Clinical Guidance

Management of hypoglycaemia in paediatric diabetes

Summary
This guidance is for the use of nurses and doctors management of children with diabetes suffering an episode of hypoglycaemia who are cared as in-patients at the Evelina London Children's Hospital. This guideline includes the signs and symptoms, causes and treatment options.

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Change History		
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12/05/17	Removed Lucozade as no longer recommended treatment in hypoglycaemia	Paediatric Diabetes Team

Management of hypoglycaemia in paediatric diabetes

Setting: Evelina London Children's Hospital

For Staff: Medical and nursing staff

Patients: Children and young people with diabetes and their families

Definition:
Hypoglycaemia in children with diabetes is a blood glucose < 4.0 mmol/L. ('4 is the floor' in diabetes provides a safety margin. It should not be confused with the lower level of 2.5-2.8 mmol/L used for people without diabetes.)

Causes:

- Too much insulin has been taken
- A delayed or missed meal or snack
- Unplanned or strenuous exercise
- Gastroenteritis/Vomiting
- Alcohol
- Undiagnosed or uncontrolled Coeliac/ Addison's and hypothyroid disease
- No obvious cause

Signs and Symptoms:

Can vary between individuals and may change. A child/adolescent may exhibit some of the symptoms below, while others may have no symptoms.

Symptoms and signs can be classified into 3 groups: autonomic, neuroglycopaenic and behavioural. (The list is not exhaustive and if you suspect a child/adolescent is experiencing a hypo their capillary blood glucose MUST be checked.)

Autonomic	Neuroglycopaenic	Behavioural
Pale Sweating/clammy Hungry Tremor Restlessness	• Headache • Confusion • Weakness • Glazed expression • Lethargy • Visual/speech disturbances • Seizures • Unconsciousness • Nausea	Irritability Mood change Erratic behaviour Combative behaviour

Treatment:

Do not leave a child/adolescent with hypoglycaemia alone.

The treatment varies with the degree of severity. Mild to moderate hypos are categorized as the person being conscious, co-operative and able to swallow. They should receive the same treatment as there is little clinical research to suggest they are separate entities. Do not attempt to give anything by mouth if impaired consciousness

Mild or moderate hypoglycaemia: child able to tolerate oral fluids / Glucogel. see page 3

Severe Hypoglycaemia: Unconscious or fitting child requires expert intervention (IM glucagon or IV glucose). see page 4
Do not give anything orally.

Accident and Emergency:

Do inform the Paediatric Diabetes Team of any patients with diabetes presenting with hypoglycaemia, even if not admitted. Either by contacting a member of the diabetes team or if non-urgent by emailing: PaediatricDiabetesandEndocrinologyTeam@gstt.nhs.uk

Prevention of hypoglyacemia:

Regular review of blood glucose levels and medication. If any concerns discuss with the paediatric diabetes team.

References:
1. NICE Clinical Guideline 15: Diagnosis and management of Type 1 diabetes in children and young people, 2004.
2. ISPAD Clinical Practice Consensus Guidelines, Clarke W et al. Assessment and management of hypoglycaemia in children and adolescents with diabetes, 2009.
3. APLS: The practical approach, 5th edition, ALSG, 2011
4. This document was adapted from the Association of Children's Diabetes Clinicians Hypoglycaemia in Diabetes Guidelines Version 1, May 2012
5. ADA Guidelines 2013 Recommendations for Hypoglycaemia, American Diabetes association. Standards of medical care in diabetes 2013: Diabetes Care 2013; 36 (suppl1)
6. Katharine Barnard, Sian Thomas, Pamela Royle, Kathryn Noyes3 and Norman Waugh Research article 'Fear of hypoglycaemia in parents of young children with type 1 diabetes: a systematic review': BMC Pediatrics 2010, 10:50
7. ISPAD Clinical Practice Consensus Guidelines, Ly et al. Assessment and management of hypoglycemia in children and adolescents with diabetes Pediatric Diabetes 2014: 15 (Suppl. 20): 180–192

Treatment of mild or moderate Hypoglycaemia

1. Follow this box if child is co-operative and able to swallow safely

Give 15g of fast acting carbohydrate (CHO) such as:

- 4 glucose tablets or 5 Dextro tablets
- 150 ml (~ ½ cup) sugary drink (not diet) such as cola – Fun size can of Cola or juice(150ml)
- 4 Fruit pastilles
- 5x jelly babies
- Glucojuice- 1 bottle

NB Chocolate or milk WILL NOT bring glucose levels up quickly enough.
LUZOCADE IS NO LONGER RECOMMENDED

2. Follow this box if child refuses to drink, is uncooperative, but is conscious

Give oral Glucose gel (Glucogel® or Dextrogel® - formerly known as Hypostop®). This is a fast acting sugary gel, in an easy twist top tube.
Each tube contains 23g gel.
Squirt tube contents in the side of each cheek (buccal) evenly and massage gently from outside enabling glucose to be swallowed and absorbed quickly.

DO NOT use oral Glucose gel in an unconscious or fitting child.

After 10-15 minutes recheck blood glucose:

1. If still low (<4 mmol/l) and able to take oral fluids repeat Box 1 above (once)
2. If still low (<4 mmol/l), refuses to take oral but is conscious, follow Box 2 above (once)
3. If deteriorated after first run through above or not responded after having administered 2nd dose of above then proceed to Box 4 (See Page 4)

3. If feeling better and blood glucose level >4.0mmol/L, give 10 -15g slow acting carbohydrate snack (or normal meal if it is meal time) such as:

- One slice of toast
- One piece of fresh fruit
- A cereal bar (max 15g CHO)
- One plain digestive or Hobnob© biscuit
- Glass of milk (200ml)

(Patients on insulin pumps: Please refer to paediatric protocol for insulin pump therapy guideline)

If hypo is just before a meal time (when insulin is usually given) the hypo should be treated first and once the blood glucose is >4.0 mmol/L the insulin should be given as usual. DO NOT OMIT INSULIN, especially important with an early morning hypo.

Review history of hypo: If possible the cause should be identified and if necessary the insulin dose adjusted, e.g. for early morning/night-time hypo ask about extra exercise the evening before and details of bedtime snack.

Treatment of Severe Hypoglycaemia

Follow this page if child unconscious or fitting (or also if not responded from page 3)

- Do involve medical assistance by this stage:
  Outside hospital: call emergency services
  Inside hospital: bleep paediatric registrar
- Place in the recovery position if possible and assess Airway Breathing Circulation
- DO NOT attempt to give any oral fluid or oral Glucose gel (Glucogel®)
- If IV access is present go straight to box 5 instead of box 4

4. Give Glucagon (Glucagen) by intramuscular injection if trained

- Check if IM glucagon has been given at home or in ambulance.
- Check expiry date.
- Administer intramuscularly in the thigh.

Dose: Age < 8 yrs or body weight <25 kg: 0.5 mg (half syringe)
Age > 8 yrs or body weight >25 kg: 1.0 mg (whole syringe)

Glucagon is a fast acting drug and the child/adolescent should respond after 10-15 minutes.

After the child has regained consciousness leave him/her on the side (recovery position) as one of the common side effects of glucagon is vomiting/nausea.

5. IV 10% Glucose

If recovery is not adequate after a dose of glucagon or IV access is readily available, then administer 2 mls/kg 10% Glucose as slow IV bolus.

Note: If alcohol causes or contributes toward hypoglycaemia, glucagon may be ineffective (as hepatic stores of glycogen depleted) and intravenous glucose will be required.

Further Monitoring after a severe hypo:

Check blood glucose after 15 minutes and then half hourly until BG stable and above 5 mmol/l

Continue to monitor baseline observations: oxygen saturations, pulse, blood pressure, temperature and respiratory rate

Record presence or absence of ketones.

Document management and inform diabetes team if during the day, or if concerns during the night.

Do not omit normal insulin unless instructed to do so by diabetes team.

If blood glucose >4.0mmol/L and child able to swallow safely:

- Offer clear fluids, and once tolerating clear fluids offer simple carbohydrates, such as toast, crackers (see box 3, page 3)) to replenish liver storage
- Try to identify the cause of hypoglycaemia and discuss this with the patient/family
- Refer to diabetes team for review of treatment, advice or education

If child not improving (BG under 4mmol/l):

- If patients have protracted vomiting and are unable to tolerate oral fluids, hospital admission and IV glucose infusion must be considered. Consider this particularly if a child has returned to the emergency department with further hypoglycaemia during the same intercurrent illness.
- If a child/adolescent remains unconscious on correction of blood glucose, consider cerebral oedema, head injury, adrenal insufficiency or drug overdose.