OBJECTIVES

- To support assessment, early recognition, and prompt intervention for pediatric patients, experiencing a hypoglycemic event in Alberta Health Services (AHS) Acute Care settings, including Intensive Care Units, Emergency Departments, Urgent Care Centres, Day Wards, and Addiction and Mental Health Inpatient Units.

APPLICABILITY

Compliance with this document is required by all Alberta Health Services employees, members of the medical and midwifery staffs, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary).

ELEMENTS

1. Exclusions

   1.1 This Procedure shall not be applied to:

   a) patients equal to or less than five (5) days old and infants admitted to the Neonatal Intensive Care Unit (NICU). The health care professional should contact the neonate’s most responsible health practitioner (MRHP) for direction or follow Zone processes.

   b) pediatric patients who have diabetes and are pregnant;

   c) patients with diabetic ketoacidosis (DKA) on continuous intravenous insulin infusion;
d) patients with diabetes who are not taking insulin or insulin secretagogues (e.g., glyburide, gliclazide, glimepiride or repaglinide); and

e) asymptomatic patients who do not have diabetes (e.g., healthy patients who are fasting can have blood glucose levels below 4.0 millimoles per litre [mmol/L]).

2. Points of Emphasis

2.1 This Procedure may be used in non-Acute Care settings. Site or Unit Managers are responsible for determining whether this Procedure in whole or in part is appropriate for their patient care setting and communicating relevant information out to AHS representatives.

2.2 Treatment is required for all patients with a blood glucose less than 4.0 mmol/L, even those asymptomatic patients who meet the criteria below:

a) patients with diabetes, who are on insulin; or

b) patients without diabetes who have symptomatic hypoglycemia due to insulin or insulin secretagogue overdose (e.g., glyburide, gliclazide, glimepiride or repaglinide), malnutrition, liver failure, or more rare conditions (e.g., medium chain acyl-CoA dehydrogenase deficiency [MCAD], insulinoma, dumping syndrome).

(i) Refer to Appendix A: Pediatric Hypoglycemia Treatment Algorithm.

2.3 An order is not required to implement this Procedure, provided that a health care professional has determined that the patient meets the specific circumstances and implementation criteria outlined within this Procedure.

Exception: A patient-specific order from the MRHP is required to administer dextrose via intravenous (IV), as this is a Schedule 1 medication; this should not delay treatment. In emergent situations where it is not possible to obtain an order prior to administering dextrose IV, obtaining an order may happen at the same time as treating the patient with IV dextrose.

2.4 It is important to avoid overtreatment of hypoglycemia since this can result in rebound hyperglycemia.

2.5 The patient shall not be sent off the unit, especially for physical activity, until their blood glucose is greater than or equal to 4.0 mmol/L after treatment, and they have had the opportunity to have a snack or meal containing carbohydrate and protein (or parenteral nutrition or enteral tube feed is re-established).

2.6 Contact the MRHP prior to holding insulin or resuming held insulin.

a) Holding insulin after a hypoglycemic event commonly results in significant hyperglycemia three (3) to four (4) hours later.
Blood glucose testing should be repeated and/or verified by laboratory testing at the health care professional's discretion if the point-of-care testing (POCT) blood glucose reading is:

a) inconsistent with the patient's clinical status (e.g., the patient is not exhibiting signs and symptoms of hypoglycemia); or

b) suspected to be related to equipment failure.

Patients prescribed self-management of their glycemic care using home glucose monitoring devices require confirmation of glucose values with an AHS POCT blood glucose meter for suspected hypoglycemia.

3. Personnel

3.1 Care and management of a patient’s hypoglycemia is a shared responsibility amongst all health care professionals where it is within their scope of practice. It is also important to involve the patient’s family in the decision-making process.

3.2 POCT with blood glucose meters shall be performed by health care professionals who have received appropriate blood glucose meter clinical education and training and have maintained the ongoing competency requirements.

4. Identification of Hypoglycemia

4.1 Hypoglycemia is defined by a blood glucose level of less than 4.0 mmol/L. This is most often seen in patients treated with insulin or an insulin secretagogue (e.g., glyburide, gliclazide, glimepiride or repaglinide).

4.2 A hypoglycemic state may be asymptomatic or symptomatic.

4.3 Symptoms of hypoglycemia may include, but are not limited to:

a) early/non-severe symptoms: headache, mood changes, irritability, tremors, tiredness, tachycardia, excessive hunger, diaphoresis, pallor, paresthesia, and/or inability to concentrate; and

b) advanced/severe symptoms, which may include all of the early/non-severe symptoms as well as: being unable to recognize and treat hypoglycemia by self, disorientation, altered level of consciousness (including unconscious state), and/or seizure.

5. Treatment of Hypoglycemia in Conscious Patients Who are Able to Swallow, Including Those Who Have a Tube Feed

5.1 Refer to Appendix A: Pediatric Hypoglycemia Treatment Algorithm.

a) For patients who are ordered nothing by mouth (nil per os [NPO]), follow the algorithm section for Altered Consciousness / Unable to Swallow.
5.2 Where the health care professional identifies a state of hypoglycemia, treatment shall be initiated as per this Procedure.

5.3 The MRHP shall be contacted and informed if the patient’s condition changes to an advanced/severe state of hypoglycemia, and when otherwise specified in this Procedure.

5.4 Quick-acting carbohydrate (e.g., dextrose) is provided based on the age of the patient. Provide a quick-acting carbohydrate as per the table below. Choose one (1) of the following age/clinically appropriate options:

<table>
<thead>
<tr>
<th>Item</th>
<th>Infant 6 days to 2 years of age</th>
<th>Child between 2 to 5 years of age</th>
<th>Child between 5 to 10 years of age</th>
<th>Child over 10 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of quick acting carbohydrate needed (or as close as possible) in grams [g])</td>
<td>5 g</td>
<td>5 g</td>
<td>10 g</td>
<td>15 g</td>
</tr>
<tr>
<td>Dextrose Tablets</td>
<td>Not applicable</td>
<td>1 tablet</td>
<td>3 tablets</td>
<td>4 tablets</td>
</tr>
<tr>
<td>Dextrose Liquid</td>
<td>½ tube</td>
<td>½ tube</td>
<td>1 tube</td>
<td>1½ tubes</td>
</tr>
<tr>
<td>Juice or Regular Pop in millilitres (mL)</td>
<td>Not applicable</td>
<td>3 tablespoons (tbsp) or 45 mL</td>
<td>1/3 cup or 85 mL</td>
<td>3/4 cup or 175 mL</td>
</tr>
<tr>
<td>Honey Package</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>1 individual package</td>
<td>1½ individual packages</td>
</tr>
<tr>
<td>Sugar Package</td>
<td>1 packet of sugar in 10 mL distilled water</td>
<td>1 packet of sugar in 10 mL distilled water</td>
<td>3 packets of sugar in 30 mL distilled water</td>
<td>4 packets of sugar in 30 mL distilled water</td>
</tr>
</tbody>
</table>

a) Exceptions to the above table:

(i) If the patient is fed by an enteral feeding tube and unable to have nutritional intake by mouth, provide dextrose tablets (as per the table above) crushed and dissolved in water via tube feed and flush with water (pre- and post-treatment).

(ii) For patients requiring thickened fluids, provide thickened juice (as per the table above) based on the thickness indicated in the patient’s diet order.
5.5 Repeat blood glucose test 15 minutes after treatment of quick-acting carbohydrate. If the patient’s blood glucose result is below 4.0 mmol/L, repeat treatment as per the table in Section 5.4 above, with appropriate for age quick-acting carbohydrate item.

a) Re-test blood glucose in 15 minutes.

b) If blood glucose remains below 4.0 mmol/L after two (2) treatments of the quick-acting carbohydrate, contact the MRHP for further treatment.

(i) If the patient becomes unresponsive or has an altered level of consciousness, proceed to Section 6 of this Procedure.

5.6 If the patient’s blood glucose result is greater than or equal to 4.0 mmol/L and the next meal is more than one (1) hour away, provide a snack of a carbohydrate and a protein source as per the table below. See Section 5.8 below if the next meal is less than one (1) hour away. Choose one (1) of the following age/clinically appropriate options:

<table>
<thead>
<tr>
<th>Snack Options</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under 10 years of age</td>
</tr>
<tr>
<td>Carbohydrate (1) and Protein (1) Required</td>
<td></td>
</tr>
<tr>
<td>White milk (includes protein choice)</td>
<td>125 mL</td>
</tr>
<tr>
<td>Bread + Cheese package OR Individual peanut butter package</td>
<td>½ slice</td>
</tr>
<tr>
<td>Carbohydrate + Protein</td>
<td>1–2 packages</td>
</tr>
<tr>
<td>Saltine cracker package (2 crackers per package)</td>
<td>2 packages</td>
</tr>
<tr>
<td>Protein + Cheese package OR Individual peanut butter package</td>
<td>1–2 packages</td>
</tr>
<tr>
<td>Carbohydrate + Protein</td>
<td>2 packages</td>
</tr>
<tr>
<td>Saltine cracker package (2 crackers per package)</td>
<td>1–2 packages</td>
</tr>
<tr>
<td>Protein + Cheese package OR Individual peanut butter package</td>
<td>2 packages</td>
</tr>
<tr>
<td>Smooth Greek yogurt (100 g) (includes protein choice)</td>
<td>½ container</td>
</tr>
</tbody>
</table>

a) Exceptions to the above table:

(i) For infants who are formula or breast fed (e.g., those not yet introduced to solids), feed until infant stops on their own or is satiated.
(ii) For patients with dysphagia on a dysphagia soft/minced/pureed diet, provide per table below:

<table>
<thead>
<tr>
<th>For child <strong>under</strong> 10 years of age</th>
<th>½ container of Ensure or Boost pudding (113 g / 142 g) <strong>OR</strong> ½ container smooth Greek yogurt (100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For child <strong>above</strong> 10 years of age</td>
<td>1 container of Ensure or Boost pudding (113 g / 142 g) <strong>OR</strong> 1 container smooth Greek yogurt (100 g)</td>
</tr>
</tbody>
</table>

(iii) For patients fed via enteral feeding tube:

- If tube feed is continuous, continue regular feeding at established rate.
- If tube feed is intermittent, give bolus of ordered formula and resume feeding at next scheduled time; consult with the Dietitian. If the Dietitian is unavailable, call the MRHP to determine the bolus amount.

5.7 When none of the recommended options in the tables above are appropriate for the patient, discuss the best snack options with the Dietitian or MRHP.

5.8 If the patient’s blood glucose result is greater than or equal to 4.0 mmol/L and the meal is **less** than one (1) hour away, give the meal only and do not provide a snack.

a) For infants who are formula or breast fed (e.g., those not yet introduced to solids), feed until infant stops on their own or is satiated.

5.9 Repeat blood glucose test one (1) hour after the hypoglycemic event.

5.10 Document patient’s symptoms, treatment provided, and response to treatment in the patient's **health record**.

5.11 Notify the MRHP at the next available opportunity, regarding the patient's hypoglycemic event.

5.12 Consider overnight glucose testing if recurrent hypoglycemia during the day.

5.13 Resume insulin schedule unless otherwise ordered. If unsure, contact the MRHP.

6. **Treatment of Hypoglycemia in Patients with Altered Consciousness / Unable to Swallow (Includes Patients Who are NPO)**

6.1 Refer to Appendix A: *Pediatric Hypoglycemia Treatment Algorithm*.

6.2 Where the health care professional identifies an advanced/severe state of hypoglycemia, the MRHP shall be contacted and informed of the patient’s change in status.
6.3 If the patient has an altered level of consciousness, place in the recovery position to maintain an open airway.

6.4 If the patient does not have IV access, attempt to establish an IV in a large vein (e.g., antecubital vein). Avoid using small peripheral veins for the administration of IV dextrose, as this hyperosmolar solution can cause extravasation and consequential complications including tissue injury and loss of limb.

   a) If unable to initiate IV within two (2) minutes, administer glucagon subcutaneously (SC) or intramuscularly (IM) as per table below and continue to attempt IV access. Administer glucagon while the MRHP is being contacted regarding the patient’s condition. Do not delay treatment.

<table>
<thead>
<tr>
<th>Child under 5 years of age OR weight 20.0 kilograms (kg) or less</th>
<th>Child above 5 years of age OR weight 20.1 kilograms (kg) or greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 milligrams (mg) of glucagon SC or IM</td>
<td>1 milligram (mg) of glucagon SC or IM</td>
</tr>
</tbody>
</table>

6.5 Once IV access is established in a large vein (e.g., antecubital vein) or central line or intraosseous (IO) line, administer dextrose 0.5 – one (1) g/kg/dose to a maximum dose of 25 g.

   a) Dextrose 25 percent in water (D25W) is recommended at a rate of two (2) – four (4) mL/kg/dose, as per the AHS Provincial Parenteral Manual. Administer over two (2) to five (5) minutes.

   b) Dextrose 10 percent in water (D10W) is an alternate recommendation at a rate of five (5) – 10 mL/kg/dose, as per the AHS Provincial Parenteral Manual. Administer over five (5) minutes.

   c) If the health care professional is unable to administer dextrose via direct IV, add dextrose to a solution of five (5) percent in water (D5W) or 0.9 percent normal saline (NS) and infuse over 15 to 20 minutes, as per the AHS Provincial Parenteral Manual.

   d) If a smaller peripheral vein is the only IV access, infuse dextrose in a solution of D5W or NS and infuse over 30 minutes, as per the AHS Provincial Parenteral Manual.

   e) A patient-specific order from the MRHP is required to administer dextrose via IV, as this is a Schedule 1 medication; however, this should not delay
treatment. In an emergent situation, obtaining an order can happen at the same time as treating the patient with IV dextrose.

6.6 Following administration of dextrose IV, infuse IV with a solution containing dextrose at a maintenance rate, or rate ordered by the MRHP.

6.7 Repeat blood glucose test in 15 minutes after the dextrose and/or the glucagon is administered.

a) If blood glucose is greater than or equal to 4.0 mmol/L and the patient is conscious and able to swallow, proceed to Section 6.9 of this Procedure.

b) Repeat the blood glucose in 15 minutes after the dextrose and/or glucagon is administered. If blood glucose is below 4.0 mmol/L and patient is conscious and able to swallow, treat with quick-acting carbohydrate as per the table below. Choose one (1) of the following age/clinically appropriate options:

<table>
<thead>
<tr>
<th>Item</th>
<th>Infant 6 days to 2 years of age</th>
<th>Child between 2 to 5 years of age</th>
<th>Child between 5 to 10 years of age</th>
<th>Child over 10 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of quick acting carbohydrate needed (or as close as possible) in grams [g])</td>
<td>5 g</td>
<td>5 g</td>
<td>10 g</td>
<td>15 g</td>
</tr>
<tr>
<td>Dextrose Tablets</td>
<td>1 tablet</td>
<td>1 tablet</td>
<td>3 tablets</td>
<td>4 tablets</td>
</tr>
<tr>
<td>Dextrose Liquid</td>
<td>½ tube</td>
<td>½ tube</td>
<td>1 tube</td>
<td>1½ tubes</td>
</tr>
<tr>
<td>Juice or Regular Pop in millilitres (mL)</td>
<td>Not applicable</td>
<td>3 tablespoons (tbsp) or 45 mL</td>
<td>1/3 cup or 85 mL</td>
<td>3/4 cup or 175 mL</td>
</tr>
<tr>
<td>Honey Package</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>1 individual package</td>
<td>1½ individual packages</td>
</tr>
<tr>
<td>Sugar Package</td>
<td>1 packet of sugar in 10 mL distilled water</td>
<td>1 packet of sugar in 10 mL distilled water</td>
<td>3 packets of sugar in 30 mL distilled water</td>
<td>4 packets of sugar in 30 mL distilled water</td>
</tr>
</tbody>
</table>

c) Exceptions to the above table:

(i) If the patient is fed via enteral feeding tube and unable to have nutritional intake by mouth, provide dextrose tablets crushed and
d) Repeat blood glucose test in 15 minutes after treatment of quick-acting carbohydrate.

(ii) If the patient's blood glucose result is less than 4.0 mmol/L, repeat treatment with quick-acting carbohydrate as per the table in Section 6.7 b) above.

(ii) Re-test blood glucose in 15 minutes.

(iii) If blood glucose remains below 4.0 mmol/L after two (2) treatments of the quick-acting carbohydrate, contact the MRHP for further treatment orders.

e) If blood glucose is below 4.0 mmol/L, and patient continues to have altered level of consciousness, is unable to swallow or is NPO, and IV/IO access is established, repeat administration of IV dextrose followed by:

(i) repeat blood glucose test in 15 minutes; and

(ii) contact the MRHP for further treatment if blood glucose remains below 4.0 mmol/L.

f) If blood glucose is below 4.0 mmol/L and patient continues to have altered level of consciousness, is unable to swallow or is NPO, and there is no IV/IO access, repeat administration of glucagon SC or IM (as per the table in Section 6.4 a) above) followed by:

(i) continued attempts to establish IV or IO access;

(ii) repeat blood glucose test in 15 minutes; and

(iii) contact the MRHP for further treatment if blood glucose remains below 4.0 mmol/L.

6.8 Once blood glucose is greater than or equal to 4.0 mmol/L and if the patient is conscious, able to swallow, and the next meal is less than one (1) hour away, give the meal only and do not provide a snack.

a) For infants who are formula or breast fed (e.g., those not yet introduced to solids), feed until infant stops on their own or is satiated.

6.9 Once blood glucose is greater than or equal to 4.0 mmol/L and the patient is conscious, able to swallow, and the next meal is more than one (1) hour away,
provide a snack consisting of carbohydrate and a protein source per table below. Choose one (1) of the following age/clinically appropriate options:

<table>
<thead>
<tr>
<th>Snack Options</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbohydrate (1) and Protein (1) required</strong></td>
<td><strong>Under 10 years of age</strong></td>
</tr>
<tr>
<td>White milk (includes protein choice)</td>
<td>125 mL</td>
</tr>
<tr>
<td>Bread + Cheese package OR Individual peanut butter package</td>
<td>½ slice</td>
</tr>
<tr>
<td>Arrowroot biscuit package (2 biscuits per package) + Cheese package OR Individual peanut butter package</td>
<td>1 package</td>
</tr>
<tr>
<td>Saltine cracker package (2 crackers per package) + Cheese package OR Individual peanut butter package</td>
<td>2 packages</td>
</tr>
<tr>
<td>Smooth Greek yogurt (100 g) (includes protein choice)</td>
<td>½ container</td>
</tr>
</tbody>
</table>

a) **Exceptions** to the above table:

(i) For infants who are formula or breast fed (e.g., those not yet introduced to solids), feed until infant stops on their own or is satiated.

(ii) For patients with dysphagia on a dysphagia soft/minced/pureed diet, provide per table below:

| For child under 10 years of age | ½ container of Ensure or Boost pudding (113 g / 142 g) OR ½ container smooth Greek yogurt (100 g) |
| For child above 10 years of age | 1 container of Ensure or Boost pudding (113 g / 142 g) OR 1 container smooth Greek yogurt (100 g) |

(iii) For patients fed via enteral feeding tube:

- If tube feed is continuous, continue regular feeding at established rate; or
- If tube feed is intermittent, give bolus of ordered formula and resume feeding at next scheduled time, consult with the Dietitian. If the Dietitian is unavailable, call the MRHP to determine bolus amount.
b) When none of the recommended snack options in the table in Section 6.9 above are appropriate for the patient, discuss the best snack options with Dietitian or MRHP.

c) If the patient is receiving parenteral nutrition, continue parenteral nutrition, infuse IV with dextrose at maintenance rate to keep the vein open (or rate ordered), and notify the MRHP. If parenteral nutrition is not running, then contact MRHP to provide orders for IV dextrose over one (1) hour and for ongoing orders.

6.10 If the patient is NPO or unable to swallow and has IV access, contact the MRHP for bolus of dextrose over one (1) hour and for ongoing orders.

6.11 If the patient is NPO or unable to swallowing and does not have IV access, discuss treatment options and nutrition plan with the MRHP and/or the Dietitian.

6.12 Repeat blood glucose test one (1) hour after blood glucose of 4.0 mmol/L or greater has been established.

6.13 Document patient’s symptoms, treatment provided, and response to treatment in health record.

6.14 For patients who are on insulin, resume insulin schedule unless otherwise ordered. Contact the MRHP if unsure. Refer to Section 7.5 below.

7. **Ongoing Patient Monitoring and Education**

7.1 Once the patient’s glycemic status has stabilized, restart routine glucose monitoring and/or increase monitoring as ordered.

7.2 Discontinue the IV infusion when no longer required, as per the MRHP’s order.

7.3 Review the recent hypoglycemic event and look at efforts to prevent a recurrence.

7.4 Review patient/family understanding of their situation and provide education/training as required.

7.5 It is not recommended that the insulin regimen be withheld, however, adjustments to insulin regimen may be required.

8. **Patient Consultation and Referrals**

8.1 For patients newly diagnosed with diabetes:

a) consult and send referral to Pediatric Endocrinology or a Pediatrician; and

b) consult and send referral to specialty diabetes multidisciplinary care team with pediatric expertise for ongoing education and management as available.
8.2 For patients with a known diagnosis of diabetes with other medical conditions:
   a) ensure patient and family is followed by specialty diabetes multidisciplinary care team with pediatric expertise for ongoing diabetes care; and
   b) consider a referral to local providers for further assessment or other pediatric specialty care (e.g., pediatric mental health providers) as required.

8.3 For patients without a history of diabetes:
   a) Follow-up with Primary Care Provider or Pediatrician, as appropriate.

9. Documentation
9.1 The following information shall be documented in the patient's health record:
   a) all blood glucose test results;
   b) associated patient symptoms observed or reported;
   c) all treatment provided, including interventions and medications administered to control or manage the patient’s hypoglycemic event;
   d) notification of the other members of the health care team;
   e) possible contributing factors and other observations; and
   d) patient and family teaching provided.

DEFINITIONS

AHS representative means Alberta Health Services employees, members of the medical and midwifery staffs, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary).

Authorized prescriber means a health care professional who is permitted by federal and provincial legislation, their regulatory college, Alberta Health Services, and practice setting (where applicable) to prescribe medications.

Family(-ies) means one or more individuals identified by the patient as an important support, and who the patient wishes to be included in any encounters with the health care system, including but not limited to, family members, legal guardians, friends, and informal caregivers.

Health care professional means an individual who is a member of a regulated health discipline, as defined by the Health Professions Act (Alberta), and who practises within scope and role.
Health record means the collection of all records documenting individually identifying health information in relation to a single person.

Most responsible health practitioner (MRHP) means the health practitioner who has responsibility and accountability for the specific treatment/procedure(s) provided to a patient and who is authorized by Alberta Health Services to perform the duties required to fulfill the delivery of such a treatment/procedure(s), within the scope of their practice.

Order means a direction given by a regulated health care professional to carry out specific activity(ies) as part of the diagnostic and/or therapeutic care and treatment to the benefit of a patient. An order may be written (including handwritten and/or electronic), verbal, by telephone or facsimile.

Patient means an adult or child who receives or has requested health care or services from Alberta Health Services and its health care providers or individuals authorized to act on behalf of Alberta Health Services. This term is inclusive of residents, clients and outpatients.

Point-of-care testing (POCT) means any testing that typically occurs outside a designated laboratory environment, and is completed nearer to, or at the site of the patient/client. This includes all testing performed by non-laboratory personnel regardless of the location of the examination.

Schedule 1 medication means the medications that are defined by the National Association of Pharmacy Regulatory Authorities (NAPRA) and provincial legislation as requiring a prescription or order from an authorized prescriber.

REFERENCES

Appendix A: Pediatric Hypoglycemia Treatment Algorithm

- Alberta Health Services Governance Documents:
  - Glycemic Management – Pediatric Policy (#HCS-283)
  - Point of Care Testing (POCT) Policy (#PS-90)
- Alberta Health Services Resources
  - Provincial Parenteral Manual
- Non-Alberta Health Services Documents:
  - Clinical Practice Guidelines 2018 (Diabetes Canada)
  - Medication Management Standards 2020 (College and Association of Registered Nurses of Alberta [CARN])
  - Practice Guideline: Medication Management 2020 (College of Licensed Practical Nurses of Alberta [CLPNA])

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APPENDIX A

Pediatric Hypoglycemia Treatment Algorithm

This procedure excludes (1) patients with DKA on IV insulin; and (2) patients equal to or less than 5 days old or infants admitted to the NICU.

Blood Glucose is below 4.0 mmol/L AND

- on insulin OR
- patients without diabetes:
  - with overdose of insulin or insulin secretagogue (e.g., glyburide, gliclazide, glimepiride or repaglinide) OR
  - with rare conditions and symptomatic hypoglycemia (see section 1.3b in procedure)

Step 2 - Treat

Select appropriate treatment based on age of the child, from table below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Infant 6 days to 2 years of age</th>
<th>Child between 2 to 5 years of age</th>
<th>Child between 5 to 10 years of age</th>
<th>Child over 10 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of carb needed (or as close as possible)</td>
<td>5 grams (g)</td>
<td>5 grams (g)</td>
<td>10 grams (g)</td>
<td>15 grams (g)</td>
</tr>
<tr>
<td>Dextrose Tablets</td>
<td>Not applicable</td>
<td>One (1) tablet</td>
<td>Three (3) tablets</td>
<td>Four (4) tablets</td>
</tr>
<tr>
<td>Dextrose Liquid</td>
<td>One-half (1/2 tube)</td>
<td>One-half (1/2 tube)</td>
<td>One tube</td>
<td>One and one-half (1 ½ tube)</td>
</tr>
<tr>
<td>Juice OR Regular Pop</td>
<td>Not applicable</td>
<td>3 tablespoons (Tbsp) or 45 milliliters mL</td>
<td>one-third (1/3) cup or 35 milliliters mL</td>
<td>three-quarters (3/4) cup or 75 milliliters mL</td>
</tr>
<tr>
<td>Honey Package</td>
<td>Not applicable</td>
<td>N/A</td>
<td>one (1) individual package</td>
<td>one and one-half (1 ½) individual packets</td>
</tr>
<tr>
<td>Sugar package</td>
<td>One (1) packet of sugar in 10 mL distilled water</td>
<td>One (1) packet of sugar in 10 mL distilled water</td>
<td>Three (3) packets of sugar in 30 mL distilled water</td>
<td>Four (4) packets of sugar in 30 mL distilled water</td>
</tr>
</tbody>
</table>

Repeat blood glucose 15 minutes after treatment.

Step 3 – Follow-Up

Able to Swallow

1. If meal is more than one hour away, give snack of a carbohydrate and protein source (see options based on age in table below)***
2. If meal is less than one hour away give meal only (do not give snack)

Exception: For infants that are formula or breast fed, feed until infant stops on their own or is sated.

<table>
<thead>
<tr>
<th>Snack Options</th>
<th>Carbohydrate (1) and Protein (1) required</th>
<th>Amount</th>
<th>Child under 3 years of age</th>
<th>Child above 10 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>White milk</td>
<td>(includes protein choice)</td>
<td></td>
<td>125 mL</td>
<td>250 mL</td>
</tr>
<tr>
<td>Bread</td>
<td></td>
<td></td>
<td>½ slice</td>
<td>Full slice</td>
</tr>
<tr>
<td>Cheese Package OR Individual Peanut Butter Package</td>
<td></td>
<td></td>
<td>1-2 packages</td>
<td>1-2 packages</td>
</tr>
<tr>
<td>Arrowroot biscuit package (2 cookies per package)</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cheese Package OR Individual Peanut Butter Package</td>
<td></td>
<td></td>
<td>1-2 packages</td>
<td>1-2 packages</td>
</tr>
<tr>
<td>Saltine cracker package (2 crackers per package) &amp;</td>
<td></td>
<td></td>
<td>1 ½</td>
<td>3</td>
</tr>
<tr>
<td>Smooth Greek yogurt (100 g)</td>
<td>(includes protein choice)</td>
<td></td>
<td>½ container</td>
<td>1 container</td>
</tr>
</tbody>
</table>

If above 4.0 mmol/L, proceed to Step 3.

If below 4.0 mmol/L, re-treat as above**

Tube Feed

1. If tube feed is continuous, continue regular feeding schedule at established rate.
2. If tube feed is intermittent and next feed is more than one hour away, contact AP to determine and order bolus amount of formula.

Go to Step 4 (see reverse page 2)

***Do not send patient off unit until blood glucose greater than or equal to 4.0 mmol/L***

2021-DEC-16 1/2
APPENDIX A CON’T

**Altered Consciousness / Unable to Swallow**
(or Patient NPO)

**IV ACCESS**
Establish or use large IV access (central line or antecubital or intraosseous)
Do NOT use small peripheral vein
Successful attempt of IV access after 1-2 minutes?

1. **Step 2 - Treat**
   1a. Administer dextrose IV 0.5 – 1 g/kg/dose to maximum dose of 25 g.
      - Dextrose twenty-five (25) percent in water (D25W) is recommended at a rate of 2-4 mL/kg/dose
      - Dextrose ten (10) percent in water (D10W) is recommended at a rate of 5-10 mL/kg/dose
   1b. Must call MRHP
      This should not delay above treatment
   2. Continue IV dextrose infusion at maintenance rate

2. Repeat blood glucose in 15 minutes
   - If below 4.0 mmol/L:
     1. If conscious/able to swallow, complete Step 2 to 3 on reverse side
     2. If altered consciousness, repeat Step 2 (above);
        Call MRHP for direction IF blood glucose remains below 4.0 mmol/L after 2 treatments
   - When blood glucose greater than or equal to 4.0 mmol/L, complete step 3 below

3. **Step 3 – Follow-Up**
   - Notify most responsible health practitioner for ongoing orders

4. **Step 4 – Ongoing Care (Conscious and Altered Level of Consciousness)**
   This section outlines follow-up instructions for patients who have blood glucose greater than or equal to 4.0 mmol/L after hypoglycemia treatment.
   1. In one hour, recheck blood glucose to ensure it remains greater than or equal to 4.0 mmol/L.
      - If below 4.0 mmol/L, call most responsible health practitioner, and initiate appropriate algorithm.
      - If greater than or equal to 4.0 mmol/L, resume routine blood glucose monitoring.
   2. Evaluate patient for cause: missed meal, exercise, change in medication (e.g. increase in insulin dose, etc.)
   4. Discuss nutrition plan and medications with most responsible health practitioner and dietitian.