Near-Infrared Spectroscopy To Non-Invasively Monitor Spinal Cord Perfusion: How Does it Work and Will it Replace Motor Evoked Potentials?

Christian D. Etz

Detection of ischemic spinal cord injury during and after extensive open or endovascular TAA/A repair utilizing SSEP and/or MEP monitoring: invasive and expensive

Spinal cord monitoring

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<th>Modality</th>
<th>SSEP</th>
<th>MEP</th>
<th>Direct SCPP</th>
<th>Laser Doppler</th>
<th>cnNIRS</th>
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SSEP: Somatosensory evoked potentials; MEP: Motor evoked potentials; Direct SCPP: Spinal cord perfusion pressure; Laser Doppler: Laser Doppler; cnNIRS: Near-infrared spectroscopy of the collateral network

Near Infrared Spectroscopy

Collateral Network

**FIRST IN-MAN SERIES**

Near-infrared Spectroscopy Monitoring of the Collateral Network Prior to, During, and After Thoracoabdominal Aortic Repair: A Pilot Study


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1. Lumbar cnNIRS sensitive to X-clamping & distal perfusion
2. Diminished lumbar cnNIRS = postoperative SCI

**HYPOTHESIS**

Perfusion & oxygenation of the collateral network directly reflects spinal cord microcirculation?

Can cnNIRS depict spinal cord oxygenation?

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**Experimental setup**

- Sev
- Sub
- TSH
- Dire oxy

**Experimental Sequence**

- Baseline
- X-clamping (ischemia: 8 min.)
- Clamp release (recovery) consecutively 4 times

**Direct Invasive Laser Doppler (LDF)**

Collateral Network

Spinal Cord

- Oxygenation
- Flow
- X-clamp
- Clamp release

HYPOTHESIS: oxygenation of the CN = spinal cord?
Paraspinous CN oxygenation directly reflects spinal cord tissue oxygenation.

Non-invasive cnNIRS

Question: Lumbar cnNIRS = Spinal cord oxygenation? ✔

Conclusions

1. CN oxygenation reflects spinal cord oxygenation

2. Lumbar cnNIRS reflects spinal cord oxygenation

Lumbar cnNIRS is an effective tool to non-invasively monitor spinal cord oxygenation.