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Flash Glucose Monitoring, using technology to improve outcomes for patients with diabetes.

Diabetes places a significant burden on millions of Australians. To successfully manage diabetes, patients and clinicians rely on data from regular blood glucose measurements. This identifies periods of hypo or hyperglycaemia for titration of hypoglycaemic agents, particularly in patients on insulin. We have access to a new flash glucose monitoring device, yet little has been documented in Australia on its role in diabetes management. We report on potential advantages of flash glucose monitoring and our early experiences with this system in clinical practice.

Traditionally, blood glucose has been monitored through fingerprick testing which provides a small window into the daily trend of patient blood glucose levels. Fingerprick testing is painful, inconvenient and only gives information at the time of measurement, with wide gaps [1] leading to insufficient glucose data throughout the day and especially at night [2]. Continuous blood glucose monitoring improves outcomes in patients with diabetes [3]. Traditional continuous blood glucose monitors require repeated calibration and are expensive for many, key factors preventing widespread adoption[2]. An alternative device, Abbott's FreeStyle® Libre™ flash glucose monitoring system is TGA approved for use in Australia for treatment decisions. It is cheaper and a simpler alternative to previous devices.

Flash glucose monitoring is pre-calibrated and requires no fingerpricks by the patient. The sensor is worn on the arm for up to 14 days, automatically storing glucose data every 15 minutes. A real-time glucose level is displayed by scanning the sensor with the reader. The reader displays current glucose values, glucose trend arrows and a graphical trace of values over the previous 8 hours. Data transfers

remotely from sensor to reader, which stores historical sensor data for 90 days[2]. The manufacturers recommend that if the person is hypoglycemic, if glucose is changing rapidly, and if symptoms are not concordant with the system readings, capillary measurements can be undertaken with the same reader to verify flash monitor readings.

Advantages of flash glucose monitoring are: no need for fingerpricking, convenience, speed and providing real time feedback about glucose trends in response to meals, exercise and insulin. A multicentre study in patients with type 1 diabetes demonstrated that the device reduced hypoglycaemia time compared to fingerprick monitoring [4].

In a recent study of patients with type 2 diabetes on insulin therapy, utilizing flash glucose monitoring for 6 months showed significant reductions in HbA1c compared with a control group for patients under 65[2]. Flash glucose monitoring also led to reductions in hypoglycaemia and improved quality of life [2].

As there has been little exposure to this device in Australia, we conducted a clinical audit amongst endocrinologists between January to March 2017, asking them to provide HbA1c readings pre and post Libre use. These preliminary data from patients (n=22) with diabetes attending public and private endocrinology clinics, using flash glucose monitoring for at least 2 weeks, demonstrate significant reductions in follow up HbA1c (mean[SD] 8.7 (-1.7)% pre and 7.7 (-1.2)% post, p=0.001). [Figure 1].

Flash glucose monitoring appears to be a promising diabetes management tool in the clinical setting. Studies have demonstrated that the use of real-time continuous blood glucose monitoring fosters self-monitoring and increased exercise in individuals with diabetes [5]. Further studies are underway to investigate how flash glucose monitoring devices can be used to support ongoing diabetes care and management.

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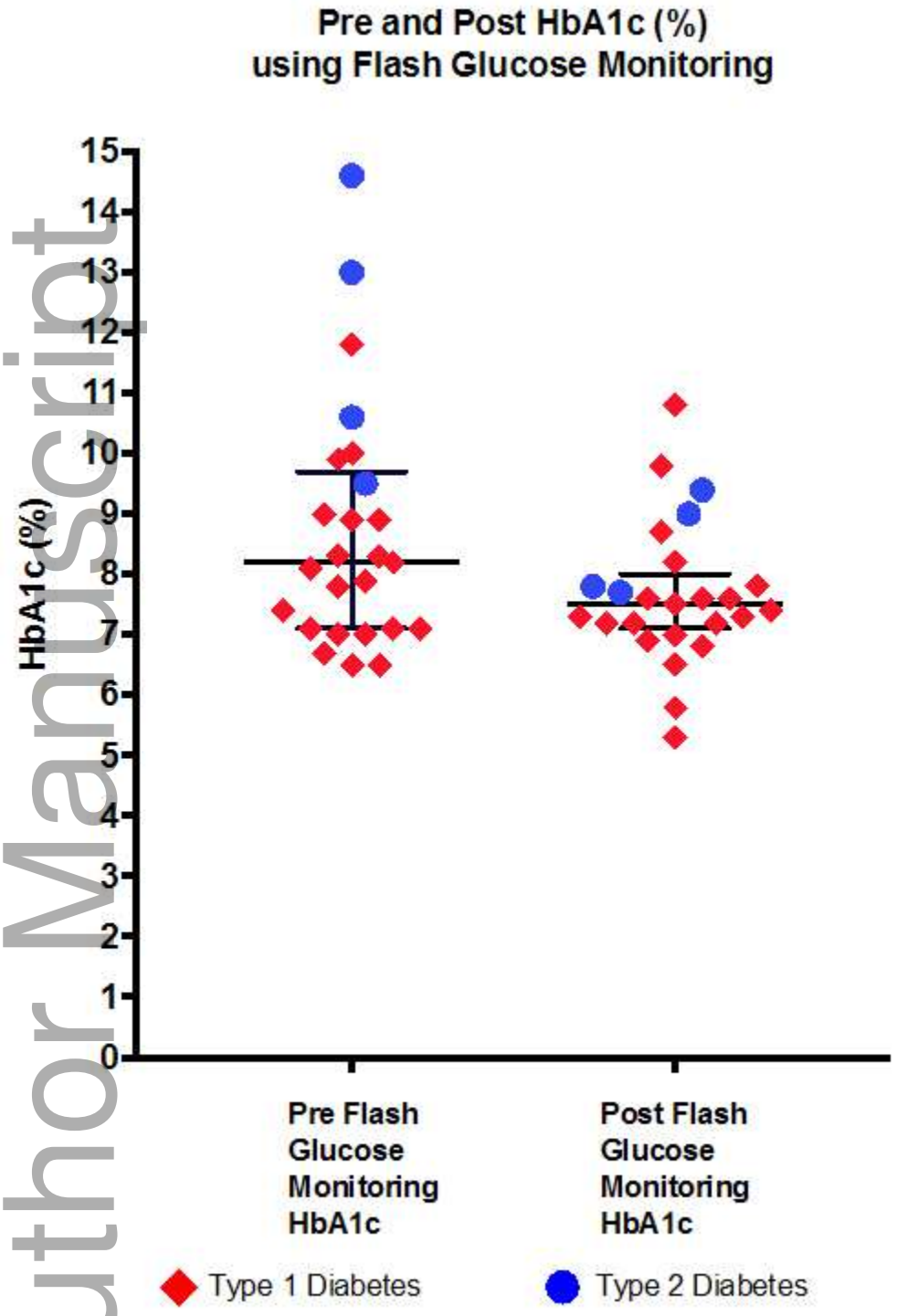

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