Neuro Nuggets from the Trenches

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The speaker has signed a disclosure form and indicated he has no significant financial interest or relationship with the companies or the manufacturer(s) of any commercial product and/or service that will be discussed as part of this presentation.

Session Summary

This lecture will provide an overview of the neurologic exam of a neonate in the context of clinical cases.

Session Objectives

Upon completion of this presentation, the participant will:

- be familiar with the entry criteria for therapeutic hypothermia;
- understand how serial neurologic exams may reveal changes in the neonate’s status;
- recognize the basic patterns for aEEG;
- understand the differential diagnosis of the floppy neonate;
- know the arterial anatomy of a neonatal stroke.

References


**Session Outline**

See presentation handout on the following pages.
Case 1

- Mercy Me Memorial calls for a referral of a 1 hour old, 3.49kg infant born at 40 weeks gestation via SVD to a 23 year old Gravida1, Para 0 mother with negative GBS/serology's.

- At delivery the patient was noted to have Meconium stained fluids and a nuchal cord times 1.
- Patient was flaccid, with no spontaneous breathing and heart rate was less than 100/minute.
- She was intubated at delivery and CPR was commenced. Apgars were 0 at 1 minute, 3 at 5 minutes and 4 at 10 minutes.

- Initial Arterial Blood Gas pH 6.8, PCO2 43mmHg and base deficit was -25.
- Patient
  - lethargic and hypotonic with no suck and
  - a poor moro reflex.
  - requiring assisted ventilation with periodic respirations and a variable heart rate.

- Does the baby qualify for Hypothermia?????
**Case 1**

1. Gestational Age greater than or equal to 35 weeks gestation
2. Birth weight greater than or equal to 1.8 kg
3. less than or equal to 6 hours since insult occurred

4. Seizures or 3 of 6 of the following:

<table>
<thead>
<tr>
<th>Clinical Criteria</th>
<th>Severe Encephalopathy</th>
<th>Moderate Encephalopathy</th>
<th>Slight Encephalopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Level of consciousness</td>
<td>Lethargy</td>
<td>Irritable</td>
<td>Alert</td>
</tr>
<tr>
<td>2. Motor activity</td>
<td>Decreased activity</td>
<td>Reduced activity</td>
<td>Normal activity</td>
</tr>
<tr>
<td>3. Posture</td>
<td>Seated, flexed</td>
<td>Supine, flexed</td>
<td>Sitting</td>
</tr>
<tr>
<td>4. Tone</td>
<td>Hypotonic, decerebration</td>
<td>Hypotonic</td>
<td>Normal</td>
</tr>
<tr>
<td>5. Primitive reflexes</td>
<td>Weak</td>
<td>Weak</td>
<td>Present</td>
</tr>
<tr>
<td>6. Autonomic dysfunction</td>
<td>Bulit</td>
<td>Developed</td>
<td>Absent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infection</th>
<th>Endocarditis</th>
<th>Varicella</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation</td>
<td>Moribund</td>
<td>Appear</td>
</tr>
</tbody>
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**Clinical Staging of hypoxic-ischemic encephalopathy**

- Table A1.1: Clinical staging of hypoxic-ischemic encephalopathy

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A11a: NEURO NUGGETS FROM THE TRENCHES  Page 4 of 11
Case 1

- Birth to 12 hours
  - Depressed level of consciousness-usually deep stupor or coma.
  - Ventilatory disturbances- “periodic” breathing or respiratory failure.
  - Intact pupillary responses.
  - Intact oculomotor responses.
  - Hypotonia, minimal movement
  - Seizures.

- 12-24 Hours
  - Variable change in level of alertness
  - More seizures
  - Apneic Spells
  - Jitteriness
  - Weakness
    - Proximal limbs, upper>lower (full term)
    - Hemiparesis (full term)
    - Lower limbs (premature)

- 24-72 hours
  - Stupor or coma
  - Respiratory arrest
  - Brain stem oculomotor and pupillary disturbances
  - Catastrophic deterioration with severe IVH and periventricular hemorrhage infarction (premature)

- >72 hours
  - Persistent, yet diminishing stupor
  - Disturbed sucking, swallowing, gag, and tongue movements.
  - Hypotonia
  - Weakness
    - Proximal limbs, upper>lower (full term)
    - Hemiparesis (full term)
    - Lower limbs (premature)

Case 2

- 38 week EGA neonate
- Mother reported decreased fetal movement for several hours.
- The amniotic fluid was foul smelling
- NRFHT which progresses to no fetal heart rate detected.
- Requires BMV, intubation, CPR and epinephrine
- First heart rate detected at 12 minutes of age.
Case 2

• Initial cord gas= 6.78/102 with a base deficit of -18.
• Neuro Exam-
  – Lethargic, Increased tone, decerebrate posturing, no reflexes, no suck, pupils were dilated with no reaction to light.

Case 2

• Persistently elevated lactic acid.
• Worsening respiratory status requiring HFOV, iNO, steroids, surfactant.
• Is this baby an ECMO candidate?

Case 2

• NEED EEG with video from EMU LAB!!!!!!!

T1

DWI
Case 2

Placental villitis with a microabscess containing mostly neutrophils in a case of congenital infection with Listeria monocytogenes.

Case 3

• 37 2/7 weeks born via C-section due to failure to progress
• Mother with pre-eclampsia and on MG
• Developed MG toxicity with level of 11
• MSF and was intubated and suctioned below cords with no meconium noted
• Poor chest rise with PPV and no heart rate at 6 minutes of life.

Case 3

• CPR, FiO2 increased to 100%. Epinephrine X1 via UVC.
• Baby transferred to NICU shortly after with ETT
• APGARs were 1 0 0 3
• Chest compressions stopped at 13 minutes of life
• Arterial cord gas 7.05/-12.4
Case 3

- Initial PE
  - Intubated
  - Lethargic
  - Poor tone
  - No suck
  - No gag
  - Weak grasp

Normal pattern
Moderate (Discontinuous pattern)
Severe
Case 4

- 35 week EGA neonate born via SVD
- APGARS 3, 4, 6
- PPV and intubation
- 7.12/55/81/-12
- Neuro Exam- No spont. Movement, pupils midsized and reactive, no gag or suck, no palmar grasp, no clonus or Babinski.

What is the etiology?
Case 4

- Differential diagnosis of the Floppy Baby
  - Infection
  - Central
    - Cerebral malformations
    - HIE
  - Spinal
    - SMA
  - Genetic
    - Prader-Willi Syndrome

Case 4

- Neuromuscular Junction
  - Myasthenia Gravis
- Muscular
  - Myopathy
    - Myotubular Myopathy
    - Central Core Myopathy
    - Nemaline Myopathy
    - Myotonic Dystrophy
  - Other
    - Glycogen Storage Disease

Case 5

- Layton 02066357
- 39 week EGA neonate with APGARS of 8 and 9.
- Serologies all negative.
- Stat C-section due to decreased fetal movement.
- Right extremity white-purple with no pulse.
Case 5

- At 3 hours of age noted to be apneic and required intubation.
- HUS showed right occipital parenchymal hemorrhage.
- Had activity concerning for seizures.