ImPACTS
IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

Section 1: Case Summary

Scenario Title:	**Non-Accidental Head Injury**
Brief Description of the case:	A 5-month-old (5 kg) with acute onset of irritability and lethargy secondary to non-accidental head injury

Goals and Objectives	
Scenario Goal:	To review the management of an infant with increased intracranial pressure (ICP) secondary to Non-accidental head injury.
Learning Objectives: (Medical and CRM)	1. Verbalize concern for increased ICP in an infant 2. Apply principles of increased ICP management 3. Perform appropriate airway management

Learners, Setting, and Personnel			
Target Learners	☒ *Transport Team Personnel (based on each center team configuration)		
Location	☐ In Situ (Transport vehicle)	☐ Simulated vehicle	☐Other:
Simulation personnel	☐ **Facilitator(s) / Sim operator ☐ Embedded Participants: • ED personnel (to give the report in section 3) • MD for medical control-via phone • Vehicle operator if utilized by the team		

Personnel:

*Transport team will include members based on the team or transport center configuration that you would typically use for the ground transport of an infant with this referral indication.
**The simulation team will provide facilitators and the opening vignette, including referral information.

Type of simulator:

Type of Simulator:
Infant – mid to high technology
Examples: Baby HAL, SimBaby Laerdal, or SimNewB Laerdal

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Supplies and Fluids	Medications
Infant/Pediatric Transport Cot Transport Bags Defibrillator, pads, electrodes **Respiratory equipment** Nasal cannula Masks / NRB NPA, OPA Bag/mask sets LMA **Intubation supplies** Range of sizes - Tubes - Stylets - Laryngoscopes Colorimetric CO2 detectors Capnography cannula Transport Ventilator Suction supplies and devices **Fluids and Flushes** D5 ½ NS D5NS, NS, LR ☐D10 ☐D25 ☐D50 IV & IO supplies Pull-Push Setup	**Code Medications** Epinephrine 0.1 mg/mL (code dose) Based on center supply/concentration Amiodarone 50 mg/mL (undiluted, straight drug) Bicarbonate 0.5 mEq/mL (4.2%) or 1 mEq/mL (8.4%) Calcium (Chloride or Gluconate) 100 mg/mL **Intubation Medications** Lidocaine 10 mg/mL Fentanyl 50 mcg/mL Atropine 0.1 mg/mL Etomidate 2 mg/mL Ketamine 10, 50, 100 mg/mL available NMB: Rocuronium 10 mg/mL, Vecuronium 10 mg/mL (has to be reconstituted with 10 mL NS), Succinylcholine [20mg/mL] **Hyperosmolar Meds** Hypertonic saline (3% HTS) Mannitol 20%, 25% **Seizure meds** Lorazepam 2mg/mL and 4mg/mL Midazolam 1mg/mL and 5mg/mL Diazepam 5mg/mL Phenobarbital 65mg/ml or 130mg/mL Levetiracetam 100 mg/mL or 15mg/mL – depends, can vary! Valproic Acid 100 mg/mL Fosphenytoin 50mgPE /mL **Antibiotics** generic antibiotics

These supplies and equipment should be available in a fashion that mimics the actual supplies for the transport team.

Section 2: Information to Transport Team upon deployment

(Transport team will be in the waiting room or any other location that is not the transport vehicle)

<table>
<tr><th colspan="6">Initial Report
(Can be via phone or by paging depends on the center)</th></tr>
<tr><td colspan="2">Patient's Name: Christian</td><td colspan="2">Age: 5 months</td><td>Gender: Male</td><td>Weight: 5 kg</td></tr>
<tr><td colspan="6">Presenting complaint: altered mental status, increasingly sleepy and irritable, not feeding well</td></tr>
<tr><td>Temp: 36.8</td><td>HR: 160</td><td>BP: 90/58</td><td>RR: 25</td><td>0_2 Sat: 98%</td><td>F_iO_2: RA</td></tr>
<tr><td colspan="3">Cap glucose: 130 mg/dL</td><td colspan="3">GCS: 15</td></tr>
<tr><td colspan="6">Narrative:
You have been deployed to pick up a 5-month-old 5-kg male with a chief complaint of "irritability" for the past few days. He is afebrile. The referring hospital reports that he is stable appearing. They are concerned about the social situation. A point of care blood gas was done, but the family refuses further work-up at the referring hospital and wants an evaluation to be done at the Children's Hospital. Ground transport time from the referring hospital to the accepting hospital is 60 minutes away. Bruises are noted on his back and buttocks.</td></tr>
<tr><td colspan="6">NKDA. PMH: healthy infant. Immunizations: UTD.
FH: cancer, stroke, heart attack, anxiety, depression, substance abuse.</td></tr>
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Section 3: Information to Transport team upon arrival to referring ED (Transport team is at bedside)

Referring ED Report

Information to Transport Team at the bedside:

This is Christian. He is a 5-month-old otherwise healthy boy who has been irritable and difficult to console for the past few days. He is not feeding well and has had only 2 wet diapers in the past 12 hours.

Physical Exam **(If transport team asks)**:
Pupils equal, fontanel flat, lungs clear, heart RRR, extremities cool, cap refill 3-4 seconds. Bruises are noted in the back and buttocks.

ED RN notifies Transport RN that child protective services has been contacted given concerns for non-accidental injury. An IV was placed after 3 attempts. Mom refused to let this ED do any more needle sticks or do any imaging, she would like further workup and care done at the children's hospital.
After talking to the accepting ED, the referring ED gave 20 mL/kg NS bolus and started D5NS at maintenance.

Diagnostic results before transport:
Point of care serum glucose: 130
VBG pH 7.35 pCO2 35 pO2 45 BE +2
Na: 136, K: 3.6, iCa:1.2
Hgb/Hct: 10/30

Medical Control: Your team has contacted your medical control. They agree with the plan to load the patient and transport as is.

PMH if asked:
Immunized, has not had surgeries or hospital admissions.
A previously healthy baby, delivered at full term at 39+3 weeks gestation after an uncomplicated pregnancy, per mother's report. Has been seen at PCP per the advised schedule and received his 4-month shots.

Current Meds: None

Social history if asked: Mom is 23-years-old, unmarried, unemployed, and lives with her boyfriend. The mother states that he is a "fussy baby". She brought him to ED today because "he's just not acting right". Caretakers and babysitters include mom, her boyfriend, mom's stepmom, and a neighbor.

The mother decided to drive to the referral hospital using her car.

Vital Signs					
HR: 160	RR: 32	$Sp0_2$: 98% on RA	Temp: 36.8	BP: 90/58	$ETCO_2$: NA
Physical Exam If a physical exam finding is not specified in the case, it is within normal limits.					
Cardiac: Sinus rhythm, no murmurs			Neuro: Alert, crying with normal tone, pupils equal 3mm and reactive, initially responds to voice or touch		
Respiratory: Lung sounds clear and equal			Head and Neck: Flat AF, (becomes full later)		
Abdomen: Soft, not distended			MSK/Skin: Bruises on back and buttocks (picture attached)		

Following the initial report and then the ED report to the transport team, the team will be instructed to move to the transport vehicle to start the actual transport.

Section 4: Scenario Progression During Transport

This will be the beginning of the actual simulation in the transport vehicle after the transport team got an update from the ED in section 3. If the transport team called medical control, they will be prompted to load and transport the child.

Scenario States, Modifiers, and Triggers			
Patient State/Vitals	**Patient Status**	***Learner Actions**	**Modifiers & Triggers to Move to Next State Notes**
1 - First Phase- ICP management (Duration 7 min) Allow the team 3 min to settle in the vehicle before changing vital signs Rhythm: Sinus Tach HR: 160 then 75 (over 2 min) BP: 99/60, then 120/90 (over 2 min) RR: 25 O_2 SAT: 95% then drop to 90% (over 2 min) Oxygen: first RA then O2 provided. Temp: 37.5	Becomes less responsive, even to painful stimuli. A slow rise in BP and a decrease in HR. Pupils equal and reactive. AF bulging/tense	☐ Recognize increased ICP ☐ Perform a focused exam ☐ 30-degree elevation ☐ Hypertonic solution ☐ Assess both airway and breathing (including SpO2) Verbalize in the first 3 minutes ☐ Assess hemodynamics (BP, HR, cap refill) Verbalize on clinical change.	(45 min ETA to receiving) - Gradually drop the HR over 2 minutes from the 160 to 70s range. - Increase bulging fontanel - If 3% or Mannitol given, bring HR up to the 110s over 2 minutes, BP unchanged

2 - Second Phase - Airway management (Duration 7 min) HR: 110s BP: 130/90 RR: 6 O_2 SAT: 70s (down from 90s over 2 min, but if already getting BVM remains 90) Temp: 37.5	Obtunded, Hypoventilation If asked - Right pupil 5 mm non-reactive, left 3 mm non-reactive	☐ Verbalize respiratory deterioration ☐ BVM hyperventilation ☐ Consider intubation or alternative airway (LMA) ☐ Contact receiving facility to update	**(30 min ETA to receiving)** Option 1- BVM or Option 2 - LMA/intubation. Both are acceptable. - If BVM or intubation, HR 100-120, BP unchanged. -If no airway intervention (BVM, LMA or intubation) patient deteriorates to asystole over 2 minutes - With BVM, intubation, or alternative airway, saturations improve to 98% -If the patient is intubated, display ETCO2 if used

Transport Team can contact medical control at any time during the case for recs based on their center practice and policies.

If the team calls medical command back for recommendations: A junior fellow answers the phone: "This is Dr. Gray, my attending is in a family meeting right now, let me message her...I don't know this patient. Can you please tell me about this child?"

IF they mention increased ICP – ok to ask, "What do you have readily on hand that you could give for increased ICP?"

IF they do not mention increased ICP, encourage the team to continue resuscitative care.

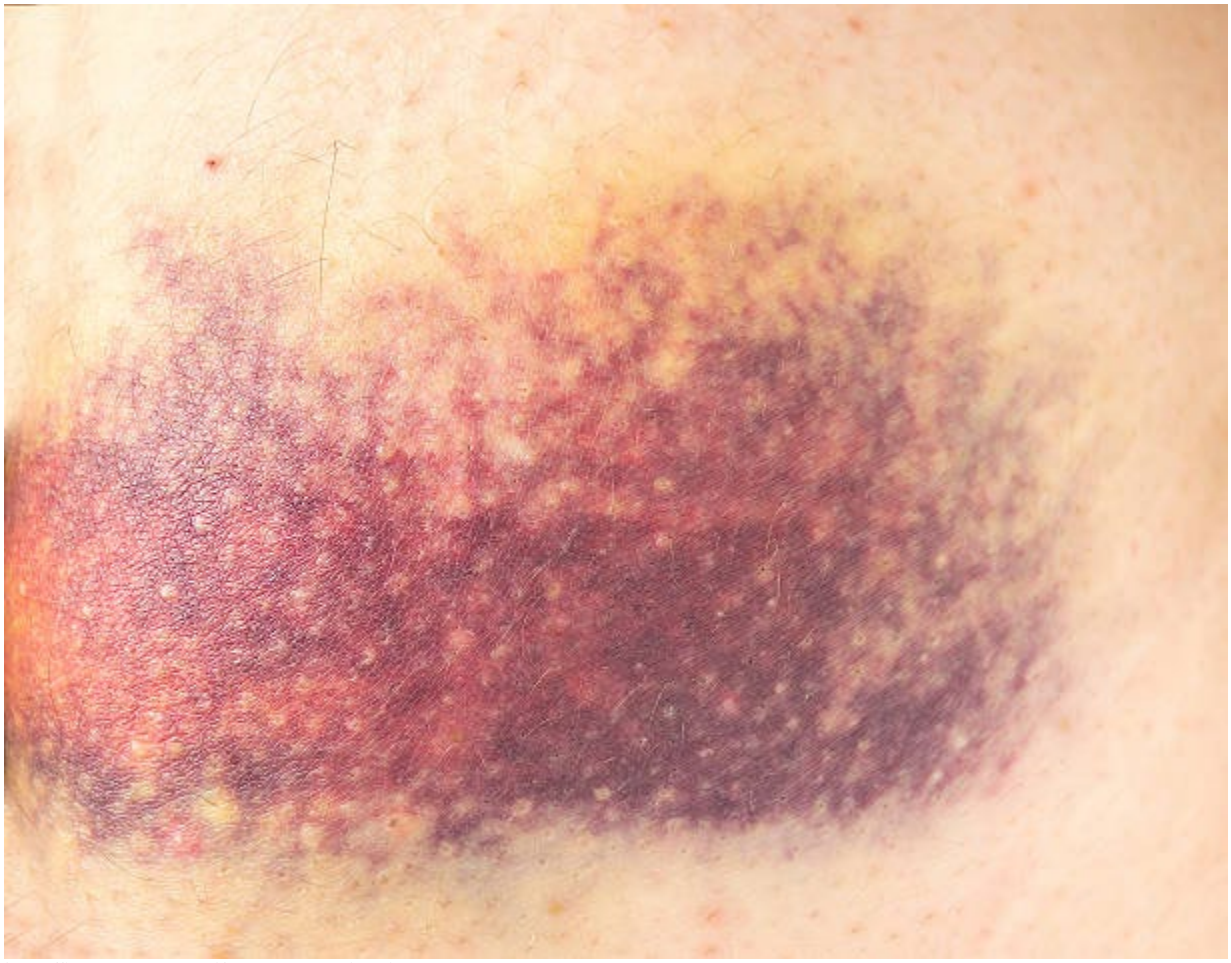
If asked whether to intubate or not – defer to the team / your institutions policy.

Appendices:

A. Laboratory Results

Glucose 94
CBG/VBG/Istat pH 7.35 pCO2 35 pO2 45 BE +2
Na: 136, K: 3.6, iCa:1.2
Hgb/Hct: 10/30

B. ECGs, X-rays, Ultrasounds, and Pictures (if requested)



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