Case Study 4

Summary Card

**CASE 4 (Hypoglycaemia)**: Pt is hypoglycaemic from fasting for surgery

The important things to get across in this case are:

- Glucose should be the first measurement done if there is any change in mental state or alertness (including confusion/aggression/drowsiness/loss of consciousness)
- Hypoglycaemia is BGL < 3mmol/L
- Seek info from parents for past history
- What reading is considered hypoglycaemia? Less than 2.5mmol/L (in newborns at risk of hypoglycaemia keep BGL>3.0 mmol/L)

**What effects is the low BGL having on his circulatory system? And why?**

**What effects is the low BGL having on his neuro status? And why?**

**Physiological changes reflected in the vital sign readings:**

- Downward: Temperature- children cool quicker than adults as more surface area compared to body mass, Hypothermia is also a secondary response to low blood sugar due to lower metabolic rate.
- Upward: Blood pressure due to the sympathetic release (adrenaline) cause peripheral vasoconstriction so if cardiac output is maintained (or with upward Heart Rate) could cause a upward BP
- Resp Rate due to the attempt to supply more oxygen to the vital organs and acidosis due to increased lactate
- Downward: Level of consciousness due to hypoglycaemia. Glucose is the primary source of energy for the brain. It is the primary substrate for the production of pyruvate for the Kreb’s cycle → oxidative phosphorylation → ATP in the brain, therefore lack of glucose in the brain leads to downward ATP and downward Level of consciousness.
- Abdo pain due to the downward blood supply to the digestive system in “fight or flight”

**Management should include:**

- IVC insertion and blood collection.
- Quick treatment with 10% dextrose 2-5 ml/kg intravenously should produce a rapid improvement in his condition by increasing blood glucose.
- Treatment should continue with a 5-10% dextrose infusion
- He can be given a milk drink and food. Surgery will be abandoned.
- Regular monitoring of BGLs (1/2 hourly or 1 hourly until stable for 4 hours)
Case 4:  
Aim: To recognise a deteriorating hypoglycaemic paediatric patient

Learning Objectives:
• Obtain adequate history
• Obtain appropriate vital signs at appropriate time intervals
• Refer appropriately
• Communicate effectively

Equipment:
• Facilitator Card
• Player 1 Card – Mother
• Player 2 Card – RN
• Player 3 Card– Medical Officer
• Medication Chart
• Observation chart
• PEWS flow chart.

Roles in the scenario
1. Patient’s parent
2. Registered Nurse
3. Paediatric RMO
4. Paediatric Registrar
5. Optional extras:
   a. Additional Nurses
   b. Consultant
   c. Relative
   d. Relative

Scenario
Jessie James
3 year old boy, Jessie James is admitted at 0700hrs for elective adenotonsillectomy on the morning of surgery. Apart from chronic symptoms relating to enlarged tonsils and adenoids he is generally fit, well, alert and communicative.

Medical history: He has had 2 previous anaesthetics at 2 and 3 years for cautery of nose to treat epistaxis.

His mother was instructed that Jessie be NBM from 12mn. But has had nothing since 1830hrs last night. He has had no premed. On admission he is taken to the playroom where he plays Nintendo Wii with Captain Starlight.

At 1045hrs Jessie’s mother returns him to his room. He is drowsy, confused, cold, clammy and sweaty. He lies curled up with severe abdominal pain. His mother rings the call bell for the nurse.

To start the scenario:
1. Assign roles to each player
2. Set up room with patient in a bed
3. Give the first player card to the player designated as the Mother
4. Give the Second player card to the player designated as the RN
5. When the RN phones the RMO place the two players (RN & Intern) back to back to simulate communication via the phone.
6. Allow the scenario to build on itself prompting other players to enter as called for or prompt if necessary
7. Supply players with further information such as medication charts, observations or blood results when asked.
**During the scenario:**

If the RN needs prompting:
- Decreased mental state/decreased AVPU. What other ob’s, ward tests could you perform?
- Who would you notify? Why? PEWS is 5. Notify team leader/CNC and RMO.
- What other observations should you do? SaO2, Cap refill, Neuro obs, BP, BGL. Assess abdominal pain, fluid balance.
- If conscious enough give drink

Facilitator should place RN and RMO back-to-back to simulate phone conversation.

In the phone call the RN should:
- Use SBAR, inform of PEWS, parameters that are deranged.

**RMO comes to review the child:**
- What is your management plan for this patient? Oxygen. Ward BGL. IV access and bloods. If unable to get IV access- call MET for immediate assistance. Rapid IV Dextrose Infusion. Repeat ward BGL post infusion. Carbohydrates.
- What would you do if the child did not respond? MET

**What would you do if the patent does not respond?**
- Seek help
- Nursing team leader or CNC
- Contact Registrar and/or Consultant
- Consider HDU

**Questions:**
- What are your next actions as a group?
- How often should observations be done? ½ hourly for 1 hour then 4 hourly if PEWS improves. Ongoing BGL monitoring ½ hrly.

**To summarise**

Ask the group:
1. What they thought went well?
2. What suggestions would they make to improve their roles?
Case Study 4
PLAYER 1 CARD
Mother
You are Mrs James, mother of 3 year old, Jessie. He has come in at 7am for elective Ts & As on the morning list. Your instructions were to fast him from 12MN. He ate dinner last night at 1730 hrs and had a glass of milk at 1830 hrs and nothing else afterwards.
He is fit and well and enjoying playing Nintendo Wii with Captain Starlight in the playroom.
At 1040 hrs he complains of stomach pains and you take him back to his room. You call the Nurse as he is cold, clammy and drowsy and doubled up in pain. You are very worried about him; he has never been like this before.

Case Study 4
PLAYER 2 CARD
RN
You admit and orientate Jessie and his Mother to the ward. 3 year old boy, Jessie James is admitted at 0700hrs for elective adenotonsillectomy on the morning of surgery.
No relevant history. 2 previous anaesthetics for cautery of nose to treat epistaxis. No problems with these anaesthetics.
Observations WNL’s on admission. Slightly elevated BP reading.
NBM awaiting OT.
He has not yet been admitted by an RMO, but they are aware.
You leave him in the playroom.

At 1045 hrs his Mother calls you to his room.
He is drowsy, sweaty, cold, clammy and curled up on the bed with abdominal pain.
The patient will also have:

Observations chart

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>HR</th>
<th>RR</th>
<th>SBP</th>
<th>Temp</th>
<th>AVPU</th>
<th>PEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/02/2008</td>
<td>0700</td>
<td>98</td>
<td>24</td>
<td>110</td>
<td>36.6</td>
<td>Alert</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1045</td>
<td>110</td>
<td>32</td>
<td>110</td>
<td>35.5</td>
<td>Pain</td>
<td>5</td>
</tr>
</tbody>
</table>

Medication chart with:
- No meds ordered

BGL = 2 mmol/L
The body has 2 major responses to hypoglycaemia:

1. HORMONAL RESPONSE. (Adrenergic)
   - Counter regulatory hormones Glucagon and Adrenaline are triggered by falling blood glucose concentration.
   - The islet cells in the pancreas release Glucagon. Glucagon allows the body to breakdown glucose stores in the liver thus increasing circulatory glucose levels.
   - The Sympathetic Nervous System then causes such symptoms as “fight or flight” response, cool peripheries, sweating, trembling, flushing, anxiety, tachycardia, increased pulse pressure and hunger.

2. NEUROGLYCOPENIA
   - The brain requires Glucose to function. Neuroglycopenaia effects are produced by decreased Glucose to the brain. The symptoms of this include inability to concentrate, tiredness, feeling tearful, difficulty speaking, behavioural changes, poor coordination, weakness and drowsiness.

Other presentations that may cause hypoglycaemia in children include:
   - Diarrheal illness especially Rota virus
   - Growth hormone deficiency in isolation or as part of multiple pituitary hormone deficiency.
   - Gastric dumping syndrome (after gastro-intestinal surgery)
   - Accidental ingestion of some drugs e.g. propanolol, ethanol.

Children generally tolerate prolonged periods of starvation even up to 24 hours. Those most at risk are children less than 4 years or less than 15 kg, or those whose weight is below 3rd percentile for age. Although these children are said to fast from 12MN they often fast from after the evening meal, which has them fasting for 12 hours already by admission.

Hypoglycaemia is uncommon but you must be aware of it and treat without delay to avoid permanent CNS damage.

He continued to make a full recovery and was back to normal by lunchtime.

Blood glucose at that time was 6.2 mmol/L.

A full medical review did not reveal any underlying syndrome or disease process – it was considered he had an exaggerated response to slightly lowered blood glucose. Formal BGL was 3.2 at time of incident.
### Case Study 4 – Paediatrics - Jesse James

#### Paediatric Early Warning Scores (PEWS)

<table>
<thead>
<tr>
<th>PEWS</th>
<th>Notify</th>
<th>Escalate</th>
<th>Intra-hospital Escort</th>
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<tbody>
<tr>
<td>0</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4/MET</td>
<td>Yes</td>
<td>Yes</td>
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</table>

#### PEWS Escalation Table

<table>
<thead>
<tr>
<th>PEWS</th>
<th>Team Leader</th>
<th>RMO Review</th>
<th>RN</th>
<th>PEWS 4.5</th>
<th>Team Leader</th>
<th>RMO Review</th>
<th>RN</th>
<th>PEWS 6.7</th>
<th>Team Leader</th>
<th>RMO Review</th>
<th>RN</th>
<th>PEWS 8</th>
<th>Team Leader</th>
<th>RMO Review</th>
<th>RN</th>
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</thead>
<tbody>
<tr>
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<td>Within 30 minutes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Within 60 minutes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Yes</td>
<td>Within 30 minutes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Within 60 minutes</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>2</td>
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<td>Within 30 minutes</td>
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<td>Yes</td>
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<td>Within 60 minutes</td>
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<tr>
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<tr>
<td>4/MET</td>
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<td>Within 30 minutes</td>
<td>No</td>
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<td>Within 60 minutes</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Guide for Assessing Level of Consciousness using AVPU tool

- **Alert**: Awake and alert OR asleep with no clinical indication to wake for assessment.
- **Voice**: Responds to verbal stimuli
- **Pain**: Responds to painful stimuli
- **Unresponsive**: No response to stimuli

#### MET Criteria (Dial “8” for MET)

- **Neonatal MET** if < 10 months or < 10 kg
- **Paediatric MET** if > 10 months or > 10 kg

#### Clinical Indications for calling child up for assessment of level of consciousness include: neurological condition, post operatively or post procedure, medical order(s); signs of clinical deterioration and/or PEWS ≥ 4.

Refer to Vital Signs Procedure for clasification.
**Case Study 4 - Paediatrics - Jesse James**

### General Observation Chart

**1-1 Years**

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Temperature</th>
<th>Pulse</th>
<th>Respiration</th>
<th>B.P.</th>
<th>Activity</th>
<th>Urinary Output</th>
<th>Additional Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comorbidities:**
- None

**Allergies:**
- None

**Medications:**
- None

**Reason for Observation:**
- To assess general health and development.

**Call if Clinical Concern:**
- Yes

**Next Review Date:**
- 1/1/2 (next 30 days)

**Signature:**
- [Signature]

---

**FACE Pain Scale - Revised**

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

**COMORBIDITY**
- None

**ACTIVITY**
- Feeding
- Sleep
- Play
- Toilet Training
- Social Interaction

**SCORING:**
- Score 0: No distress
- Score 1: Distress
- Score 2: Marked distress
- Score 3: Severe distress

**Additional Instructions and Comments:**
- None

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**Compliance Chart for Pediatric Age Group**

- [Diagram of compliance chart]

**ACT Health**

**Canberra Hospital and Health Services**

**Case Study 4 - Paediatrics - Jesse James**
Case 4 – Paediatrics - Jesse James

Doctor MUST initial addressograph if used
UR No: 133453
Family Name: James
Given Names: Jessie
DOB: Sex: M F

REGULAR MEDICATIONS

YEAR 20
DATE & MONTH

VARIABLE DOSE MEDICATION

Drug level
Time level taken

Route
Frequency
Or is retarded time and individual dose

Initiation
Repeat

Prescriber Signature: Print Your Name: Contact:

WARFARIN

INR

Date

WARFARIN EDUCATION RECORD

INR Goal: 2.0 to 3.0
Patient Education: Follow-up with pharmacist

DOCTORS MUST ENTER administration times

Date

Initiation

Prescriber Signature: Print Your Name: Contact:

REGULAR MEDICATIONS

YEAR 20
DATE & MONTH

DOCTORS MUST ENTER administration times

Drug level
Time level taken

Route
Frequency
Or is retarded time and individual dose

Initiation
Repeat

Prescriber Signature: Print Your Name: Contact:

DOES NOT APPEAR TO BE A DOCUMENT WITH MEDICATION INFORMATION.