VANCOUVER ISLAND health authority

Standard Number:	12.4.2G
Effective Date:	January 2012

Interprofessional Practice & Clinical Standards

☐ **Policy (P)** ☒ **Guideline (G)** ☐ **Protocol (PRT)** ☐ **Procedure (PR)** ☐ **Plan of Care (POC)**

Professional Responsible / For Use By:	Registered Nurses
Title:	**PEDIATRIC HYPOGLYCEMIA (LOW BLOOD SUGAR)**
Indications:	**FOR USE WITH CHILDREN WITH DIABETES WHO ARE ON INSULIN THERAPY.** Tighter control in most children with diabetes reduces the incidence of complications and hence their associated social, emotional and economic burdens. **If there are physician orders for the management of pediatric hypoglycemia, the orders supersede these nursing guidelines**
Care Outcomes:	Hypoglycemia is recognized promptly and treated appropriately, based on the child's situation and extent of symptoms (low blood sugar, and both autonomic and neuroglycopenic symptoms); risk of injury is reduced and over treatment is avoided.
Definitions:	**Hypoglycemia = Blood sugar less than 4 mmol/L** **Paediatric Patient** = defined as up to age 17 years less one day (not inclusive of NICU patients) **Mild hypoglycemia** = autonomic symptoms (trembling, palpitations, sweating, anxiety, hunger, nausea, tingling) (Able to feed self and swallow.) **Moderate hypoglycemia** = autonomic and neuroglycopenic symptoms (difficulty concentrating, confusion, irritability, weakness, drowsiness, vision changes, difficulty speaking, headache, dizziness, tiredness, mood changes) (May need assistance but able to swallow.) **Severe hypoglycemia** = unable to swallow, unconscious, convulsions / seizures (Requires the assistance of another person.) **Fast-acting carbohydrate** = A simple carbohydrate that is absorbed quickly to raise the blood sugar within a short time (in the absence of protein, fat, or complex starch) **Examples:**

10 grams (for children less than 5 years or less than 20 kg)	**15 grams (for mild hypoglycemia)**	**20 grams (for moderate hypoglycemia)**
1/3 cup/85mL clear juice or regular pop	½ cup/125mL clear juice or regular pop	½ cup/125mL juice/pop with 1 tsp sugar added
glucose gel (10g dose)	glucose gel (15g dose)	glucose gel (20g dose)
N/A	glucose tablets (15g dose)	glucose tablets (20g dose)
2 tsp sugar (2 packets) dissolved in ½ cup water	3 tsp sugar (3 packets) dissolved in ½ cup water	4 tsp sugar (4 packets) dissolved in ½ cup water
2 tsp (10 mL) honey or maple/pancake syrup	3 tsp (15 mL) honey or maple/pancake syrup	4 tsp (20 mL) honey or maple/pancake syrup

Procedure - Steps	Key Points
1. <u>Mild Hypoglycemia:</u> • Oral ingestion of **15 g of *fast-acting* carbohydrate**, preferably as 1/2 a cup / 125 ml of regular juice or soft drink. In children less than 5 years, or less than 20 kg, it is recommended to treat with **10 g** of carbohydrate (this would be 1/3 a cup / 85 ml of regular juice or soft drink). • **Wait 15 minutes** (nurse or care giver should stay with the child); retest blood glucose, if it remains less than 4 mmol/L retreat as above**. Notify a physician if 2 or more hypoglycemia treatments are required.** • Repeat above until blood glucose is greater than 4 mmol/L • **Once the hypoglycemia has been reversed** and to prevent repeated hypoglycemia, the child should have, in addition to the fast-acting treatment above, their usual meal or snack. A snack (including 15 g carbohydrate and a protein source) is recommended if a meal is more than 45 minutes away and in the absence of complicating factors. (Note: If hypoglycemic at night always follow with a snack as the next meal is breakfast.) • Inform Physician • Document incident of hypoglycemia, treatment given and response on the medical record	• It is estimated that hypoglycemia of any severity occurs annually in 5 to 20 % of patients being treated with insulin. Although these hypoglycemic episodes are rarely fatal, they can be associated with serious, short-term clinical sequelae and delayed development in younger children. • Glucose tablets are not recommended for small children as they are large and hard to chew. Choose glucose gel instead. • Know the location of the juice or soft drinks, IV glucose and glucagon (if available) in your facility. • Do not treat with protein or fat during the initial phase of hypoglycemia as low blood sugar decreases the stomach's ability to digest. By giving a patient fat or protein at this stage will not treat the low and may further add to the hypoglycemia as this type of food will be poorly absorbed.
2. <u>Moderate Hypoglycemia:</u> • Oral ingestion of **20 g of *fast-acting* carbohydrate**, i.e. 1/2 cup / 125ml of regular juice or soft drink with 1 tsp of sugar (1 package of sugar) added. • **Wait 15 minutes** (nurse or care giver should stay with the child); retest blood glucose, if it remains less than 4 mmol/L retreat as above. **Notify a physician if 2 or more hypoglycemia treatments are required.** • Repeat above until blood glucose is greater than 4 mmol/L • **Once the hypoglycemia has been reversed** and to prevent repeated hypoglycemia, the child should have, in addition to the fast-acting treatment above, their usual meal or snack. A snack (including 15 g carbohydrate and a protein source) is recommended if a meal is more than 45 minutes away and in the absence of complicating factors. (Note: If hypoglycemic at night always follow with a snack as the next meal is breakfast.) • Inform Physician • Document incident of hypoglycemia, treatment given and response on the medical record.	• Glucose tablets are not recommended for small children as they are large and hard to chew. Choose glucose gel instead. • Know the location of the juice or soft drinks, IV glucose and Glucagon (if available) in your facility. • Do not treat with protein or fat during the initial phase of hypoglycemia as low blood sugar decreases the stomach's ability to digest. By giving a patient fat or protein at this stage will not treat the low and may further add to the hypoglycemia as this type of food will be poorly absorbed.

Procedure - Steps	Key Points
3. <u>Severe Hypoglycemia:</u> • Turn child on side and do not attempt to give anything orally • Give Glucagon 0.5 mg IM or SC if child is less than 20 kg. Give Glucagon 1 mg IM or SC if greater than 20 kg. May repeat times one in 15 minutes if still unconscious. • Once the child is conscious, check blood sugar and continue to treat hypoglycemia orally with 20 gm of carbohydrates until blood glucose is greater than 4 mmol/L. • **Alternate treatment** if IV access is available: give IV dextrose (2 mL/kg of D10W IV push administered slowly at 2-3 mL/min). • Once awake check blood glucose, continue to treat hypoglycemia orally as for moderate hypoglycemia and repeat until blood glucose is greater than 4 mmol/L • **Once the hypoglycemia has been reversed**, to prevent repeated hypoglycemia, the child should have in addition to the fast-acting treatment above, their usual meal or snack. A snack (including 15 g carbohydrate and a protein source) is recommended if a meal is more than 45 minutes away and in the absence of complicating factors. (Note: If hypoglycemic at night always follow with a snack as the next meal is breakfast.) • Inform Physician • Document incident of hypoglycemia, treatment given and response to treatment on the medical record.	• In children with diabetes, the severity of hypoglycemia is defined based on the clinical manifestations of the episodes. • If the patient has IV access the preferred treatment is a glucose infusion. • Extravasation of higher concentrations of glucose will lead to severe tissue damage and the use of D50W is not recommended for children under 50kg. • **The maximum number of Glucagon injections per episode is two (2).** Read the package insert for instructions on reconstitution and administration. • Nausea and vomiting can be side effects of Glucagon and can last up to 24 hours.

References:

Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. <u>Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada</u>. *Canadian Journal of Diabetes*. 2008; 32 (suppl. 1) S1-S201.

endodiab.bcchildrens.ca/pdf/glucogon.htm. <u>Glucagon for Severe Low Blood Sugar (Hypoglycemia)</u>. September 20, 2010.

endodiab.bcchildrens.ca/pdft1dmgmt.htm. <u>Hypoglycemia</u>. June 29, 2010.

endodiab.bcchildrens.ca/pdfhypoflow.htm. <u>Hypoglycemia Treatment Flowchart</u>. December 26, 2005.

Metzger, Daniel, MD, FAAP, FRCPC. <u>The Management Of The Child With Type 1 Diabetes</u>. endodiab.bcchildrens.ca/pdf/t1dmgmt.htm May 4, 2010.

Sunehag, A. & Haymond, M. W. <u>Approach to hypoglycemia in infants and children.</u> www.uptodate.com January 27, 2011.

Yale, J., Begg, I., Gerstein, H., Houlden, R., Jones, H., Maheux, P., & Pacaud, D. <u>2001 Canadian Diabetes Association Clinical Practice Guidelines for the Prevention and Management of Hypoglycemia in Diabetes</u>. *Canadian Journal of Diabetes*, 26:1, pp. 22-35.

VANCOUVER ISLAND health authority

PAEDIATRIC HYPOGLYCEMIA TREATMENT FLOWCHART

Diabetic child with blood glucose less than 4 mmol/L

MILD SYMPTOMS
Hunger, Irritability, Trembling, Weakness, Diaphoretic, Anxiety, Dizziness, Pallor, Drowsy, Crying, Headache

MODERATE SYMPTOMS
Sleepiness, Erratic behaviour, Poor coordination, Confusion, Slurred speech, Mood changes, Nightmares, Dysphasia, Blurred vision

SEVERE SYMPTOMS
Unable to swallow
Combative
Unconscious
Seizure

TREATMENT NEEDED
If possible, check blood glucose, but always treat when in doubt.
Nurse or caregiver to stay with child.

MILD
Treat with 15 grams of fast-acting sugar, i.e. ½ cup juice or regular pop or glucose tablets or glucose gel (15 gram dose)
(For children under 5 years, use 10 grams or 1/3 cup of juice/regular pop)
**** Notify physician if 2nd treatment for hypoglycemia is required***

MODERATE
Treat with 20 grams of fast-acting sugar, i.e. ½ cup of juice or regular pop with 1 tsp package of sugar added or glucose tablets or glucose gel (20 gram dose)
**** Notify physician if 2nd treatment for hypoglycemia is required***

SEVERE
Position on side; NPO (no gel!)
Give Glucagon IM or SC
(0.5 mg if less than 20 kg, 1.0 mg if greater than 20 kg)
or if IV available, give IV dextrose
(2 mL/kg of D10W IV push administered slowly at 2-3 mL/min)
Inform Physician

Wait 15 mins
Re-check blood

** Notify physician*

Blood sugar above or equal to 4mmol/L

Blood sugar less than 4 mmol/L

Wait 15 mins
Re-check blood

** Notify physician*

Blood sugar above or equal to 4mmol/L

Blood sugar less than 4 mmol/L

Child regains consciousness

Remains unconscious
Repeat Glucagon x 1 only

When is the next meal or snack?

If less than 45 minutes away: give meal or snack early

If more than 45 minutes away: give additional snack including 15 grams of carbohydrate and a protein choice

Notify physician and document on variance record and diabetes record