Neuraxial Anesthesia in the Presence of Clinical Anticoagulation: What are our Options for Pediatric Patients?

Ralph J Beltran MD, Senthil G Krishna MD, Tarun Bhalla MD, Joseph D Tobias MD
Department of Anesthesiology & Pain Medicine, Nationwide Children’s Hospital, Columbus, Ohio

Case Report

Case #1
- An 11 year-old girl with a history of Ewing’s sarcoma who presented for re-operation of limb fixation and muscle flap with contralateral fibular bone harvesting.
- Intraoperatively, an epidural catheter was placed for postoperative pain management.
- Seven hours into the surgery, an acute arterial thrombosis occurred during vascular anastomosis of the muscle flap, requiring emergent anticoagulation management.
- An epidural catheter was placed prior to induction of anesthesia.
- She was managed with enoxaparin 1 mg/kg every 12 hours, which was initiated.
- Enoxaparin was stopped 24 hours preoperatively.
- On POD#1, enoxaparin was inadvertently restarted at the previous dose.
- Enoxaparin was stopped after the first dose, and held for 24 hours prior to beginning enoxaparin.
- Postoperatively, the heparin infusion was discontinued, and enoxaparin (1 mg/kg every 12 hours) initiated.
- The epidural catheter was removed uneventfully on POD#5 after the first dose of enoxaparin.

Case #2
- The second case was a 16 year-old with visceral hyperalgesia, gastroparesis, and upper extremity DVT who presented for placement of a gastric pacemaker.
- She was managed with enoxaparin 1 mg/kg every 12 hours, which was stopped 24 hours preoperatively.
- An epidural catheter was placed prior to induction of anesthesia.
- On POD#1, enoxaparin was inadvertently restarted at the previous dose.
- Enoxaparin was stopped after the first dose, and held for 24 hours prior to removal of the epidural catheter on POD#5 without incident.

Discussion

The complications stemming from neuraxial catheters in the presence of clinical anticoagulation can be severe, with spinal hematoma carrying potentially devastating consequences.

The actual incidence of spinal hematoma remains unknown. Tryba reported 13 cases of spinal hematomas after reviewing 800,000 epidural anesthetics in adults.1 Ruff reported 7 spinal hematomas in 342 patients who received neuraxial anesthesia in the presence of anticoagulation.2

In pediatrics, the risk of complications after performance of epidural analgesia was assessed by the NAP-3 study. They determined the risk of paraplegia or death to be 1:10,000.3 The American Society of Regional Anesthesia (ASRA) recommends removal of the epidural catheter 2 hours prior to beginning enoxaparin.4

In the first patient, anticoagulation was started emergently to save her graft. In the second patient, enoxaparin was given due to miscommunication between clinical teams.

Recommendations for catheter management in the presence of emergent or acute anticoagulation are lacking. Involvement of the Pain Service for early diagnosis of potential complications is advocated by ASRA. Serial neurologic examinations remain an important component of early diagnosis, but communication between clinical teams is paramount to good clinical outcomes.

Clarification of ASRA guidelines and ongoing literature review by all health care providers can help decrease the possibility of mismanagement. Creating tools to clarify these guidelines can prove important in facilitating their interpretation among different providers.

References

4. Figures Department of Anesthesiology & Pain Medicine, Nationwide Children’s Hospital: Regional Anesthesia guidelines