Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

PAEDIATRICS

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

NATIONAL CLINICAL GUIDELINE

Title: Identification and Management of Hypoglycaemia in Children with Type 1 Diabetes

Clinical Strategy and Programmes Office

Health Service Executive

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1 Aim of Guideline

The aim of this guideline is to provide clear and standardised guidelines for all staff caring for paediatric patients with type 1 diabetes in relation to the recognition and management of hypoglycaemia.

2 Purpose and Scope

2.1 The purpose of this guideline is to improve the management of paediatric hypoglycaemia in insulin treated patients. It applies to children with diabetes on insulin therapy with a blood glucose ≤3.9 mmol/L.

2.2 This guideline is intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services. It is designed to guide clinical judgement but not replace it.

2.3 In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the child.

3.0 Background and Introduction

3.1 Hypoglycaemia is the most frequent acute complication of type 1 diabetes either due to excess insulin or illnesses causing nausea, vomiting or diarrhoea and decreased oral intake.

3.2 Prolonged or recurrent hypoglycaemia, especially when associated with symptoms and signs can cause long term neurological damage or death. Thus, prompt recognition and treatment are essential.

4.0 Legislation/other Related Policies

4.1 Model of Care for All Children and Young People with Type 1 Diabetes (2015)

http://www.hse.ie/eng/about/Who/clinical/natclinprog/paediatricsandneonatology/paedsmoc.pdf

5.0 Glossary of terms and definitions

BG	Blood Glucose
CHO	Carbohydrate
CSII	Continuous Subcutaneous Insulin Infusion (pump therapy)
Hypoglycaemia	For the purpose of this guideline hypoglycaemia is defined as children with diabetes and on insulin therapy with a blood glucose ≤3.9 mmol/L

6.0 Roles and Responsibilities

6.1 This guideline should be reviewed by each hospital's senior management team to appropriately plan implementation. This will ensure that the inpatient care of children/neonates admitted to their facility is optimised irrespective of location.

7.0 Clinical Guideline

The goal is to return the blood glucose level to normal (target 5.5 mmol/L) identify cause and plan to prevent recurrence of hypoglycaemia

7.1 Identify the severity of hypoglycaemia episode:

7.1.1 *Mild (adrenergic response only)*

- tremor
- sweating
- hunger
- palpitations
- pallor

7.1.2 *Moderate (plus neuro-glycopenic symptoms)*

- headache
- confusion
- irritability
- sleepiness
- weakness

7.1.3 *Severe (loss of consciousness)*

- coma or seizures

7.2 Immediate management

7.2.1 *Mild*

7.2.1.1 Give glucose drink (not Diet drink) or glucose tablets that will give patient approx. 0.3 g/kg (10gms Carbohydrate for child less than 35 kg child and 15 g for child greater than 35 kg child) – see Table 1.

Table 1. Treatment of Mild/Moderate Hypoglycemia

Quick Acting Carbohydrate Amount	**Approximate Volume to be given**	
Drinks	***10gms***	***15gms***
Orange Juice *(10.7gms/100ml)*	90mls	140mls
Apple Juice *(11gms/100ml)*	90mls	140mls
Soft drink e.g. 7 UP *(11gms/100ml)*	90mls	140mls
	Amount to be given	
Sweets	***10gms***	***15gms***
Dextrose Energy Tablets *(3gms/tab)*	3.5	5
Glucotabs *(4gms/tab)*	2.5	4
Bassetts Jelly Babies *(5gms/tab)*	2	3
Maynards Wine Gums *(3.5gms/tab)*	3	4

7.2.1.2 Re check in 10-15 mins; repeat above if BG is not > 4mmol/L

7.2.1.3 **Give a snack of approx 10-15 gram complex CHO (e.g. banana, 2 biscuits) to prevent recurrence of hypoglycaemia (if event is not at a mealtime)**

7.2.1.4 Glucogel can be very useful in young children who may not agree to take a drink (on command) **but should never be used if patient is unconscious/obtunded due to risk of aspiration**

7.2.2 Moderate

7.2.2.1 Glucogel tube x 1-2 (10g CHO per tube)
Glucogel should never be used if patient is unconscious/obtunded due to risk of aspiration

7.2.2.2 Then treat as above with glucose drink + snack of approx. 15-20 g CHO (e.g. banana, 2 digestive biscuits)

7.2.2.3 Repeat this after 10-15 mins if BG is not > 4mmol/L

7.2.3 Severe

GLUCAGON
0.1-0.3 mg/kg to a maximum of 1.0 mg im/sc **without delay**. Age < 12 years : ½ vial= 0.5mg Age > 12 years : full vial= 1mg

7.2.3.1 If IV line in situ (in hospital) give 2 ml/kg 10% dextrose over 10 minutes IV

7.2.3.2 May vomit after glucagon in recovery phase

7.2.3.3 An episode of severe hypoglycaemia requiring glucagon requires evaluation in ED

7.3 Why did hypoglycaemic episode occur?

7.3.1 It is important to identify why hypoglycaemic episode occurred. Common causes include delayed meal/snack, insufficient carbohydrate consumed, exercise, illness with decreased absorption (gastroenteritis).

7.3.2 Evaluate the hypo-awareness of the child and provide tailored re-education if required.

7.3.3 Insulin dose adjustment may be required. This must be done in conjunction with the diabetes team or local paediatrician. Decrease appropriate insulin dose by approximately 10% next day if hypoglycaemic episode is unexplained

7.4 Recurrent hypoglycaemia

7.4.1 Consider rarer causes:

- Addison's disease
- Coeliac disease
- Alcohol
- Undisclosed self-administration of insulin

7.5 Management of Hypoglycaemia on CSII

7.5.1 Hypoglycaemia may also occur in children using insulin pumps.

7.5.2 Treatment is with fast acting carbohydrates (e.g. 100 mls juice or non- diet soft drink) or glucogel as per 7.2.2.1. and recheck in 10 mins to ensure blood glucose has normalised

7.5.3 When using a pump, a follow up carb containing snack (like a banana or 2 plain biscuits) is **not** generally required.

7.5.4 Carbohydrate eaten post hypo when BG has returned to the normal range must be bolused for.

7.5.6 Severe hypoglycaemia with seizure is unusual in children using pumps but should be managed as for all insulin treated children see 7.2.3

7.5.7 Pump suspension pending normalisation of BG level may be considered in this unusual scenario.

8.0 Implementation Revision and Audit

8.1 Distribution to the CEO of each Hospital Group for dissemination through line management in all acute hospitals within their group.

8.2 Implementation through Senior Management Teams of each acute hospital.

8.3 Distribution to other interested parties and professional bodies

8.4 The NCPPN Diabetic Working group has agreed that this guideline will be reviewed on a 3 yearly basis.

8.5 Regular audit of implementation and impact of this guideline through outcome and process measures is recommended to support continuous quality improvement. It is the responsibility of each unit providing care for children with diabetes and intercurrent illness to audit the unit practise regularly in order to ensure that care in being provided in line with guidelines and that any deviations are clinically justified. The audit process should be coordinated in each paediatric unit under local paediatric clinical governance and should be taken from a multidisciplinary perspective where appropriate. Where the audit identifies areas for practise improvement, it is the responsibility of each individual unit to implement changes and re-audit to support continuous quality improvement.

9.0 References

International Society for Paediatric and Adolescent Diabetes (2014) ISPAD Clinical Practice Consensus Guidelines 2014.
http://www.ispad.org/?page=ISPADClinicalPract

British Society of Paediatric Endocrinology and Diabetes (2012) BSPED Recommended DKA Guidelines 2012

10.0 Qualifying Statement

10.1 These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach.

10.2 Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each child.

10.3 Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

10.4 This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:

- Discussing care with the child, parents/guardians and in an environment that is appropriate and which enables respectful confidential discussion.
- Advising children, parents/guardians of their choices and ensure informed consent is obtained.
- Meeting all legislative requirements and maintaining standards of professional conduct.
- Applying standard precautions and additional precautions, as necessary, when delivering care.
- Documenting all care in accordance with local and mandatory requirements.

11.0 Appendices

11.1 Appendix 1

Acknowledgements

This guideline has been developed by the National Clinical Programme for Paediatrics and Neonatology Diabetes Working Group. The members of this group include medical, nursing and dietetic representatives from paediatric diabetes services. The Diabetes Working Group also wish to thank those who provided input and feedback on draft versions of this guideline throughout development, and those who provided valuable input during the consultation process.

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11.2 Appendix 2

Sign Off

Sign off by Paediatric Diabetes Working Group	December 2018
Sign off by Paediatric Clinical Advisory Group	
Sign off by HSE CSPD Senior Management Team	