

Scoliosis Repair in a Child with Cerebral Palsy and Developmental Delay

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Case Objectives:

After preparing and discussing this case, the PBLD discussant/learner will be able to:

1. Understand how the presence of cerebral palsy can alter the evaluation and management of a patient undergoing spinal fusion
2. Develop an anesthetic plan that takes into consideration:
 - a. Positioning
 - b. Spinal cord monitoring
 - c. Hemodynamic management
 - d. Blood conservation, transfusion and coagulation
3. Discuss options for pain management
4. Discuss current knowledge regarding postoperative blindness

Stem Case:

A 12-year old girl with cerebral palsy and progressive scoliosis is scheduled for posterior spinal fusion. She was born at 30 weeks gestation, required mechanical ventilation for two weeks and sustained a Grade 3 IVH.

Current problems

Mild asthma: uses albuterol prn; none for two weeks

Moderate generalized spasticity and speech apraxia. Walks with assistance.

Developmental delay: In 2nd grade in a special education program

Seizure disorder: well-controlled generalized seizures.

ADHD

PSH

Strabismus correction

Selective dorsal rhizotomy

History of agitation on emergence

Medications

Carbamazepine (Tegretol)

Valproate

Adderall

Exam

Ht 136 cm Wt 35 kg

Playful, no eye contact

HEENT: drooling

Chest: Using accessory muscles. Lungs clear with distant breath sounds on the right

1. *Is there any other historical information that you want?*
2. *What tests will you order?*
PFT's? CXR? Blood gas?
Coags?
Anticonvulsant serum concentrations?
3. *What risks do you discuss?*

Preoperative preparation

4. *Which monitors do you plan to use?*
Is an arterial line necessary for all posterior spinal fusions?
Does this patient need a central line? If not always, then under what conditions?
What are the advantages and limitations of SSEP monitoring? Motor potentials?
5. *What technique(s) will you employ to minimize the need for allogenic blood transfusion? Is preoperative autologous donation risk-free? How do different methods (autologous, hemodilution, erythropoietin) compare in cost-effectiveness? How efficacious are antifibrinolytic agents? Their risks?*
6. *Will you use a hypotensive technique? If so, what is your target BP? Agents?*
7. *Will you order preoperative sedation? If so, what?*

The patient spits out the sedative and is crying.

8. *What would you do? Will you take her against her will? Would your approach be different if she were functioning at a higher cognitive level?*

Intraoperative course

The second attempt at sedation is successful, but the patient is now snoring loudly and her lips are dusky. You whisk her off to the operating room, apply the monitors and her SpO₂ is 82%?

9. *Do you proceed with induction? How?*

After induction and insertion of your chosen lines, the patient is turned prone.

10. What precautions must be taken during positioning? Can we prevent injury?

11. What is your anesthetic technique?

Surgery commences, and several hours later the urine output decreases significantly.

12. What is your differential diagnosis? What would you do?

Your intervention reestablishes some urine output, surgery continues and the EBL has reached 200 ml.

13. Do you want to alter management, i.e., hetastarch? albumin? transfusion? What is your trigger for transfusion? What is an acceptable Hct for this patient?

Later, the MAP is in the low 50's with dips into the low 40's. Urine output is minimal.

14. What is your differential of intraoperative hypotension? How would you treat it?

The technician monitoring the SSEP's and MEP's reports concerning data. The surgeon is upset and wants a wake-up test.

15. What steps can you take to improve the signals? How long will it take to wake up the patient? What is the likelihood of the patient remembering this? Are there other risks with the wake-up test?

The patient moves her legs, surgery continues, and the bleeding continues and continues.

16. Should coags be sent? How often? Is there a formula for giving FFP, e.g., after 5 units of PRBCs?

INR is 1.6 aPTT 42 sec Fibrinogen 110 Platelet count 110,000

17. Would you treat?

Surgery is completed, the patient is turned supine, and an x-ray is taken to document the hardware placement. The patient begins to respond to commands and is breathing.

18. Will you extubate? Are there any bedside tests to determine readiness for extubation?

19. What is your plan for analgesia? Will it affect your plan for extubation vs. mechanical ventilation?

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