

UW open TAAA repair

Physiologic principles for reducing risk of SCI are the same regardless of surgical technique:

- Optimize spinal cord oxygen delivery
- Reduce spinal cord oxygen demand
- Reduce reperfusion injury
- Reduce direct neuronal injury that occurs during ischemia

The application of spinal cord protective strategies differs in different surgical techniques

At UW TAAA surgery is done with clamp and sew technique unless the aneurysm involves the distal aortic arch. We repair those aneurysms using DHCA

This Checklist applies to clamp and sew technique and not aneurysms done with DHCA.

Monitors and preparation

Modified lateral position, left side up with pelvis tilted toward flat

Interspace of thoracoabdominal incision depends on level of aneurysm

Most important is understanding details of the surgical plan

Blood and nasopharyngeal temperature

Right arm arterial pressure

PAP

TEE

SFP: Lumbar drain placed with fluoroscopy. Fluid drained to SFP < 5-8 mm Hg depending on SCI risk

EEG to achieve burst suppression during cross clamp

Bronchial blocker in left mainstem bronchus for Crawford I, II, some III TAAAs

Cold room

Internal defibrillator paddles

3 large peripheral IVs and CVL to replace 1-2 blood volume loss during aortic clamp

Cell saver

Drugs

Fentanyl and midazolam

No subQ heparin if spinal drain

Benadryl/famotidine prophylaxis for allergic reaction to blood components

Methylprednisolone 30 mg/Kg up to 2 gm

Mannitol 12.5 gm

Cardiac drugs for bolus

Pentobarbital 3-5 mg/Kg to achieve burst suppression during clamping

Magnesium sulfate 2 gm

Infusions: epinephrine; norepinephrine; NTG; esmolol; insulin; bicarbonate 1 meq/ml

Naloxone [10 mcg/ml] at 1 mcg/Kg/hr continuously in dedicated central port beginning after induction

Do not use: arterial dilators, BAIR huggers, milrinone, epidural/intrathecal narcotics/local anesthetics

Before proximal aortic clamping

Blood temperature 33.8°C

Left lung down

SFP < 5-8 mm Hg depending on SCI risk

SBP 85-90 mm Hg for clamping

Heparin 3000-5000 units only if patient has prosthetic graft, heart valve, or clamp proximal to left subclavian artery

Preclamp drugs given: adequate fentanyl, methylprednisolone, mannitol, benadryl, famotidine, naloxone

pRBC and FFP hung

During proximal aortic clamp and celiac, SMA and renal artery occlusion

Reduce ventilation to maintain normocarbia

Increase FiO₂

60 sec burst suppression using pentobarbital as MAP allows

MAP 100 mm Hg [NTG/esmolol if clamp and sew, norepinephrine if assisted circulation, to achieve MAP goal]

SFP < 5-8 mm Hg

SCPP = 0.75 MAP – SFP [SCPP goal =/> 65 mm Hg]

SFD timed to achieve SFP goal with =/< 130 ml fluid drained during surgery

Prevent hypertension during renal perfusion

Bicarbonate infusion 0.05 meq/kg/min during visceral artery ischemia to prevent systemic acidemia

Replace blood loss during aortic clamp with RBC, FFP, cell saver to prevent coagulopathy and maintain Hb 9-10 mg/dL

Platelets and cryoprecipitate as indicated

Proactive transfusion to prevent coagulopathy during large surgical blood loss in short time

Fluid warmers and warm room once blood temperature is 33.9°C to maintain temperature =/> 32.5°C

Treat hypokalemia caused by bicarbonate infusion

Magnesium sulfate 2 gm

Anticipate aortic occlusion for 60-70 minutes until visceral reperfusion

Reperfusion to celiac, SMA, renal arteries

Increase ventilation to maintain normocarbia

Stop bicarbonate infusion

Rapid RBC and FFP administration

Hemodynamic changes with visceral reperfusion predict changes when legs are reperfused

Treat hypotension with epinephrine, norepinephrine, calcium

Amiodarone for arrhythmia

Begin volume loading and NE/E infusions in anticipation of perfusing legs

INR, platelet count, fibrinogen, Hb, ABG, K, lactate to assess component replacement/metabolic state

Continue SCPP goals (MAP 100 mm Hg, SFP < 5-8 mm Hg)

Left lung can be ventilated after visceral arteries are open

Reperfusion of legs

Distal anastomosis completed soon after visceral/renal reperfusion

Increase ventilation to maintain normocarbica

Rapid RBC and FFP administration

Pressors and inotropes as needed

After the aorta is open to everything

Confirm no retrograde dissection on TEE

Replace insensible surgical loss deficit

Treat anemia/coagulopathy

Establish urine output

If oliguria with hypervolemia, adequate MAP and CI, consider furosemide

Intercostal arteries may be re-implanted using side clamp. May require one lung ventilation

Continue MAP, SFP and SCPP goals

Hb 10 g/dL

INR 1.3

Platelet count > 100 K/uL

Fibrinogen > 250 mg/dL

Glucose =/< 170 mg/dL

Correct pH and potassium

Reduce FiO₂

Adequate volume resuscitation and CI necessary to normalize lactate

Passive rewarming only: warm fluid, warm room

Goals for ICU transfer: volume resuscitated, pH 7.4, decreasing lactate, making urine, good CI,

MAP, SFP, SCCP, Hb 10 g/dL, not coagulopathic, no surgical bleeding, distal pulses, warming,

normocarbica, adequate oxygenation

Head CT after surgery if blood in spinal fluid

Postoperative management

Continue MAP and Hb goals; prevent hypoxemia and coagulopathy

Continue SFP goal until patient lifts legs

Head CT if blood in spinal fluid

Leg lifts every hour

Monitor SFP and do not drain spinal fluid after patient lifts legs unless weakness occurs

Allow SFP to return to baseline

Remove spinal drain at 48 hrs if normal leg strength, platelets > 90 K/uL, INR =/< 1.3

Blood patch if post SFD HA

Do not administer low molecular weight heparin in hospital after spinal fluid drainage