

## SCA 9

### SAFETY OF LUMBAR DRAINS IN THORACIC AORTIC OPERATIONS PERFORMED WITH EXTRACORPOREAL CIRCULATION

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**Background:** Lumbar cerebrospinal fluid (CSF) drainage has been demonstrated to be effective for reversing delayed-onset paraplegia after thoracic aortic reconstruction (1-2). The trend toward increased use of extracorporeal circulation to provide lower body perfusion during thoracic aortic reconstruction has prompted questions concerning the safety of lumbar CSF drains in fully anticoagulated patients. To address this controversy, the nine-year experience of using lumbar CSF drainage in thoracic aortic surgery using extracorporeal circulation with full heparinization was evaluated.

**Methods:** Retrospective analysis of a prospective aortic surgery database revealed 162 patients (age  $67 \pm 13$  yr) who underwent thoracic aortic repair (1993–2002) with lumbar CSF drainage, extracorporeal circulation and full anticoagulation. CSF catheters were inserted at L3-5 after induction of general anesthesia and after antibiotic prophylaxis with vancomycin and gentamicin. CSF was drained to maintain pressures of 10-12 mm Hg. In the absence of neurologic deficit or coagulopathy, the catheters were capped at 24 hrs and removed at 48 hrs. CSF was drained beyond 24 hrs to reverse delayed onset paraparesis.

**Results:** CSF drains were used in 135 thoracoabdominal aortic aneurysms (Crawford type I, n=66; II, n=23; III, n=36; IV, n=10) and 27 descending thoracic aortic repairs (aneurysm, n=24; traumatic aortic injury, n=2; aortic coarctation, n=1). Left atrial-

femoral bypass was used in 130, full cardiopulmonary bypass in 32, with 27 requiring hypothermic circulatory arrest. Time between catheter insertion and anticoagulation was  $188 \pm 76$  min. Heparin achieved a maximum activated clotting time of  $534 \pm 194$  sec. extracorporeal circulation time was  $115 \pm 73$  min. Hypothermic circulatory arrest time was  $40 \pm 15.05$  min. Mortality was 7.4% (12/162), permanent paraplegia was 3.1% (5/162) and delayed-onset paraplegia with full or partial neurologic recovery was 6.8% (11/162). No epidural or spinal hematoma was observed. The incidence of catheter-related complications was 2.4% (4/162): temporary abducens nerve palsy (n=1) and retained catheter fragments (n=3), two of which presented with meningitis; all had full recovery without sequelae.

**Conclusion:** CSF drainage in thoracic aortic surgery on extracorporeal circulation with full anticoagulation did not result in hemorrhagic complications. The incidence of permanent paraplegia was relatively low. Catheter-related complications were potentially avoidable and had no permanent sequelae. In this limited experience, intraoperative insertion of lumbar CSF drainage catheters prior to full anticoagulation for extracorporeal circulation appeared to be safe.

#### References:

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2. Weiss SJ, Hogan MS, McGarvey ML, Carpenter JP, Cheung AT: Successful treatment of delayed onset paraplegia after suprarenal abdominal aortic aneurysm repair. *Anesthesiology* 2002; 97:504-6