

The role of real-time continuous glucose monitoring in children with type 1 diabetes Insights of a clinical specialist diabetes dietitian

Learning that your child has type 1 diabetes can be overwhelming and frightening. Suddenly, management of your child's eating, sleeping and activity patterns becomes even more complex as you work to keep their glucose levels from soaring too high or dropping too low. Where do you even begin?

Francesca Annan, Clinical Specialist Paediatric/Adolescent Diabetes Dietitian, commented: "As part of my clinical practice, I have worked extensively with young people using real-time continuous glucose monitoring (RT-CGM). Just one of the many benefits observed is the improvement in time in range with patients on RT-CGM."

The National Institute for Health and Care Excellence (NICE) guidance NG18 (*Diabetes [type 1 and type 2] in children and young people: diagnosis and management*) includes criteria on which patients should be considered for RT-CGM. These criteria include frequent severe hypoglycaemia, impaired awareness of hypoglycaemia, and the inability to recognise or communicate symptoms of hypoglycaemia; see **Box 1**.² However, emerging clinical evidence means these guidelines are currently under review.³

In clinical practice, NICE criteria are used to determine when to move forward with RT-CGM in children and young people. RT-CGM should be considered when there are significant issues with glycaemic management, comorbidities or any other conditions that make diabetes more difficult to manage.

But what kind of clinical benefits can patients achieve with long-term

What is RT-CGM?¹

Real-time continuous glucose monitoring (RT-CGM) is a powerful tool which automatically delivers a glucose reading to a compatible device every 5 minutes.

RT-CGM shows patients where their glucose is going and how fast it's getting there, providing critical information to help with their diabetes management.



The Dexcom G6 continuous glucose monitoring system. To learn more, visit dexcom.com/UKIEHCP.

RT-CGM use, and how does the technology measure up against other self-management regimens? COMISAIR was a prospective, 3-year study in adult patients with type 1 diabetes that set out to compare four treatment strategies based on combinations of glucose monitoring systems and insulin delivery methods. Compared with self-monitoring of blood glucose, RT-CGM users in the study significantly reduced their HbA_{1c} levels, spent less time in hypoglycaemia and more time in range (TIR), regardless of insulin delivery method.⁴

Whilst COMISAIR data are from an adult population, they are supported by findings from the 2017/18 National Paediatric Diabetes Audit (NPDA). The audit, which collected data on over 29 000 children and young people across England and Wales, showed that use of CGM with both multiple daily injections (MDI) and continuous subcutaneous insulin infusion (CSII) are associated with better HbA_{1c}

Box 1. NICE NG18 guidelines on continuous glucose monitoring²

Offer ongoing real time continuous glucose monitoring with alarms to children and young people with type 1 diabetes who have:

- Frequent severe hypoglycaemia **or**
- Impaired awareness of hypoglycaemia associated with adverse consequences (for example seizures or anxiety) **or**
- Inability to recognise, or communicate about, symptoms of hypoglycaemia (for example because of cognitive or neurological disabilities)

Consider ongoing real time continuous glucose monitoring for:

- Children and young people who undertake high levels of physical activity (for example, sport at a regional, national or international level)
- Children and young people who have comorbidities (for example anorexia nervosa) or who are receiving treatments (for example corticosteroids) that can make blood glucose control difficult

For further guidelines on continuous glucose monitoring in children and young people see NG18 sections 1.2.62 through 1.2.64

outcomes compared with those not using CGM.⁵

This evidence can be used to inform decisions about access to RT-CGM. These real-world data show that RT-CGM is allowing people to self-manage and spend more time in range. TIR is becoming an increasingly important marker of glycaemic management. Recently published consensus guidelines from the ATTD (Advanced Technologies & Treatments for Diabetes) Congress recommend using TIR alongside HbA_{1c} as an integral part of RT-CGM data analysis and treatment decision-making.⁶

The improved TIR reported in COMISAIR⁴ patients on RT-CGM is just one of the many benefits observed in clinical practice. Giving patients access to information about glucose excursions provides them with an opportunity to learn about glucose responses and develop strategies to prevent hypo- and hyperglycaemia. With RT-CGM, families are able to understand their glucose responses to food and activity and adapt how they deliver their insulin. RT-CGM has also helped us clinicians to learn more about responses to food and activity that are informing research.

The potential benefits of RT-CGM are clear. However, whilst some families will

start using RT-CGM and quickly establish successful strategies, other families may need more support to maximise the benefits. When introducing patients and their families to the technology, clear guidelines and ongoing communication are key, particularly at the start of RT-CGM use. Helping families to understand what a glucose profile of someone who does not have diabetes looks like is important to set expectations. Data can be overwhelming and have a negative impact on families, and alarm fatigue can be an issue. This is also true for carers and school staff, who may need help understanding RT-CGM and their role in diabetes management. For adolescents, it is also important to think about how RT-CGM information is used and the impact this can have on relationships.

Education about glucose responses to food and the timing of insulin are particularly important, which is why the Paediatric Endocrinology Society (PES) has published guidance on using trend arrows. This provides a framework for patients and caregivers, by helping them to interpret and use RT-CGM data to make mealtime insulin dosing decisions.⁷

Final thoughts

With potential clinical benefits such as reduced HbA_{1c}, less time in hypoglycaemia and more TIR,^{4,8} RT-CGM is helping a growing number of patients and their families. It has also been shown to impact on patient quality of life and wellbeing.⁹

Further resources

To learn more about how RT-CGM could benefit your patients, visit diabetesonthenet.com/UKIEHCP. Here you can find lots of useful resources including a CPD module to further your knowledge of RT-CGM.

References

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