

The role of real-time continuous glucose monitoring in type 1 diabetes

Insights of a diabetes specialist nurse

Management of type 1 diabetes has come a long way in recent years, with real-time continuous glucose monitoring (RT-CGM) offering a glimmer of hope to patients with frequent hypoglycaemia and/or suboptimal HbA_{1c}.

With over 16 years' experience as an adult diabetes specialist nurse, Geraldine Gallen has seen the benefits of CGM technology first-hand in patients of all ages and clinical backgrounds. Geraldine started working with CGM when the technology was still in its infancy, and her first experience of sensor usage was performing retrospective (or 'blind') CGM on patients for diagnostic purposes. For the first time, the team could see patterns and trends, and diagnose nocturnal hypoglycaemia. "For those without access to RT-CGM, hypoglycaemia can cause huge anxiety, especially at night. This can cause a lot of distress for people with diabetes and their loved ones. Being able to see patterns and trends and detect patterns of hypoglycaemia gives

people with diabetes and their families huge reassurance."

RT-CGM is not routinely funded for all people with type 1 diabetes. The National Institute for Health and Care Excellence (NICE) guidance NG17 (*Type 1 diabetes in adults: diagnosis and management*) includes criteria on which patients should be considered for RT-CGM. These criteria currently include a complete loss of awareness of hypoglycaemia, or a suboptimal HbA_{1c} (see **Box 1** for full criteria).² However, emerging clinical evidence means these guidelines are currently under review.³

For Geraldine, the NICE criteria and the Diabetes UK technology pathway⁴ have proven to be useful tools during local discussions with caregivers and CCGs for creating local pathways, helping to bring RT-CGM technology to those who need it

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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.

Box 1. NICE NG17 guidelines on continuous glucose monitoring²

Consider real time continuous glucose monitoring for adults with type 1 diabetes who are willing to commit to using it at least 70% of the time and to calibrate it as needed, and who have any of the following despite optimised use of insulin therapy and conventional blood glucose monitoring:

- More than 1 episode a year of severe hypoglycaemia with no obviously preventable precipitating cause
- Complete loss of awareness of hypoglycaemia
- Frequent (more than 2 episodes a week) asymptomatic hypoglycaemia that is causing problems with daily activities
- Extreme fear of hypoglycaemia
- Hyperglycaemia (HbA_{1c} level of 75 mmol/mol [9%] or higher) that persists despite testing at least 10 times a day (see recommendations 1.6.11 and 1.6.12). Continue real time continuous glucose monitoring only if HbA_{1c} can be sustained at or below 53 mmol/mol (7%) and/or there has been a fall in HbA_{1c} of 27 mmol/mol (2.5%) or more

For further guidelines on continuous glucose monitoring in adults see NG17 sections 1.6.21 through 1.6.24

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most. Geraldine adds: “A patient may present with an HbA_{1c} above 75 mmol/mol (9%) despite optimal control and having attended a structured education programme. If the patient’s main issue is problematic hypoglycaemia or they suffer from frequent severe hypoglycaemia, RT-CGM should be an option as first-line therapy.”

But what kind of clinical benefits can patients achieve with long-term RT-CGM use, and how does the technology measure up against other self-management regimens? COMISAIR was a prospective, 3-year study that set out to compare four treatment strategies for managing type 1 diabetes 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, regardless of insulin delivery method.⁵

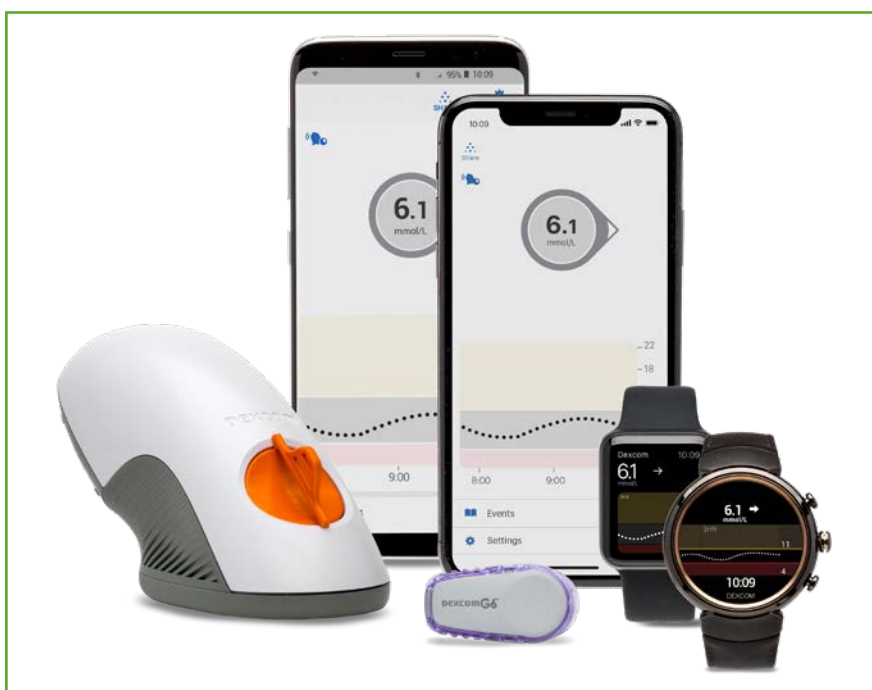
Time in range, or TIR, is becoming an increasingly important marker of glycaemic

control. 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 Geraldine has witnessed similar results to those seen in COMISAIR in her own practice. “We are seeing a lot of clinical improvement in HbA_{1c}, time in range and we are seeing less time in hypoglycaemia.”

In Geraldine’s clinical practice, the decision-making process for getting eligible patients started on RT-CGM begins with the multi-disciplinary team (MDT). “As part of our technology pathway,³ we discuss all patients as part of an MDT decision”, Geraldine explains. “We offer a 3-month trial of RT-CGM to assess clinical benefits and for the person with diabetes to decide if it is the right technology for them. This trial has allowed us to move patients who were ambivalent about the technology, and prompted those that find technology difficult due to other medical or psychological needs to give it a try. We have had some great successes where other technologies have not been successful”.

Geraldine goes on to explain: “We’ve had terrific results, even with those that we didn’t think would manage the technology. Thanks to RT-CGM features such as ‘urgent low soon’ alerts, which can warn users in advance within 20 minutes of a severe hypoglycaemic event, we have patients who receive fewer paramedic call outs due to hypos. These patients aren’t seeing us as often, because they don’t need to.”

Whilst Geraldine considers NICE guidance helpful for ensuring the right patients are put forward for RT-CGM, she is keen to highlight that there are other patients who may benefit from this technology, and would like to see more research conducted in these groups. She explains: “Active patients who do a



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lot of sport who may be worried about hypoglycaemia and keeping their levels high to avoid hypos, and don't want to be attached to an insulin pump. If hypoglycaemia or fear of hypoglycaemia are the main issues, an RT-CGM device might be the right choice, as the 'urgent low soon' alert prompts them to take action before their blood glucose levels drop too low."

Final thoughts

With potential clinical benefits such as reduced HbA_{1c}, less time in hypoglycaemia and more time in range,^{5,7} RT-CGM is helping a growing number of patients to meet their treatment goals in a way that fits in with their individual needs. This has been shown to impact on patient quality of life and wellbeing.⁸

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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