NM Spinal Fusion - Intraoperative
Enhanced Recovery After Surgery (ERAS)

Children's Mercy KANSAS CITY | Evidence Based Practice

Inclusion Criteria:
- Patients with neuromuscular scoliosis undergoing posterior spinal fusion

Exclusion Criteria:
- Previous index surgery
- Pre-existing spinal or hardware infection
- Trauma/tumor/spondylolisthesis without risk factors

QR code for mobile view

Preoperative Care in SDS
- Clear carbohydrate-rich drink up to 2 hours before surgery
  - Document ingestion of clear carb drink
- Obtain UCG for patient > 10 years
- Consider IV placement in SDS
- Anxiolysis: per anesthesia team

Prior to surgery patient/family meets
- Pre-op nurse
- Anesthesiologist
- Surgeon
- Child Life Specialists

Patients on ketogenic diet will not receive the carbohydrate rich drink

Case Setup & Induction

Equipment
- Infusion pumps
- Hotline with blood tubing
- Prone pillow
- Bite blocks
- Tegaderm/ointment for eye protection
- Esophageal temp probe

Vascular Access
- Ultrasound (US) in room to capture image; order anesthesia
- 2-3 large bore IVs (avoid antecubital location if possible)
  - Obtain T&S with IV placement (and cortisol if needed)
- Low threshold for CVC placement (preferred by PICU)
  - Discuss with surgeon
- Arterial line

Induction
- Consider the avoidance of non-depolarizing neuromuscular blocking agents (NMBA) for intubation
- May give succinylcholine if appropriate

Intraoperative Care

Maintenance of TIVA
- Propofol gtt: 50 - 150 mcg/kg/min
  - High dose may decrease NM signals
- Remifentanil gtt: 0.2 - 0.5 mcg/kg/min

or

- Sufentanil gtt: 0.2 - 1 mcg/kg/min
- Avoidance of inhaled anesthetics
- Avoidance of dexmedetomidine gtt

PONV Prophylaxis
- Dexamethasone 0.1 mg/kg IV (Max 8 mg)
- Ondansetron 0.15 mg/kg IV (Max 8 mg)

Antibiotics

No MRSA history:
- Cefepime 50 mg/kg IV (Max 2 G)

MRSA history:
- Clindamycin 10 mg/kg IV- if susceptible (Max 900 mg) ***PLUS*** cefepime 50 mg/kg (Max 2 G)

OR
- Vancomycin15 mg/kg IV ***PLUS*** cefepime 50 mg/kg IV (Max 2 G)

Coagulation
- Tranexamic acid (TXA)
  - Loading Dose: 30 mg/kg (Max 2 G)
  - Infusion: 10 mg/kg/hour

Muscle Relaxants
- Surgeons may ask for NMB to be given for exposure following completion of baseline neuro-monitoring

Multimodal Analgesia
- Methadone 0.1 mg/kg IV (Max 8 mg) at start of case
- Ketamine gtt: 5 mcg/kg/min
- Acetaminophen: 12.5 mg/kg IV (Max 1000 mg)
  - Administered at beginning of case and q6 hrs
- Ketorolac 0.5 mg/kg IV (Max 15 mg)
  - Administered at end of case (confirm with surgeon)
- Consider avoiding long-acting opioids (morphine and hydromorphone), may give fentanyl boluses PRN
- Surgeon may inject local anesthetic at incision site

MAP Management
- Have phenylephrine or dopamine gtt in line
- Ephedrine prn
- MAP goals vary by **phase of surgery**

Fluid Management/Blood Transfusion
- Utilize cell saver

Temperature Management
- Maintain normothermia (36^0 to 38^0 C) utilizing upper & lower Bair Hugger

Phases of Surgery & Mean Atrial Pressure (MAP) Goals

****Always Confirm w/ Surgery****
- Phase 1: Decortication of vertebral laminae, destruction of facet joints and removal of spinous processes
- Phase 2: Placement of pedicle screws
  - MAP goal ~65 mmHg (If < 10 yrs old, normal age based MAP)
- Phase 3: Distraction of spinal cord
  - MAP goal 75 - 85 mmHg (If < 10 yrs old increase to 25% above normal)

Change or Loss of Neuromuscular Signals
- Make sure surgeon stops operating
- Verify change or loss w/ neuro-monitoring team and ask for characterization (change vs loss; diffuse vs focal)
- Verify correct probe placements and patient positioning
- Increase MAP
  - Age > 15: 85 - 95 mmHg
  - Age 10 - 14: 80 - 90 mmHg
  - Age 5 - 9: 75 - 85 mmHg
  - Age 1 - 4: 70 - 80 mmHg
- Hypoventilate > 45 mmHg
- Confirm current medications, including infusions
- Optimize ABG and O^2 carrying capacity (transfuse as needed)
- Consider lidocaine IV 1 - 2 mg/kg to treat possible vasospasm
- Prepare for possible wake-up test
- Coordinate postop plans w/ surgeon

Emergence

End of Case
- Upon completion of final neuro-monitoring test:
  - May discontinue ketamine gtt
  - If preferred, may discontinue propofol infusion and start inhalation anesthetic
- Continue TXA until closing of skin
- Administer ondansetron, ketorolac, & acetaminophen if have not already

Transport Considerations
- If going to PICU, transport directly to PICU intubated for bedside handoff (PICU & surgeon preference)
  - Consider continuing propofol gtt and/or starting demedetomidine gtt for transport
  - If NOT planning to transport intubated, discuss with surgeon

Transfer to PICU

- Assessment/Referral

- PICU
- Inpatient Floor - Discharge

Contact: EvidenceBasedPractice @cmh.edu

Link to: synopsis and references

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