



Novel use of continuous glucose monitoring device to enhance glycaemic control in a poorly adherent patient with type 2 diabetes and vascular dementia in an aged care facility

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Abstract

Older adults with type 2 diabetes mellitus (T2DM) and cognitive impairment present significant challenges for safe glycaemic management in residential aged care settings. We describe the case of a 73-year-old woman with T2DM, vascular dementia, ischaemic heart disease and chronic kidney disease, who experienced marked glycaemic variability and poor adherence to capillary blood glucose monitoring (BGM). Her diabetes was managed with linagliptin and basal insulin; however, refusal of finger-prick testing, dietary non-adherence, and monitoring-related anxiety limited detection of hypo- and hyperglycaemia. Blood glucose levels fluctuated widely from 4.8 to 27.8 mmol/L, contributing to fatigue, anxiety, hyperglycaemia-related polyuria, and increased falls risk.

Continuous glucose monitoring (CGM) devices are commonly used for type 1 diabetes mellitus in Australia as they are fully subsidised through the National Diabetes Service Scheme (NDSS). However, usage is low in T2DM due to limited subsidies. Therefore, a novel use of a CGM device, FreeStyle Libre 2 Plus sensor™, was introduced following multidisciplinary consultation involving the patient, general practitioner, nursing staff, and family. Nursing staff were trained in device use and alarm-based responses, with thresholds set for hypoglycaemia and hyperglycaemia. CGM trend data enabled safer medication titration, including addition of modified release gliclazide, resulting in reduced hyperglycaemic episodes and improved time within target glucose range. Nursing staff reported increased confidence and timely interventions, while the patient experienced improved energy and confidence.

Despite funding barriers and limited evidence, CGM proved a feasible and minimally intrusive strategy for improving glycaemic control in a poorly adherent aged care resident.

Keywords: Continuous Glucose Monitoring; Residential Aged Care; Dementia; Technology Assisted; Type 2 Diabetes Care

1. Introduction

The incidence of T2DM and dementia in aged care residents is conservatively estimated at 20%¹ and 54%² respectively. This is compounded by increased diabetic risks like hypoglycaemia and mortality, irrespective of diabetes duration³. Continuous glucose monitoring (CGM) devices are commonly used for type 1 diabetes mellitus in Australia as they are fully subsidised through the National Diabetes Service Scheme NDSS⁴. However, they are not routinely used in patients with T2DM due to limited funding. Therefore, CGM may offer a novel and minimally intrusive approach to monitoring BSLs in a poorly adherent patient in an aged care setting. It provides early detection of hypoglycaemia and hyperglycaemia while enhancing confident medication titration. These outcomes support broader consideration of technology-assisted diabetes management in residential aged care which is becoming more acceptable to elderly diabetic patients⁵.

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A 73-year-old woman residing in an Australian residential aged care facility with a history of type 2 diabetes mellitus (T2DM) presented with fluctuating blood sugar levels (BSLs) but was poorly adherent with measurements due to her vascular dementia. Her diabetes was initially managed with linagliptin 5mg mane and glargine 6 units nocte. She also had ischemic heart disease, chronic kidney disease, dyslipidaemia and insomnia. Functionally, she ambulated with a four-wheel walker and required staff support for medications, meals and glucose testing.

Capillary blood glucose monitoring (BGM) was performed 3 times daily by staff. BSLs ranged from 4.8mmol/L to 27.8 mmol/L and she was frequently not adherent with BGM or a diabetes friendly diet. She reported fatigue and anxiety associated with fluctuating glucose levels and frequent finger-prick tests. There were occasional hyperglycaemia induced polydipsia and polyuria which increased her falls risk.

2. Methods

Continuous Glucose Monitoring (CGM) using the FreeStyle Libre 2 Plus sensor TM was commenced after consultation with the patient, her general practitioner (GP), nursing staff and family. The device was applied to the patient's left arm by a registered nurse and changed every 14 days as per manufacturer instructions. Nursing staff were trained in scanning, interpreting data and responding to alarms via the patient's phone app at least 3 times daily. Alarms were set for <4.0 mmol/L hypoglycaemia and >15 mmol/L hyperglycaemia. GP reviewed glucose trends weekly and data was collected over two months.

3. Results and Discussions

The availability of trend data enabled safer titration and Gliclazide MR 30mg mane was added. This reduced hyperglycaemic events from approximately 8 to 3 (Figure 1). All were detected via alarms and managed promptly. The BSLs readings between 4 to 12 mmol/L improved from 21/34 (61.7%) to 89/109 (81.6%). Nursing staff reported greater confidence in decision making which led to more prompt interventions with hypoglycaemia. The patient reported improved energy and confidence.

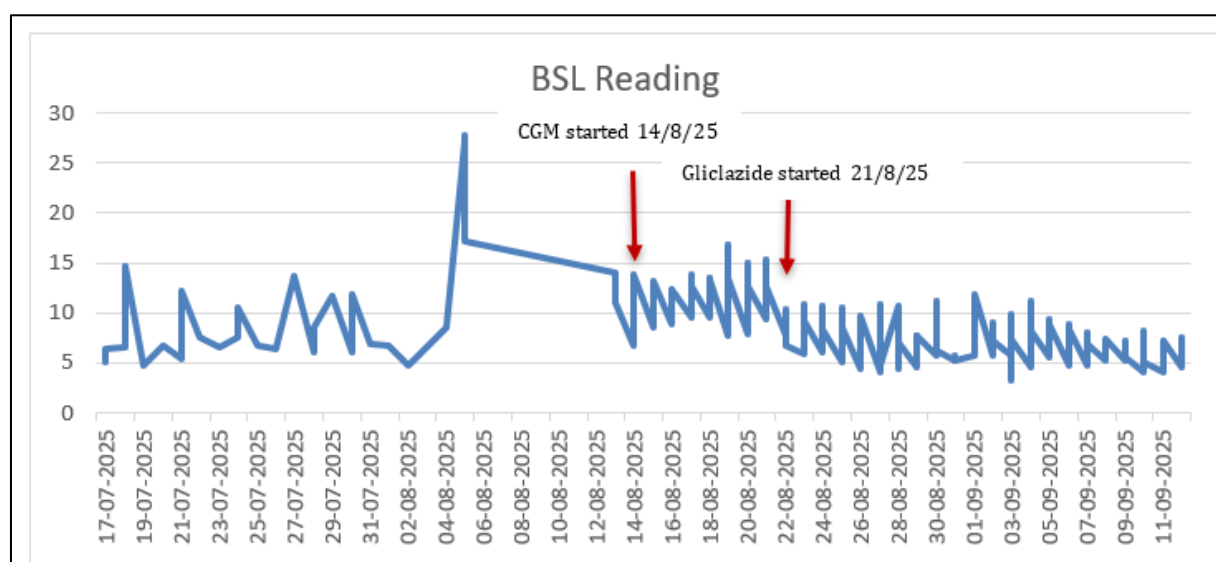


Figure 1 Improved glycaemic control after CGM was started

4. Conclusions

Novel use of CGM in a poorly adherent patient with T2DM and vascular dementia resulted in improved glycaemic stability, reduced hyperglycaemia and improved wellbeing in a residential aged care setting. While funding and workflow challenges remain, this case provides real-world evidence supporting wider implementation of diabetes technology in aged care, with potential benefits in safety, independence and staff workload.

Compliance with ethical standards

Disclosure of conflict of interest

The authors (Shuang Quan Chan, Rodel Gantalao) declare no conflicts of interest regarding this manuscript.

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Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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