Hypoglycaemia In Diabetes Child Health
Clinical Guideline V5.0

May 2018
1. **Aim/Purpose of this Guideline**
   This guideline applies to medical and nursing staff, and children with diabetes on insulin injections or pumps, and their families.

2. **The Guidance**

   2.1 **Definition** of hypoglycaemia in children with diabetes is a blood glucose < 4.0 mmol/L. (This nationally accepted ‘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 patients without diabetes.)

   2.2 **Signs and Symptoms of Hypoglycaemia** (‘Hypo’) vary between individuals and may change with age. 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 still be checked.)*

<table>
<thead>
<tr>
<th>Autonomic</th>
<th>Neuroglycopaenic</th>
<th>Behavioural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pale</td>
<td>Headache</td>
<td>Irritability</td>
</tr>
<tr>
<td>Sweating/clammy</td>
<td>Confusion</td>
<td>Mood change</td>
</tr>
<tr>
<td>Hungry</td>
<td>Weakness</td>
<td>Erratic behaviour</td>
</tr>
<tr>
<td>Tremor</td>
<td>Glazed expression</td>
<td>Nausea</td>
</tr>
<tr>
<td>Restlessness</td>
<td>Lethargy</td>
<td>Combative behaviour</td>
</tr>
<tr>
<td></td>
<td>Visual/speech disturbances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unconscious</td>
<td></td>
</tr>
</tbody>
</table>

   2.3 It is important to explain to young people with diabetes the effects of alcohol consumption on blood glucose levels, in particular the increased risk of hypoglycaemia including hypoglycaemia whilst sleeping, and the fact that glucagon might not be effective.

   2.4 **Treatment of Hypoglycaemia:**
   **NB This guideline is a starting point and some patients may have an individualized hypo treatment plan.**
   The treatment varies with the degree of severity. The severity of hypoglycaemia can be categorised as mild, moderate or severe. Mild and moderate hypos should receive the same treatment as there is little clinical research to suggest they are separate entities.
   - **Mild or Moderate Hypoglycaemia**: child able to tolerate oral fluids / Glucogel. *See Page 2*
   - **Severe Hypoglycaemia** Unconscious or fitting child requires parenteral therapy (IM glucagon or IV glucose). *See Page 3*

   2.5 **Also remember:**
   - Do not leave a child/adolescent with hypoglycaemia alone.
   - Inform Paediatric Diabetes Nurse of any patients with diabetes presenting with hypoglycaemia, even if not admitted: they can be paged 8am - 8pm via switchboard on 01872 250000 (if patient discharged at night, then please phone them at 8am).
2.6 Treatment of Mild or Moderate Hypoglycaemia

**Box 1. Follow this box if child is co-operative and able to tolerate oral fluids**
Give 10-20g (or 0.3g/kg) of fast acting oral carbohydrate such as:
- 3-4 glucose tablets.
- Sugary drink such as Coca-cola or Lucozade Energy/Sport: volume required depends on carbohydrate content on label (NB check regularly because companies may change carbohydrate content).
- 3 jelly babies (but don't use these if you'd be tempted to take too many of them!).
- If people want to try fruit juice it should be smooth (no bits) and the carbohydrate dose should be doubled i.e. 20-40g (or 0.6g/kg).\(^3\)
- NB Chocolate or milk WILL NOT bring glucose levels up quickly enough.

**Box 2. Follow this box if child refuses to drink, is uncooperative, but is conscious**
Give Glucogel® or Dextrogel® (formerly known as Hypostop®). This is a fast acting sugary gel, in an easy twist top tube. Each tube contains 10g glucose. 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 Glucogel in an unconscious or fitting child.**

**Box 3. After 10-15 minutes recheck blood glucose:**
NB Hypo treatment should increase blood glucose by approximately 3-4mmol/L.
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 5 (See Page 3).
4. If better and blood glucose > 4.0 mmol/L follow Box 4 (see below).

**Box 4. If feeling better and blood glucose level >4.0mmol/L:**

a. **Patient on insulin pump:** Does not usually require slow-acting carbohydrate snack after a mild-moderate hypo, but consider after a severe hypo. Consider a temporary reduction in basal rate.

b. **Patient on insulin injections:** 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 (not banana)
- A cereal bar (max 15g CHO)
- One plain digestive or hobnob biscuit
- Glass of milk (200ml)

c. 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.

d. Retest 20-30 minutes later to confirm target glucose (>4.0 mmol/L) is maintained.

e. 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.
2.7 **Treatment of Severe Hypoglycaemia**

Follow this page if child unconscious or fitting (or also if not responded from page 2)

CHECK CAPILLARY BLOOD GLUCOSE AND CONFIRM HYPOGLYCAEMIA (<4 mmol/l)

- 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 Glucogel®
  - If IV access is present go straight to **box 6 instead of box 5**.

**Box 5. If on an insulin pump: SUSPEND the pump temporarily, then continue as below.**

**Give Glucagon (Glucagen) by intramuscular injection**

- **NB** If alcohol causes or contributes toward hypoglycaemia, Glucagon may be ineffective (as hepatic stores of glycogen depleted) and intravenous glucose will be required.
- 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 <25kg: 0.5 ml (half syringe)
  - Age > 8 yrs or body weight >25kg: 1 ml (whole syringe)
- Glucagon is a fast acting drug and the child/adolescent should respond after 5 minutes.
- After the child has regained consciousness leave him/her on one side as one of the common side effects of glucagon is vomiting/nausea.

**Box 6. IV 10% Glucose**

If recovery is not adequate after a dose of glucagon, or if IV access is readily available, **AND** BG<4mmol/l, then administer 2 mls/kg 10% Dextrose as slow IV bolus. This can be repeated if required up to a maximum total of 5mls/kg.

**Box 7. Further Monitoring** after a severe hypoglycaemia:

- Check blood glucose after 5 minutes, 15 minutes and then half hourly until BG stable.
- Continue to monitor baseline observations: oxygen saturations, pulse, blood pressure, temperature
- Record presence or absence of ketones.
- Document management.
- Inform diabetes nurse when next available between 8am to 8pm. If there are concerns overnight between 8pm and 8am, discuss with the paediatric consultant on call who can contact Dr Mallam/Robertson if required.
- Do not omit normal insulin unless instructed to do so by diabetes team.
- If child not improving:
  - Suspend insulin pump if not already done so.
  - 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.

If blood glucose >4.0mmol/L and child able to tolerate oral fluids:

- **Restart insulin pump if it had been suspended and consider a temporary reduction in basal rate.**
- Offer clear fluids, and once tolerating clear fluids offer simple carbohydrates, such as toast, crackers (see box 4, [page 2](#))
- 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

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- **Restart insulin pump if it had been suspended and consider a temporary reduction in basal rate.**
- Offer clear fluids, and once tolerating clear fluids offer simple carbohydrates, such as toast, crackers (see box 4, [page 2](#))
- 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
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Compliance with guideline.</th>
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<tbody>
<tr>
<td>Lead</td>
<td>Audit lead</td>
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<tr>
<td>Tool</td>
<td>Audit and internal review.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Annually.</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Diabetes team.</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Diabetes team.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
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</tbody>
</table>

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Hypoglycaemia In Diabetes Child Health Clinical Guideline V5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>31/05/2018</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>31/05/2018</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>31/05/2021</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252802</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Guideline includes recognition and treatment of hypoglycaemia in diabetes- Child Health.</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Hypoglycaemia Diabetes Child</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT CPFT KCCG</td>
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<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>31/05/2018</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>CLINICAL GUIDELINE FOR HYPOGLYCAEMIA IN DIABETES-CHILD HEALTH V4.0</td>
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<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Diabetes consultants. Diabetes team. Directorate Audit and Guidelines meeting. Divisional Board 31 July 2018</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Tunde Adewopo</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed} Name: Caroline Amukusana</td>
</tr>
</tbody>
</table>
Signature of Executive Director giving approval

{Original Copy Signed}

Publication Location (refer to Policy on Policies – Approvals and Ratification):

Internet & Intranet ✓ Intranet Only

Document Library Folder/Sub Folder

Clinical / Paediatrics

Links to key external standards

None

Related Documents:

2. NICE (2015) Diabetes (type 1 and type 2) in children and young people. NICE guideline NG18 www.nice.org.uk/guidance/ng18

Training Need Identified? No

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tbody>
<tr>
<td>May 2012</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>F.Ackland, C.Burren. J.Edge, E.Hind, A.McAulay</td>
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<tr>
<td>August 2012</td>
<td>V2.0</td>
<td>Local adjustments</td>
<td>KMM, SJR, AE, TS,MS,PA,GB-Paediatric Diabetes Team.</td>
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<td>Sept 2013</td>
<td>V3.0</td>
<td>Re format only</td>
<td>Tabitha Fergus Deputy ward manager</td>
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<tr>
<td>10 Nov 2017</td>
<td>V4.0</td>
<td>No Changes</td>
<td>Katie Mallam</td>
</tr>
</tbody>
</table>
May 2018  V5.0

Updated in line with new guidance. NB alcohol, may be individualised, Box 1 treatments, IV 10% dextrose maximum 5mls/kg.
Minor amendment to title to meet requirements of Policy review group.


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This document is only valid on the day of printing

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Appendix 2. Initial Equality Impact Assessment Form

This assessment will need to be completed in stages to allow for adequate consultation with the relevant groups.

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Directorate and service area: Child Health</th>
<th>Is this a new or existing Policy? existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycaemia In Diabetes Child Health Clinical Guideline V5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of individual completing assessment: Katie Mallam</td>
<td></td>
<td>Telephone: 01872 252800</td>
</tr>
</tbody>
</table>

1. **Policy Aim***

   **Who is the strategy / policy / proposal / service function aimed at?**
   - Clear guidelines for recognition and treatment of hypoglycaemia in diabetes in child health.

2. **Policy Objectives***

   - Standardised care.

3. **Policy – intended Outcomes***

   - Standardised care.

4. **How will you measure the outcome?**

   - Audit

5. **Who is intended to benefit from the policy?**

   - Children and families. Medical and nursing staff.

6a. **Who did you consult with**

   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   - X

   **Please record specific names of groups**
   - Paediatric Guidelines Meeting
   - WCSH Divisional Board Meeting

b). **Please identify the groups who have been consulted about this procedure.**

   - Guideline agreed

What was the outcome of the consultation?

- Guideline agreed
7. The Impact
Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>X</td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Marriage and Civil partnership</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>x</td>
<td></td>
<td></td>
<td>No areas indicated</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended. Yes | No | X

9. If you are not recommending a Full Impact assessment please explain why.

No areas indicated
Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed Chris Warren

Date 31/05/2018