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Paraplegia Following Pneumonectomy and Descending Thoracic Aorta Mass Resection

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Paraplegia Following Pneumonectomy and Descending Thoracic Aorta Mass Resection

Authors
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Comments
Poster presentation at the New England Anesthesia Resident Conference, held on March 24, 2012 in Burlington, VT.
The major intraoperative challenge of this case was the conflicting goals in fluid management for concomitant pneumonectomy and thoracic aorta resection. A conservative approach was taken to fluid management. Although it is difficult to be certain, low-normal intravascular volume and hypotension around the time of aortic clamping and release may have contributed to renal injury and SCI. Conversely, the patient's favorable postoperative pulmonary function may have been attributable to adequate circulating volume and perfusion pressure maintained by administration of ample IV fluids.

Fluid management for thoracic aorta cross-clamping

Spinal cord ischemia (SCI): SCI is a devastating complication of surgical repair of the thoracic aorta. The incidence of SCI with surgical repair of the thoracic aorta has been reported to be as high as 14%, and thoracotomy has an estimated SCI incidence of 0.01%. SCI may present with lower extremity weakness ranging from paraparesis to paraplegia. Moreover, clinical onset of SCI may be immediate or as late as months after the surgery. Prevention of SCI and neurological deficit is not only important in ensuring a better quality of life but also in improving the survival rate.2,3

Spinal Cord Ischemia Prevention & Management

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<tr>
<th>Spinal Cord Ischemia (SCI)</th>
<th>Intervention</th>
<th>Example</th>
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<tr>
<td><strong>Aortic Cross Clamping</strong></td>
<td>Improvement of aortic cross clamp pressure</td>
<td>Minimize aortic clamp time, increase MAP</td>
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<td>Suppression of aortic cross clamp metabolism</td>
<td>Moderate selective hypothermia (2°C to 34°C), profound hypotensive circulatory arrest (14-16%); infusing of cold saline into the intrathoracic space</td>
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<td>Neuroprotection of the aorta</td>
<td>Pharmacological neuroprotection of the aorta</td>
<td>Methylprednisolone, mannitol, naloxone, intrapleural papaverine</td>
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<td>Prevention of steal from collateral arterial network during aortic cross clamping and opening of aorta</td>
<td>Ligation of back bleeding intercostal arteries, prevention of pharmacological glycation of endarterectomy shunt which occurs from use of drugs such as aspirin</td>
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<td>Early detection and intervention of SCI</td>
<td>Intraoperative monitoring of somatosensory evoked potentials and motor evoked potentials</td>
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**Spinal Cord Ischemia Risk**

Dysfunction of somatosensory evoked potentials and motor evoked potentials can be used to detect early changes in spinal cord function. These tests are performed during the surgical procedure and are used to guide the surgeon in making decisions about the extent of aortic cross clamping and the timing of aortic cross clamping and opening of the aorta.

**Follow-Up visit**

Visit to take a few steps with the aid of a walker

**Discussion**

The incidence of SCI with surgical repair of the thoracic aorta may be up to 14%.4 Maintenance of adequate mean arterial pressure, and thus SCI perfusion pressure, is paramount in limiting SCI. Typically, first-line management for maintenance of MAP is fluid administration, then vasopressors.5 As discussed above, aggressive IV fluids were avoided, thus, vasopressors were used for selected blood pressure goals.

Furthermore, we chose CSF drainage for additional SCI treatment as this combination was felt to be the most evidence-based approach of the SCI prevention described in the literature.

**References**


**Abbreviations**

- ALI: Acute Lung Injury
- ATN: Acute Tubular Necrosis
- CSFD: Cerebrospinal Fluid Drain
- GETA: General Endotracheal Anesthesia
- Gtt: Drip
- I&O: In and Out
- IS: Incentive Spirometry
- LA: Local Anesthetic
- LE: Lower Extremity
- LPM: Liter Per Minute
- MAP: Mean Arterial Pressure
- PF: Plantar Flexion
- DF: Dorsiflexion
- POD: Post-Operative Day
- SC: Spinal Cord
- SCI: Spinal Cord Injury
- UO: Urine Output
- CSF: Cerebrospinal Fluid
- IVF: Intravenous Fluid
- EBL: Estimated Blood Loss
- Shock Index: MAP x HR
- WBC: White Blood Cells
- Hct: Hematocrit
- Hgb: Hemoglobin
- FENa: Fractional Sodium Excretion
- POD: Post-Operative Day
- NYHA: New York Heart Association
- ARB: Angiotensin II Receptor Blocker
- ACEI: Angiotensin-Converting Enzyme Inhibitor
- GFR: Glomerular Filtration Rate
- BUN: Blood Urea Nitrogen
- Cr: Creatinine
- CI: Cardiac Index
- MAP: Mean Arterial Pressure
- HR: Heart Rate
- LA: Local Anesthetic
- LE: Lower Extremity
- LPM: Liter Per Minute
- CT: Computed Tomography
- MRI: Magnetic Resonance Imaging
- PET: Positron Emission Tomography
- CT: Computed Tomography