



Pediatric  
Critical Care  
Learning



## PCCL Session: Summary Report and Resources

PCCL session topic: “Seizing the Moment – diagnosis and management of status epilepticus”

Date: March 21<sup>st</sup>, 2025

### Learning objectives:

- Explore when to suspect status epilepticus.
- Discuss the management of status epilepticus.
- Review intraosseous access, including tips for insertion and its use for blood sampling, fluids, and medication.

### Case:

- 1 year old female with a history of hypoxic ischemic encephalopathy, epilepsy, global developmental delay, g-tube feeding. She presents with 1 week of emesis and diarrhea and 2-3 days of lethargy, with 1 day of limited interactivity and 6-8 hours with no consistent response to external stimuli. This is a substantial change from her baseline
- Medications: Vigabatrin and vitamin D. She is fully immunized
- **Initial vital signs:** T: 37.5C, **HR: 120s-140s**, RR 20s, BP 90s/60s, SpO2 98% RA.
  - She appears slightly mottled and is not responsive to sound or touch but does make occasional spontaneous movements. The significant findings on exam were: generalized hypotonia, **capillary refill of 3-4 seconds** and **decreased level of consciousness compared to baseline**, with eyes closed, no withdrawal from painful stimuli. Her pupils were reactive, and reflexes were intact. She had brief myoclonic jerking of her wrist and ankles every 1-2 minutes
- Investigations: Chemistry: **Na 116, Cl 90**, K 5, CO2 25, Glucose 5, creatinine 50, urea 5, liver enzymes normal. VBG: **7.48/42/26/Lactate 3.0**. CBC: Hb 136, Plt 260, WBC 12, neutrophils 6. CRP 8. CSF: Glucose 3.9, Protein 0.4g/L, RBC 5, WBC 6
- Initial management: Brought to trauma bay and assessed by emergency physician, and pediatrics called for consultation
  - Received **bolus normal saline** 20cc/kg bolus
  - 0.1mg/kg **IV Ativan** given x 2 with transient response (1–2-minute period of improved level of consciousness and crying)
  - Hyponatremia identified on labs and 5cc/kg of **hypertonic saline (3% NaCl)** given
  - IO inserted (x2).
  - **Keppra load (60mg/kg/dose)** IO once with no effect. **Ceftriaxone 50mg/kg** given IO
  - Second 5cc/kg bolus of **3% Hypertonic saline** given as infant was still seizing and Na still less than 120 on CBG. 20cc/kg bolus NS given
  - Convulsive status epilepticus became more apparent, and discussion of further management with neurology at BCCH
    - **Fosphenytoin load** (20mg/kg/dose) IO once with no effect



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- **Phenobarbital load** (20mg/kg/dose) IO once with no effect
- **Hydrocortisone stress dose** given (100mg/m<sup>2</sup>) due to hyponatremia and previous prolonged steroids
  - Intubated using **ketamine and rocuronium** IO to facilitate **midazolam infusion** with dosing discussed with neurology on call at BCCH
  - Started **epinephrine infusion** via IO for hypotension and evidence of poor peripheral perfusion
- PICU transport team arrived, inserted central line and transferred to BCCH for ongoing care

### Learnings:

#### **Subtle Status Epilepticus**


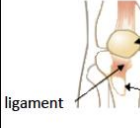

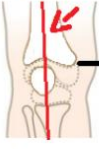



- Discussed the difference between Non-Convulsive Status Epilepticus (NCSE) and Subtle Status Epilepticus. NCSE is a state without clinical signs, often presenting as altered mental status changes. Whereas Subtle Status Epilepticus is a state of ongoing seizure activity with subtle clinical signs and altered mental status changes.
- Subtle Status Epilepticus Signs:
  - Subtle eye movements (blinking, nystagmus, staring)
  - Automatisms (lip smacking, chewing, or minor limb movements)
  - Autonomic instability (tachycardia, hypertension)
- Status Epilepticus (convulsive and non-convulsive) in children require a high index of suspicion, rapid diagnosis, and prompt treatment to improve outcomes and minimize neurological sequelae.

#### **Treatment of Status Epilepticus**

- Reviewed treatment of status epilepticus as:
  - Initial management: ABCs, monitor vital signs, check blood glucose, establish IV, send labs
  - First line Treatment: Benzodiazepines (e.g., lorazepam, diazepam, midazolam)
  - Second line: Antiepileptic drugs (e.g., levetiracetam, fosphenytoin, phenytoin, valproic acid)
  - Refractory Cases: Continuous EEG monitoring and potential anesthetic therapy (propofol, midazolam, ketamine) in ICU settings.
  - Underlying Causes: Correct metabolic disturbances, infections, or other precipitating factors.
- Reviewed the ease in which the documents for treatment of seizures can be found in the “in a hurry” section of the [PCC landing page](#).

#### **Intraosseous Access**

- Discussed that intraosseous access (IO) is a rapid and reliable method for delivering fluids, medications, and blood products when intravenous (IV) access is difficult or delayed.
- Commonly used IO devices include EZ-IO, Bone Injection Gun (BIG), and manual needles.
- Needle size varies by patient weight and site of insertion.
- Confirmation of placement:
  - Needle stands upright without resistance
  - Aspiration of bone marrow (may not always be possible)
  - Free-flowing infusion without signs of extravasation
- All IV medications and fluids can be administered via IO.
- Fast and effective alternative for vascular access in critically ill children.
- Reviewed the ease in which the documents for IO insertion can be found in the “in a hurry” section of the [PCC landing page](#).

Paediatric intraosseous insertion at a glance		
<b>NEEDLE SELECTION</b> 		<b>INDICATION:</b> Need for immediate IV access without ability to insert line. *All intravenous medication can go via intraosseous line including inotropes* Do not use >24hrs.
		<b>CONTRAINDICATIONS</b> <ul style="list-style-type: none"> <li>• Fracture in the bone of insertion</li> <li>• Infection at site of insertion</li> <li>• Landmarks not identifiable</li> <li>• IO/attempted IO access in bone within last 48 hrs</li> <li>• Prosthesis /orthopaedic procedure near site</li> </ul>
<b>Proximal Tibia</b> 1. Position: Infant: flexed knee, Adolescent: straight leg  2. Palpate tibial tuberosity (bony thickness below patella) 3. Insert 2-3cm below + medial to tibial tuberosity into the flat antero-medial surface of tibia 	<b>Proximal Femur &lt; 6yr old</b> 1. Position: straight leg.  2. Palpate 2-3cm above external condyle 3. Insertion just medial to midline to avoid tendon 	<b>Proximal Humerus &gt;6yr old</b> 1. Position: Elbow adducted, hand over the umbilicus  2. From the mid-shaft humerus, palpate up, toward the proximal aspect/humeral head. 3. Palpate small bony protrusion close to shoulder. 4. Insert at base of greater tubercle (Insert at 45° to bone) 

## Resources:

- [Seizures](#)
- [Intraosseous](#)
  - Blood Work via IO - [A New Study of Intraosseous Blood for Laboratory Analysis | Archives of Pathology & Laboratory Medicine](#)
- [Weight based dosing of medications](#)



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The resources shared throughout this session are for reference purposes only. Please consult your health authority leaders for guidance on adoption and use of these resources within your local context. The advice provided during the PCCL sessions is not intended to replace the clinical judgment of the healthcare providers who are with the patient. While PCCL sessions may suggest recommendations, the final decisions regarding a child's care and treatment should always rest with the healthcare professionals involved in their care at both the referring and receiving centres.

If you need additional in the moment support refer to the Provincial Real Time Virtual Support Pathways: If you need additional in the moment support refer to the Provincial Pediatric Virtual Support

Pathways: <https://childhealthbc.ca/pcc/provincial-pediatric-virtual-support-pathways>