Ashford and St. Peter's Hospitals
NHS Foundation Trust

Paediatric Diabetes Department

Guidelines for the management of Hypoglycaemia in Children and Young People with Type 1 Diabetes Mellitus

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Guideline History		
Date	**Comments**	**Approved By**
September 2013	New Guideline	Paediatric Guidelines Group
October 2018	Whole document review	Paediatric Guideline Group
October 2021	Whole document review	Paediatric Guideline Group

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1. Guidelines for the management of Hypoglycaemia in Children and Young People with Type 1 Diabetes Mellitus

Introduction

To provide standardised, evidence-based management of hypoglycaemia in children and young people with Type 1 diabetes on insulin therapy.

Definition:

The definition of hypoglycaemia in children with diabetes is a blood glucose < 4.0 mmol/L.

"**4 is the floor**" in diabetic patients provides a vital safety margin. Do not confuse with the lower level of 2.6 mmol/L used for patients without diabetes.

Please do not diagnose hypoglycaemia from Continuous Glucose Monitors (CGM), hypoglycaemia must ALWAYS be confirmed on finger prick check!

Signs and Symptoms of Hypoglycaemia (Hypo):

A child/adolescent may exhibit some of the symptoms below, whilst others may have no symptoms:

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

*The list is not exhaustive and if you suspect a child/adolescent is experiencing a hypo, their capillary blood glucose **MUST** still be checked.*

"If in doubt, check it out"

It is important to explain to young people with Type 1 diabetes, the effects of alcohol consumption on blood glucose levels, in particular, the increased risk of hypoglycaemia including hypoglycaemia whilst sleeping.

Treatment of Hypoglycaemia:

If the child or young person is able to tolerate oral fluids / Glucogel, See Page 5
If Unconscious or fitting child requires parenteral therapy (IM glucagon or IV glucose), See Page 6

Also remember:

- Do not leave a child/adolescent with hypoglycaemia alone.
- Please inform Paediatric Diabetes Specialist Nurses *on extension 3314 or 6690* of any patients with diabetes presenting with hypoglycaemia to A&E, even if not admitted (**please note** - the PDSNs are not always in the office, so please leave a message if you do not directly speak a member of the Diabetes Team).
- If out of office hours, please email asp-tr.generalpaeddiabetes@nhs.net and leave a message on the PDSN office answerphone to inform them (extension 3314 or 6690).

Treatment of Hypoglycaemic Conscious Child

1. If child is co-operative and able to tolerate oral fluids:

Injections = Glucose tablets as per weight table below

Pump = If patient usually uses Glucose tablets or Lift drink then please give treatment as they would at home

If patient uses alternative treatment or is unsure regarding hypo treatment then please give glucose tablets as per weight table below

2. 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.**

<20kg – ½ tube

20-50kg – 1 tube

>50kg – 1 ½ tubes

Squirt tube contents in the side of each cheek (buccal) and massage gently from outside enabling glucose to be swallowed and absorbed quickly.

DO NOT use Glucogel® in an unconscious or fitting child.

After 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 still low (<4 mmol/l) after 3rd attempt of treatment & child still conscious – **bleep Registrar**
4. If child becomes unconscious or has a seizure then proceed to Box 4 (See Page 4)
5. If better and blood glucose > 4.0 mmol/L follow **Box 3** (see below)

***Stand alone Pump** = *if after 1st attempt - still low (<4 mmol/l) then disconnect pump for 30-60mins*

****If Hybrid Closed Loop (HCL) pump please do not disconnect unless discussed with diabetes team**

3. If feeling better and blood glucose level >4.0mmol/L, re-test **20-30 minutes** later to confirm target (>4.0mmol/L) is maintained:

Injections = Give slow acting carbohydrate snack (if pre-meal see below*):

- One slice of toast
- Small Banana
- A cereal bar (max 15g)
- One **plain** digestive or hobnob biscuit

Insulin Pump = No follow up snack required

***Hypo pre-meal** = Treat Hypo First! Once the blood glucose is >4.0 mmol/L - normal insulin dose should be given as usual. DO NOT OMIT INSULIN. Consider cause of hypoglycaemic episode?

Weight (kg)	**Dextrose Tablets (3.7g)**
10	1
20	2
30	3
40	4
50	5
60	6

Treatment of Hypoglycaemic Unconscious child

Follow this page if child unconscious or fitting (or if not responded from page 5)

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

- 2222 Priority Call
- Place in the recovery position if possible and assess ABC
- DO NOT attempt to give any oral fluid or Glucogel®
- If IV access is present, go straight to box 5 instead of box 4 below.

4. Give Glucagon (Glucagen) by Intramuscular injection

- 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 ml (half syringe)
Age > 8 yrs or body weight >25 kg: 1.0 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.

5. IV 10% Glucose

If recovery is inadequate after a dose of glucagon or IV access is readily available **AND** BG <4 mmol/l**: Give 2 mls/kg 10% Dextrose** as slow IV bolus.

***Note**: If alcohol is involved, glucagon may be ineffective (as hepatic stores of glycogen depleted) and intravenous glucose will be required.

Further Monitoring after severe Hypoglycaemia:

- Check blood glucose after 5 minutes, 15 minutes and then half hourly until BG stable above 5 mmol/l
- Continue to monitor baseline observations: oxygen saturations, pulse, blood pressure, temperature
- Record presence of or absence of ketones.
- Notify the Diabetes Team during working hours & liaise with on-call team as needed
- **Do not omit normal insulin**.

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

- Offer clear fluids, and once tolerating clear fluids, offer simple carbohydrates, such as toast, crackers (see box 3, page 5)
- Try to identify the cause of hypoglycaemia and discuss this with the patient/family
- Refer to the Diabetes team for review of treatment, advice or education.

If child not improving:

- Admit for IV fluids (5-10% dextrose saline)
- If a child/adolescent remains unconscious on correction of BG consider cerebral oedema, head injury, adrenal insufficiency or drug overdose.

2. Supporting References

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

ISPAD Clinical Practice Consensus Guidelines 2014. Assessment and management of hypoglycemia in children and adolescents with diabetes. Ly TT et al Pediatr Diabetes. 2014 Sep;15 Suppl 20:180-92. doi: 10.1111/pedi.12174. Epub 2014 Jul 12.

3. Supporting relevant trust guidelines

Guidelines for Sick Day Rules

4. Guideline Governance

a. Scope

This guideline is relevant to all staff caring for all children from 0-18 years old across the emergency department, inpatient ward and outpatient department.

b. Purpose

i. This guidelines aims to facilitate a common approach to the management of children. At times deviation from the guideline may be necessary, this should be documented and is the responsibility of the attending consultant.

ii. This guideline is subject to regular review to ensure ongoing evidence based practice.

c. Duties and Responsibilities

All healthcare professionals responsible for the care of all children 0-18years should be aware of practice according to this guideline.

d. Approval and Ratification

This guideline will be approved and ratified by the Paediatric Guidelines Group.

e. Dissemination and Implementation

i. This guideline will be uploaded to the trust intranet 'Paediatric Guidelines' page and thus available for common use.
ii. This guideline will be shared as part of ongoing education within the Paediatric Department for both medical and nursing staff.
iii. All members of staff are invited to attend and give comments on the guideline as part of the ratification process.

f. Review and Revision Arrangements

a. This policy will be reviewed on a 3 yearly basis by the appropriate persons.
b. If new information comes to light prior to the review date, an earlier review will be prompted.
c. Amendments to the document shall be clearly marked on the document control sheet and the updated version uploaded to the intranet. Minor amendments will be ratified through the Paediatric Guidelines Group. A minor amendment would consist of no major change in process, and includes but is not limited to, amendments to documents within the appendices.

g. Equality Impact Assessment

Background • Who was involved in the Equality Impact Assessment
Author and the supervising consultants.
Methodology • A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age) • The data sources and any other information used • The consultation that was carried out (who, why and how?)
All groups of staff and patients were taken into consideration and there is no bias towards or against any particular group.
Key Findings • Describe the results of the assessment • Identify if there is adverse or a potentially adverse impacts for any equalities groups
There is no evidence of discrimination.
Conclusion • Provide a summary of the overall conclusions
There is no evidence of discrimination.
Recommendations • State recommended changes to the proposed policy as a result of the impact assessment • Where it has not been possible to amend the policy, provide the detail of any actions that have been identified • Describe the plans for reviewing the assessment
This guideline is appropriate for use.

h. Document Checklist

To be completed (electronically) and attached to any document which guides practice when submitted to the appropriate committee for approval or ratification.

Title of the document: Guidelines for the management of Hypoglycaemia in Children and Young People with Type 1 Diabetes Mellitus

Policy (document) Author: Adapted by Dr Sonali D'Cruz (Consultant Paediatrician) and Dr Ellie Day (Paediatric Registrar)

Executive Director: N/A

		Yes/No/ Unsure/NA	Comments
1.	**Title**		
	Is the title clear and unambiguous?	**Yes**	
	Is it clear whether the document is a guideline, policy, protocol or standard?	**Yes**	
2.	**Scope/Purpose**		
	Is the target population clear and unambiguous?	**Yes**	
	Is the purpose of the document clear?	**Yes**	
	Are the intended outcomes described?	**Yes**	
	Are the statements clear and unambiguous?	**Yes**	
3.	**Development Process**		
	Is there evidence of engagement with stakeholders and users?	**Yes**	**Paediatric Guidelines Group in September 2013.**
	Who was engaged in a review of the document (list committees/ individuals)?	**Yes**	**Paediatric Guidelines Group in September 2013.**
	Has the policy template been followed (i.e. is the format correct)?	**Yes**	
4.	**Evidence Base**		

		Yes/No/ Unsure/NA	Comments
	Is the type of evidence to support the document identified explicitly?	**Yes**	
	Are local/organisational supporting documents referenced?	**Yes**	
5.	**Approval**		
	Does the document identify which committee/group will approve/ratify it?	**Yes**	
	If appropriate, have the joint human resources/staff side committee (or equivalent) approved the document?	**N/A**	
6.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	**Yes**	
	Does the plan include the necessary training/support to ensure compliance?	**Yes**	
7.	**Process for Monitoring Compliance**		
	Are there measurable standards or KPIs to support monitoring compliance of the document?	**Yes**	
8.	**Review Date**		
	Is the review date identified and is this acceptable?	**Yes**	
9.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for coordinating the dissemination, implementation and review of the documentation?	**Yes**	**Clinical Lead, Paediatric Diabetes Service**

		Yes/No/ Unsure/NA	**Comments**
10.	**Equality Impact Assessment (EIA)**		
	Has a suitable EIA been completed?	**Yes**	

Committee Approval (Paediatric Guidelines Group)			
If the committee is happy to approve this document, please complete the section below, date it and return it to the Policy (document) Owner			
Name of Chair	**Dr Claire Mitchell**	**Date**	**01/12/2021**
Ratification by Management Executive (if appropriate)			
If the Management Executive is happy to ratify this document, please complete the date of ratification below and advise the Policy (document) Owner			
Date: n/a			