

Global Guideline

for Type 2 Diabetes

Chapter 18: Children

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Recommendations

■ Standard care

CH1 Diagnose symptomatic children using plasma glucose and WHO 1999 criteria [1].

CH2 Attempt to assign type of diabetes, using history and physical examination, including weight, BMI, urine ketones, pH, electrolytes.

When the diabetes appears to be Type 2 diabetes, remain alert to the possibility and associated risks of Type 1 diabetes or MODY.

Where differentiation is uncertain, islet-cell related antibodies and C-peptide estimation may add further information.

CH3 Provide initial care appropriate to age and developmental stage, including lifestyle counselling, diabetes education with the family, blood glucose monitoring, management with insulin or oral agents (metformin) according to clinical features, and psychological assessment.

CH4 Provide continuing care and support including:

- lifestyle measures in the context of the family
- self-monitoring of blood glucose, with attention to continuity from the management team, and to ensure care for diabetes at school
- HbA_{1c} every 2-6 months (see *Clinical monitoring*).

CH5 Arrange annual surveillance including weight and height, BMI, blood pressure, urine protein and albumin, eye review.

■ Comprehensive care

CH_c1 Screening might also be extended to asymptomatic children who are at high risk in the particular population (criteria might include BMI, family history, age, race/ethnicity, insulin resistance as evidenced by acanthosis nigricans).

CH_c2 Attempts to assign the type of diabetes after diagnosis could also include more routine testing for islet-cell related antibodies and C-peptide, and HNF and glucokinase genotyping.

CH_c3 Initial care will be as for *Standard care*, while continuing care may also include routine psychosocial support; ongoing surveillance may include lipid profile.

■ Minimal care

CH_M1 Diagnose symptomatic children by urine glucose or capillary plasma glucose.

CH_M2 Attempt to assign type of diabetes by history and physical examination assessing weight, BMI, blood pressure, and urine ketones.

CH_M3 Initial care should include lifestyle information, diabetes education with the family, monitoring of blood glucose, and management with insulin and/or metformin according to clinical features.

CH_M4 Provide continuing care including:

- lifestyle measures in the context of the family
- advice to the school on dealing with emergencies and avoiding discrimination.

CH_M5 Surveillance will include weight, height, BMI, blood pressure, urine protein, and eye review.

Rationale

Type 2 diabetes in children is increasing in many populations around the world. Affected children may have a positive family history of Type 2 diabetes, and in most cases the BMI is above the 85th percentile for gender and age, defined as overweight. However, this is not universal, notably in some Asian and Oriental populations. Overweight in childhood is associated with poverty in relatively developed areas but with affluence in developing areas of the world. Type 2 diabetes in children is a severe disease with very poor outcomes over 10-20 years. It is associated with significant islet B-cell failure as well as insulin resistance, and is at least as demanding to manage as Type 1 diabetes in children. Children with Type 2 diabetes are more at risk of hypertension, dyslipidaemia and polycystic ovarian syndrome than those with Type 1 diabetes.

Evidence-base

It is only relatively recently that the emergence of Type 2 diabetes in children has been recognized. In European populations Type 1 diabetes remains the predominant form in children, but in Japanese populations 80 % of childhood diabetes is Type 2 diabetes, and the condition is increasing in incidence and prevalence in many parts of the world. It is usually diagnosed after the age of 10 yr, in mid- to late-puberty, with the reduced insulin sensitivity of puberty

apparently playing a role [2]. The evidence-base remains limited, and only the Canadian guideline deals specifically with the condition [3]. There is a NICE guideline on Type 1 diabetes in children, and this refers briefly to the need to distinguish children with Type 2 diabetes [4]. Many of the global issues, and the paucity of evidence, were considered at an IDF meeting in 2003 [5], while the topic has been addressed in a number of US publications [6-10].

Use of adult diagnostic criteria [1] reflects lack of other evidence and the problems of staging and normative values in the 10- to 13-year age group. The Canadian guideline states that insulin is required when there is severe metabolic decompensation at diagnosis (ketoacidosis, HbA_{1c} ≥9.0 %, symptoms of severe hyperglycaemia); otherwise the recommended initial treatment is intensive lifestyle intervention, adding metformin as first-line therapy if glycaemic targets are not achieved [3]. An algorithm devised by Silverstein and Rosenbloom in a review of North American practice [6] suggests that in those started on insulin (plus lifestyle) achievement of a DCCT-aligned HbA_{1c} <7.0 % allows tapering of insulin dose with addition of metformin, and attempts to 'wean off' insulin. However, the evidence-base for treatment is very limited, with data on insulin use mainly from Type 1 diabetes. The Canadian guideline cites evidence for efficacy and safety of metformin (over 16 weeks) in adolescents with Type 2 diabetes, and draws attention to the contra-indications in the case of kidney or liver disease [3].

The gastro-intestinal side-effects of metformin are poorly tolerated by children and adolescents, yet other oral glucose-lowering options have barely been explored.

Recommendations on surveillance for complications reflect evidence on microvascular complications in Pima Indian and Japanese populations, cited in the Canadian guideline [3]. The risks of pregnancy in this age-group need to be borne in mind in relation to drug therapy.

Consideration

Health-care professionals dealing with children need to be alert to the possibility of Type 2 diabetes, and aware of the seriousness of the condition. Most of these children are overweight at diagnosis, and most are in families with others who are overweight and at risk of Type 2 diabetes, so advice on lifestyle modification can usefully involve the whole family.

Implementation

A continuing integrated package of care should be offered by a multidisciplinary paediatric diabetes team, trained in the difficult area of distinguishing Type 2 diabetes in children, outlining the pathways of care, and dealing with the possibility of multiple medication. Structured records and recall systems are essential, as is the need to address the transition to adult diabetes care services.

Evaluation

Systematic evaluation of an emerging epidemic will include, at all levels, numbers of patients, medications given, and complications at diagnosis. Standard care should also include documentation of BMI, glycaemic control, and complications on follow-up, while comprehensive care should additionally evaluate efficacy of treatment, cost, and criteria used for diagnosis.

References

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