Clinical guideline on practical management of type 2 diabetes in children and young people

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The Association of Children's Diabetes Clinicians (ACDC) recently published the clinical guideline, *A practical approach to management of type 2 diabetes in children and young people (CYP) under 18 years*, in collaboration with the Type 2 National Working Group (ACDC, 2021). It aims to provide a practical and holistic approach towards managing type 2 diabetes (T2D) in CYP.

T2D in young people is an aggressive disease with an increased risk of complications, which can result in greater morbidity and mortality during the most productive years of life (Viner et al, 2017). T2D is increasingly prevalent in CYP, the impact of an increase in obesity worldwide (Reilly, 2010).

Screening and diagnosis

The ACDC guideline recommends asymptomatic screening for T2D in individuals with a high body mass index (BMI >85th centile) and one or more risk factor. Risk factors include first- or second-degree family history of type 2 diabetes, high-risk ethnicity, maternal gestational diabetes or insulin resistance (acanthosis nigricans or presence of other metabolic conditions, such as hypertension and hyperlipidaemia, polycystic ovary syndrome or small-for-gestational-age babies).

If a diagnosis is suspected based on clinical symptoms, a point-of-care random blood glucose must be performed on the same day and abnormal results discussed with the local diabetes team via locally agreed pathways. Diagnosis can be made based on fasting glucose, a 2-hour glucose concentration during an oral glucose tolerance test or an HbA_{1c}.

Once the diagnosis of diabetes is made, the type of diabetes should be diagnosed clinically based on signs and symptoms, biochemical investigations, family history and clinical progression. Monogenic diabetes must be considered, especially where the clinical picture is atypical for type 1 or 2. Where there is diagnostic doubt, the CYP should receive appropriate safety-netting for the possibility of evolving type 1 diabetes (including blood ketone testing) and be re-evaluated after a short period of time.

Diabetes autoantibody testing, such a glutamic acid decarboxylase [GAD], islet antigen-2 [IA-2] and zinc transporter 8 [ZnT8], should be considered in CYP with a clinical diagnosis of T2D. This is due to the high frequency of islet cell autoimmunity in otherwise "typical" T2D and where there is diagnostic uncertainty. Those with diabetes antibodies are more likely to need insulin early.

Monitoring

It is recommended that HbA_{1c} should be measured every 3 months in CYP with T2D. Treatment should be intensified if HbA_{1c} does not fall below 48 mmol/mol (6.5%) at 3 months. HbA_{1c} targets should be individualised after the first 3 months, with an aim of <48 mmol/mol (6.5%). The TODAY study showed that an HbA_{1c} of 45 mmol/mol (6.3%) or more after initiation of metformin was shown to be a predictor of eventual loss of glycaemic control; for every 0.1% increase in HbA_{1c}, there was a 16% increase in risk of loss of glycaemic control, with a median time to loss of control of approximately 11 months, irrespective of treatment arm (Zeitler et al, 2015). In addition, high HbA_{1c} was associated with increased risk of retinopathy (Today Study Group, 2013).

Education and support

All CYP should be taught how to monitor their blood glucose levels and should be provided with necessary equipment. Individualised circumstances should be considered when advocating the use of continuous or flash glucose monitoring systems, which have not been recommended for routine use in CYP with T2D.

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Multidisciplinary team approach

The guideline has recommended a multidisciplinary team (MDT) approach to support management in CYP with T2D. A team involving a dietitian, specialist nurse and psychologist support is key to improving outcomes. T2D should be managed in the secondary care setting, with close integration with primary care. Primary care should also be involved in the child's care in line with a whole-family approach. Additional resources, such as social prescribing and exercise prescription, are also useful. Multi-agency working should be included in the MDT approach. Emphasis on collaboration with an adult diabetes MDT team is essential, ideally through a young adult service, to enable seamless transition and provide support with complex cases.

Diabetes education

Individualised structured diabetes education should be provided to CYP with T2D and their carers at the time of diagnosis. This should then be revised soon after diagnosis, then annually or more frequently dependent on individual need. TODAY Standard Diabetes Education and iCAN are two existing programmes that can be used.

Treatment considerations

Weight reduction

Weight reduction as part of a strategy to reduce BMI should form part of diabetes management in CYP with T2D, as this has been associated with better glycaemic outcomes. CYP with T2D should be offered a family-based weight loss programme based on a range of personalised diet strategies, physical activity and behavioural interventions to treat obesity. An individualised and family-wide approach to dietary modification is essential. A specialised paediatric diabetes dietitian should work together with the family to identify potential diet and lifestyle changes and formulate a plan with SMART goals.

Physical activity levels recommended for CYP with T2D are the same as for those without T2D (60 minutes per day of moderate/vigorous physical activity to improve body composition and insulin sensitivity). Physical activity is likely to have multiple beneficial effects on health beyond glycaemic control.

Mental health

The SEARCH study reports that young people older than 10 years of age with T2D have a much higher risk of moderate-to-severe depression than young people with type 1 diabetes (Hood et al, 2014). It is recommended that CYP must have ongoing access to mental health professionals who are involved with the diabetes team. There should also be regular mental health screening for CYP with T2D.

Medication

The guideline recommends the use of metformin as first-line treatment in metabolically stable individuals (HbA_{1c} <69.4 mmol/mol [8.5%]). The goal of treatment should be to attain HbA_{1c}<48 mmol/mol (6.5%). It is advised that liraglutide should be added to metformin before considering the use of insulin. Basal insulin should be started in newly diagnosed CYP if their HbA_{1c} is >69 mmol/mol (8.5%), with an aim of weaning insulin once target HbA_{1c} is achieved.

As there is a lack of published evidence, there has been no positive recommendation for the use of any other group of drugs. For post-pubertal young people not achieving adequate control despite metformin ± liraglutide and ± insulin, the use of a sodium–glucose cotransporter 2 (SGLT2) inhibitor could be considered cautiously following discussion with diabetologists who work with adults with diabetes and are therefore more experienced with this drug class.

Bariatric surgery

There is a clear benefit of bariatric surgery in adolescents with BMI >35 kg/m^2 in terms of improving T2D. It is recommended as a treatment option for obesity-related T2D in obese CYP who are demonstrating inadequate response to pharmacological treatments within 12–18 months, to avoid reduction in beta-cell mass.

Complications

Glycaemic control improves microvascular risk. Unfortunately, however, the increased risk of a major adverse cardiovascular event (MACE) in adults with T2D is not reduced by improved glycaemic control. Additional measures, including

reduction in excess adiposity, smoking prevention, increased physical activity and reduction of hypertension and dyslipidaemia, are essential to reduce MACE risk. The guideline also emphasises the screening and treatment of diabetes-related complications in CYP.

Blood pressure should be measured at every clinic visit and consideration for starting an ACE inhibitor should be made if it remains above the 95th centile for age after completing 6 months of lifestyle modifications, including weight loss, exercise and reduction in salt intake.

Lipid testing is recommended when initial glycaemic control has been achieved or after 3 months of commencing treatment. Statins can be used for children above 10 years of age.

Regular screening for non-alcoholic fatty liver disease, retinopathy and microalbuminuria should take place, and these complications should be managed.

Sleep disturbance and obstructive sleep apnoea (OSA) are increasingly recognised as being associated with obesity and insulin resistance in both adults and children and type 2 diabetes in adults is recognised as a well-known risk factor for future cardiovascular disease.

If symptoms and home sleep monitoring devices are suggestive, the diagnosis of OSA should be made by formal polysomnography, and referral should be made to a sleep specialist for further management.

Conclusion

CYP with T2D are likely to have complex needs. Most paediatric diabetes multidisciplinary teams have good experience of managing type 1 diabetes and its complexities, yet relatively little experience in managing T2D and associated comorbidities. This guideline was developed to improve the care of CYP with T2D, which is increasing in prevalence. ■

Association of Children's Diabetes Clinicians (ACDC) Guideline Development Group and Type 2 National working group (2021) *A practical approach to management of type 2 diabetes in children and young people (CYP) under 18 years*. Available at: https://bit.ly/3DqG3dX (accessed 31.03.22)

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