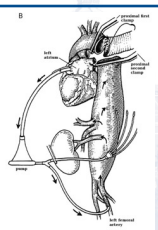


Paraplegia risk with TAAA repair
- Extent 2: 7 - 15% range
- Extent 3: ~ 5% risk

Increasing levels of aortic replacement potentiate SCI risk due to disruption of spinal cord perfusion.

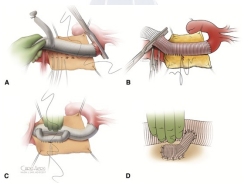
Optimizing Spinal Cord Perfusion

- Distal aortic perfusion – cardiopulmonary bypass, **left heart bypass**
- Cerebrospinal fluid drainage
- Blood pressure augmentation
- Intercostal reimplantation

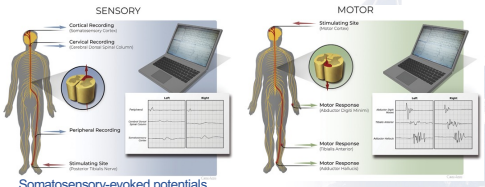


Optimizing Spinal Cord Perfusion

- Distal aortic perfusion – cardiopulmonary bypass, **left heart bypass**
- Cerebrospinal fluid drainage
- Blood pressure augmentation
- **Intercostal reimplantation**
- Hypothermia, naloxone*



Neuromonitoring – The Basics – 50% drop MEPs



Somatosensory-evoked potentials (SSEPs)

Motor-evoked potentials (MEPs)

Neuromonitoring - Intraoperative Conduct

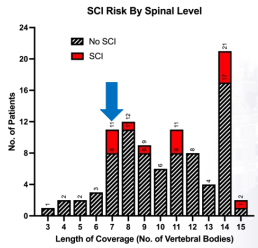
"Homeostasis"

Anesthesiologists/Perfusionists
Increase proximal blood pressure > 140 mmHg
Increase distal aortic perfusion pressure > 80 mmHg
Optimize hematocrit
Drain CSF < 10 mmHg

Surgeons
Initiate distal aortic perfusion
Sequential clamping of the aorta
Stop backbleeding from the ICAs
Reattatch T8 to T12 ICAs
Re-establish pulsatile flow to the pelvis

Neurophysicist
Monitor MEP & SSEP changes/loss

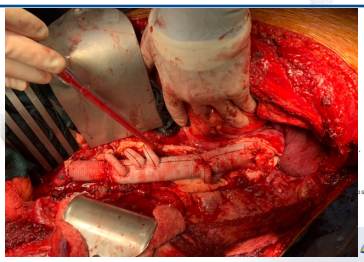
Length of repair and SCI risk



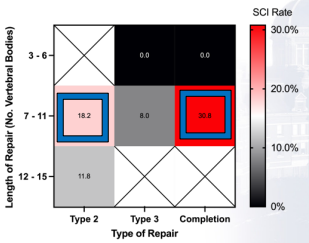
MEP characteristics: 5% Permanent Paraplegia

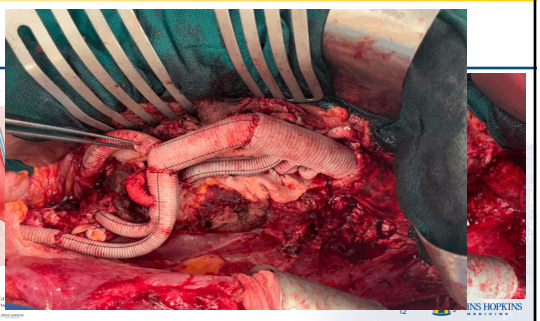
	Total	Type 2	Type 3	Completion	p-value
Did they change? %					0.19
No change	54.4%	58.5%	65.2%	26.7%	
Reversible change	32.9%	34.1%	17.4%	53.3%	
Irreversible change	5.1%	2.4%	8.7%	6.7%	
Unreliable reading	7.6%	4.9%	8.7%	13.3%	
Unilateral change; %	11.4%	12.2%	4.3%	20.0%	0.32
When did the changes occur?					0.053
Abdominal; %	16.5%	9.8%	17.4%	33.3%	
Abdominal bottom-up; %	7.6%	2.4%	8.7%	20.0%	
Thoracic; %	8.9%	17.1%	0%	0%	
Abdominal and thoracic; %	1.3%	2.4%	0%	0%	
End of case; %	2.6%	4.8%	0%	0%	
No change or unreliable; %	1.3%	0%	0%	6.7%	

Change of MEPS in the Chest



Relationship between length of repair and SCI risk





Conclusions

The number of replaced spinal levels, especially >7 levels, and previous aortic repairs should guide intraoperative neuroprotective measures including intercostal and lumbar reimplantation.

- MEP changes may lag after intercostal of lumbar sacrifice.
- Flexibility with repair techniques is mandatory.

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Questions?

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