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Quick reference guide

Type 1 diabetes: diagnosis and management of type 1 diabetes in children and young people

Update, June 2009

We have updated our guidance on screening for other conditions in children and young people with type 1 diabetes (pages 3 and 5); we have removed the recommendation to re-test for coeliac disease at least every 3 years after diagnosis. This update follows the development of 'Coeliac disease: recognition and assessment of coeliac disease' (NICE clinical guideline 86, 2009).

The changes are shown in this document as greyed out text.



Clinical Guideline 15

Developed by the National Collaborating Centre for
Women's and Children's Health

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Scope of the guideline

This quick reference guide summarises the recommendations in the NICE guideline for the care of children and young people with type 1 diabetes. The NICE guideline (www.nice.org.uk/CG015NICEguideline) also contains recommendations for the care of adults with type 1 diabetes, which are summarised in a separate quick reference guide (see www.nice.org.uk/CG015adultsquickrefguide).

Note

In this guideline, the following terms are used to refer to specific age groups:

- children – people younger than 11 years
- young people – people aged 11–17 years.

Where children are too young to make informed decisions, their treatment and care should be discussed in consultation with their parents (or legal guardians). Some aspects of care will also require discussion with, or provision of information for, other family members (such as siblings) and carers who are not part of the family (for example, child minders and school staff).

This guidance is written in the following context:

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Management from diagnosis

Children and young people with type 1 diabetes should be offered an ongoing integrated package of care by a multidisciplinary paediatric diabetes care team. To optimise the effectiveness of care and reduce the risk of complications, the diabetes care team should include members with appropriate training in clinical, educational, dietetic, lifestyle, mental health and foot care aspects of diabetes for children and young people.

At the time of diagnosis, children and young people with type 1 diabetes should be offered home-based or inpatient management according to clinical need, family circumstances and wishes, and residential proximity to inpatient services. Home-based care with support from the local paediatric diabetes care team (including 24-hour telephone access to advice) is safe and as effective as inpatient initial management.

Education

Children and young people with type 1 diabetes and their families should be offered timely and ongoing opportunities to access information about the development, management and effects of type 1 diabetes. The information provided should be accurate and consistent and it should support informed decision-making.

Monitoring glycaemic control

Children and young people with type 1 diabetes and their families should be informed that the target for long-term glycaemic control is an HbA_{1c} level of less than 7.5% without frequent disabling hypoglycaemia and that their care package should be designed to attempt to achieve this.

Diabetic ketoacidosis

Children and young people with diabetic ketoacidosis should be treated according to the guidelines published by the British Society for Paediatric Endocrinology and Diabetes (see page 5).

Screening for complications and associated conditions

Children and young people with type 1 diabetes should be offered screening for:

- coeliac disease at diagnosis ~~and at least every 3 years thereafter until transfer to adult services~~
- thyroid disease at diagnosis and annually thereafter until transfer to adult services
- retinopathy annually from the age of 12 years
- microalbuminuria annually from the age of 12 years
- blood pressure annually from the age of 12 years.

Psychosocial support

Children and young people with type 1 diabetes and their families should be offered timely and ongoing access to mental health professionals because they may experience psychological disturbances (such as anxiety, depression, behavioural and conduct disorders and family conflict) that can impact on the management of diabetes and well-being.

This quick reference guide should be interpreted, where necessary, with reference to the full guideline (see *Further information* for details).

Diagnosis and management of type 1 diabetes in children and young people

Diagnosis

World Health Organization 1999 criteria*:

- hyperglycaemic (random blood glucose more than 11 mmol/litre)
- polyuria
- polydipsia
- weight loss

* World Health Organization (1999). Surveillance, definition, diagnosis and classification of diabetes mellitus and its complications. (http://whqlibdoc.who.int/hq/1999/WHO_NCD_NCS_99.2.pdf)

Insulin preparations and regimens

Preparation	Onset	Duration
Rapid-acting analogues*	15 minutes	2–5 hours
Short-acting	30–60 minutes	up to 8 hours
Intermediate-acting	1–2 hours	16–35 hours
Long-acting analogues	1–2 hours	> 24 hours

*Optimally given before eating but can be given just after eating if eating habits are erratic (children under 5 years)

Regimens

- 1, 2 or 3 injections per day: rapid- or short-acting insulin premixed or self-mixed with intermediate-acting insulin before meals with intermediate- or long-acting insulin
- MDI regimen: rapid- or short-acting insulin before meals with intermediate- or long-acting insulin
- Insulin pump therapy (CSII)

Young people:

- Offer MDI as part of an integrated package of care if MDI fails (impossible to maintain HbA_{1c} less than 7.5% without disabling hypoglycaemia):
- Offer CSII (requires commitment and competence to use it effectively)
- Consider 1, 2 or 3 injections per day

Children under 11 years:

- Offer most appropriate regimen to optimise glycaemic control

Immediate management

- Urgent (same-day) referral to multidisciplinary paediatric diabetes care team
- Involve the child/young person and family in making decisions
- Offer home-based initial management with 24-hour access to advice from care team
- Offer inpatient care if child/young person has diabetic ketoacidosis, is less than 2 years old, has social or emotional difficulties, or if family lives a long way from hospital
- Offer MDI regimens to young people (11 years or older; see below for under 11 years)
- Aim to optimise glycaemic control (see below)
- Offer education about: insulin; monitoring glycaemic control; effects of diet, exercise and intercurrent illness on glycaemic control; and avoidance, detection and management of hypoglycaemia
- Screen for coeliac disease and thyroid disease

Monitoring glycaemic control

- Short-term**
- Use frequent self-monitoring of blood (not urine) glucose
 - Aim for pre-prandial blood glucose 4–8 mmol/litre and post-prandial blood glucose less than 10 mmol/litre
 - Adjust insulin dose according to the trend in pre-prandial, bedtime and night-time blood glucose measurements if on 2 injections per day
 - Adjust insulin dose after each pre-prandial, bedtime or night-time blood glucose measurement if appropriate when on MDI regimen
 - Measure blood glucose more than 4 times/day during intercurrent illness or if trying to optimise glycaemic control
- Offer blood glucose monitor with memory and encourage use of a diary

Long-term

- Use HbA_{1c} (test 2–4 times/year or more frequently if poor glycaemic control)
 - Aim for HbA_{1c} less than 7.5% without frequent disabling hypoglycaemia
 - Current HbA_{1c} should be available at clinic visits
 - Offer additional support if HbA_{1c} is consistently more than 9.5%
- Aiming for low HbA_{1c} increases risk of hypoglycaemia but high HbA_{1c} increases risk of long-term microvascular complications

Education

- Ongoing education with access to information and opportunities for discussion at clinic visits
- Tailor according to maturity, culture, existing knowledge and wishes of child/young person and family
- Explain effects of alcohol, smoking and substance misuse on glycaemic control and vascular complications

Exercise

- Encourage exercise and participation in sports
- Advise on effects of exercise on blood glucose
- Prevent exercise-induced hypoglycaemia by monitoring blood glucose levels before and after exercise and making appropriate changes in insulin/food intake

Diet

- Advise on effects of nutritional changes on glycaemic control
- Give support to help optimise weight
- Discuss timing and composition of snacks and problems associated with fasting and feasting
- MDI regimens: adjust insulin to carbohydrate intake

Ongoing care

Offer an integrated package of care from a **multidisciplinary paediatric diabetes care team** with training in clinical, educational, dietary, lifestyle, mental health and foot care aspects of diabetes in children and young people

At every clinic visit

- ✓ Measure HbA_{1c} (ensure current level is available for use in the clinic)
- ✓ Check injection sites
- ✓ Measure height and weight and calculate body mass index

Once a year

- ✓ Check for retinopathy, microalbuminuria and blood pressure from 12 years
- ✓ Screen for thyroid disease
- ✓ Review foot care

Every 3 years

- ✓ Screen for coeliac disease

Dental and eye examinations as for other children/young people
Do not screen for blood lipids or neurological function
Consider juvenile cataracts, necrobiosis lipidica and Addison's disease at clinic visits

Intercurrent illness

- Offer guidance – often known as 'sick day rules'
- Offer blood/urine ketone testing strips

Surgery

- Only in centres with facilities for care of children/young people with diabetes
- Agree protocol for safe management

Communication between organisations

- Inform children/young people and families about diabetes support groups
- Regular liaison between diabetes care teams and school staff

Transition to adult care

- Agree protocols for transfer from paediatric to adult services
- Organise age-banded clinics and joint clinics with adult services
- Encourage attendance 3 or 4 times/year
- Allow time for young people to familiarise themselves with the practicalities of transition
- Timing depends on physical development, emotional maturity, stability of health, other life changes and local circumstances
- Offer advice on aspects of care that change with transfer to adult services (targets for short-term glycaemic control and screening for complications)

Key: CSII, continuous subcutaneous insulin infusion; HbA_{1c} glycosylated haemoglobin; MDI, multiple daily injection

Complications

Hypoglycaemia

- Reduce risk by having rapid access to carbohydrate and blood glucose monitoring equipment
- Wear or carry type 1 diabetes identification
- Offer glucagon and educate carers on emergency use

Mild to moderate hypoglycaemia (aware and responds to symptoms):

- Immediately consume rapidly absorbed simple carbohydrate
- As symptoms improve or normoglycaemia is restored consume complex long-acting carbohydrate
- Recheck blood glucose within 15 minutes

Severe hypoglycaemia (unable to respond, semi-conscious/unconscious and requires assistance):

- Use 10% intravenous glucose if in a hospital setting
- Use intramuscular glucagon or concentrated oral glucose solution outside hospital or when intravenous access not practical
- As symptoms improve or normoglycaemia is restored consume complex long-acting carbohydrate (if sufficiently awake)
- Repeat blood glucose measurements to check if further glucose is needed
- Seek medical assistance if child/young person fails to respond or symptoms persist for more than 10 minutes

Diabetic ketoacidosis

- Follow British Society for Paediatric Endocrinology and Diabetes guidelines (see page 5)
- Initial management in a high-dependency unit or bed on a children's ward
- Manage in a paediatric intensive care unit if deteriorating consciousness, suspected cerebral oedema, inappropriate response to treatment or age less than 2 years
- Children who are clinically well but with hyperglycaemia, blood pH less than 7.3 and less than 5% dehydrated may respond to oral rehydration, frequent subcutaneous insulin injections and blood glucose monitoring

Psychological/social issues

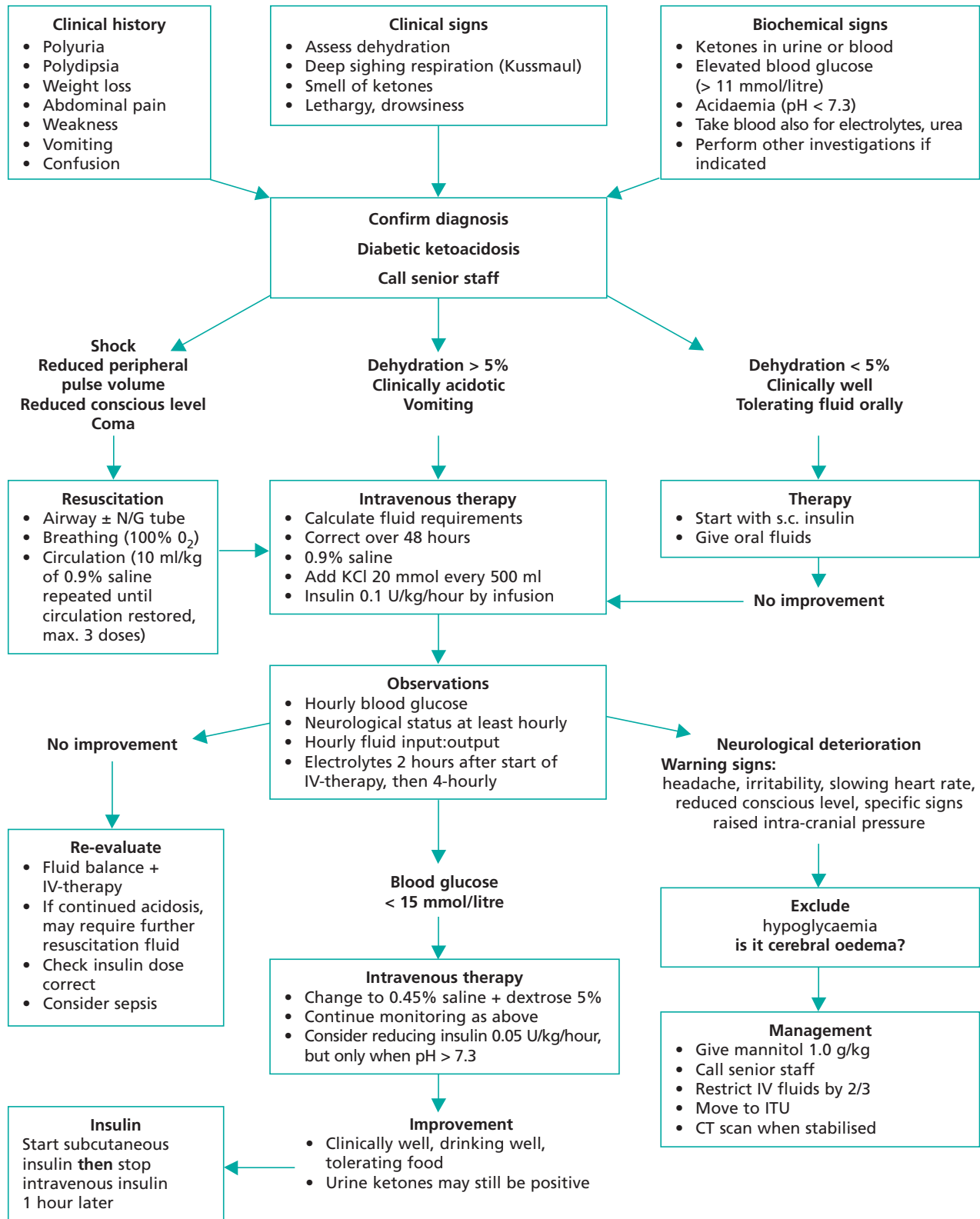
Complications:

- Emotional and behavioural problems (including family conflict)
- Anxiety and depression
- Eating disorders
- Cognitive disorders
- Behavioural and conduct disorders
- Non-adherence to therapy

Psychosocial support:

- Offer timely and ongoing access to mental health professionals
- Offer structured behavioural intervention strategies and support strategies for reducing diabetes-related family conflict
- Offer young people mentoring and self-monitoring of blood glucose levels supported by problem solving

Algorithm for the management of diabetic ketoacidosis*



*Adapted from *BSPED Recommended DKA guidelines. Guidelines for the management of diabetic ketoacidosis 2004* (British Society for Paediatric Endocrinology and Diabetes), copyright 2004, with permission from the British Society for Paediatric Endocrinology and Diabetes.

Implementation

Local health communities should review their existing practice for type 1 diabetes against this guideline. The review should consider the resources required to implement the recommendations set out in Section 1 of the NICE guideline, the people and processes involved and the timeline over which full implementation is envisaged. It is in the interests of children and young people with type 1 diabetes that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

This guideline should be used in conjunction with the National Service Framework for Diabetes (available from www.doh.gov.uk/nsf/diabetes/index.htm) and the Children's National Service Framework (available from www.doh.gov.uk/nsf/children/index.htm).

Further information

Distribution

This quick reference guide to the Institute's guideline on type 1 diabetes contains the key priorities for implementation, summaries of the guidance, and notes on implementation. The distribution list for this quick reference guide is available from www.nice.org.uk/CG015childrendistributionlist.

NICE guideline

The NICE guideline, *Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults*, is available from the NICE website (www.nice.org.uk/CG015NICEguideline).

The NICE guideline contains the following sections: Key priorities for implementation; 1 Guidance; 2 Notes on the scope of the guidance; 3 Implementation in the NHS; 4 Research recommendations; 5 Full guideline; 6 Related NICE guidance; 7 Review date. It also gives details of the grading scheme for the evidence and recommendations, the Guideline Development Groups, the Guideline Review Panels and technical detail on the criteria for audit.

A quick reference guide for the diagnosis and management of type 1 diabetes in adults is available from the website (www.nice.org.uk/CG015adultsquickrefguide) or from the NHS Response Line (see below for ordering information).

Full guideline

The full guideline includes the evidence on which the recommendations are based, in addition to the information in the NICE guideline. It is published

by the National Collaborating Centre for Women's and Children's Health. It is available from www.rcog.org.uk/mainpages.asp?PageID=117, www.nice.org.uk/CG015childrenfullguideline and on the website of the National Electronic Library for Health (www.nelh.nhs.uk).

Information for the public

NICE has produced a version of this guidance for the families and carers of children with type 1 diabetes, young people with type 1 diabetes, and the public. The information is available, in English and Welsh, from the NICE website (www.nice.org.uk/CG015childrenpublicinfo). A version of the guidance for adults with type 1 diabetes, their families and carers, and the public is also available from the NICE website (www.nice.org.uk/CG015adultspublicinfo). Printed versions are also available – see below for ordering information.

Related guidance

NICE has issued technology appraisal guidance on the use of long-acting insulin analogues for the treatment of diabetes, the use of continuous subcutaneous insulin infusion for diabetes, and the use of patient education models in diabetes. NICE has also issued a series of guidelines on the management of type 2 diabetes. For information about NICE guidance on diabetes that has been issued or is in development, see www.nice.org.uk

Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

Ordering information

Copies of this quick reference guide can be obtained from the NICE website at www.nice.org.uk/CG015childrenquickrefguide or from the NHS Response Line by telephoning 0870 1555 455 and quoting reference number N0622. Information for the public (guidance on the management of type 1 diabetes in children and young people) is also available from the NICE website or from the NHS Response Line (quote reference number N0623 for the English version and N0560 for the version in English and Welsh).

The quick reference guide for the diagnosis and management of type 1 diabetes in adults is available from the NICE website (www.nice.org.uk/CG015adultsquickrefguide) or from the NHS Response Line (quote reference N0558). Information for the public is available from the NICE website or from the NHS Response Line (quote reference N0559 for a version in English and N0624 for a version in English and Welsh).

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