Review and Audit of Diabetes Control in Children and Young People with Diabetes Using the Freestyle® Libre Flash Glucose Scanning System (FGS)

Nottingham University Hospitals NHS Trust

Aisha Zahid[1], Pooja Sachdev[2], Louise Denvir[2], Tabitha Randell[2], Josephine Drew[2]

1. University of Nottingham Medical School, Nottingham, UK; 2. Department of Paediatric Endocrinology, Nottingham Children's Hospital

Background: The Freestyle Libre Flash Glucose Scanning System (FGS) is a glucose sensing technology device for people with diabetes to monitor plasma glucose levels, reducing the need for routine fingerprick testing. The device is worn on the upper arm and provides both a reading for that time but also graphs displaying glucose levels for the 8 hours prior to the scan. Self funded use of the Libre started within our paediatric diabetes clinic almost 2 years ago when the license was first obtained for the 4-17 year age group. The FGS device is now available on the National Health Service (April 2018) providing certain criteria are met. Potential for most benefit in paediatrics includes patients who have difficulty completing regular fingerprick tests, impaired awareness of hypoglycaemia (the arrow alongside the plasma glucose reading displays glucose trends) and patients who undertake glucose monitoring >8 times a day. This audit aims to evaluate the use of the Freestyle Libre device in children and young people attending NCH diabetes clinics to assess its effectiveness in improving diabetes control measured by HbA1c reduction.

Methods: Patients attending the paediatric clinic who had used the FGS device between April 2016 and November 2017 were identified. Data was collected retrospectively from the Diamond (diabetes record) database and Diasend software, where information from the FGS device is downloaded. We recorded HbA1c levels before using the Freestyle Libre device, whether the patient continued to use the monitor for approximately 3 months and the HbA1c level 3 months after. The average number of scans per day were also recorded (where possible) using the download from 2 weeks before the second HbA1c results.

Results: 121 patients were identified with T1DM who had used the FGS device. 63 patients stopped using the device in < 3 months. Reasons for discontinuation of the FGS device included reduced accuracy and financial costs. Patient data was unavailable for 2 patients.

The 56 patients (30 males) who continued to use the device for 3 months had a a mean age of 13 years 5 months (±3.4). Average age at diagnosis of diabetes was 8 years and 5 months (SD±4.3). Duration of diabetes was approximately 5 years (SD±4.1).

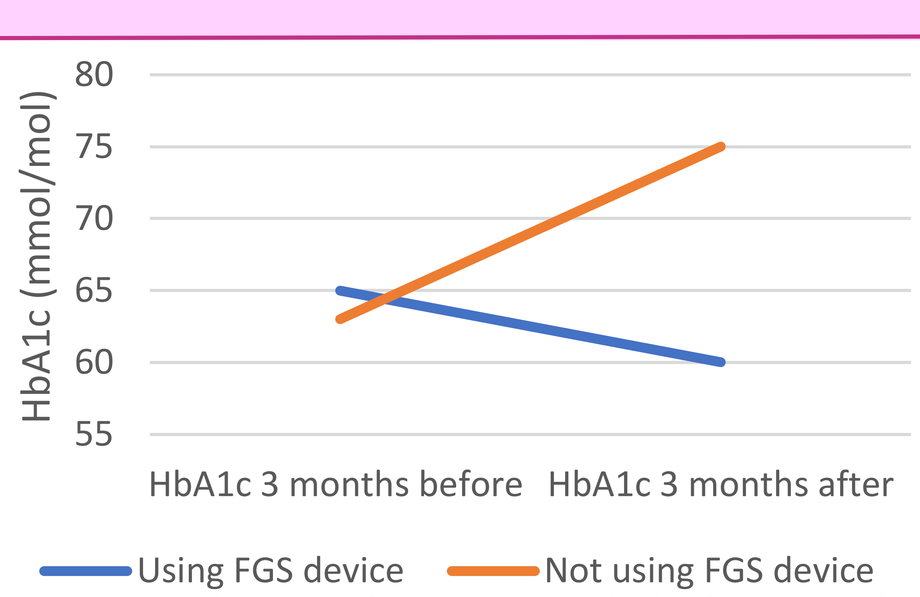

Figure 1: HbA1c results over 3 months both using and not using the FGS device

Results showed a reduction in HbA1c from 63.66mmol/mol(SD±16.3) to 60.41mmol/mol (SD±15.72), a difference of 3.25mmol/mol ($p<0.05$). CI = 0.1 to 6.4. Patients who discontinued using the FGS device had an average increase in HBA1C of 2.48mmol/mol ($p<0.05$), from 57.74mmol/mol(SD±9.73) to 59.95mmol/mol(SD±10.93). CI = -4.02 to -0.43 (figure 1). The average number of scans undertaken with the FGS device was 6 scans per day (SD±5.5) and the average number of fingerprick tests was 4 per day (SD±3.21). 30% of patients using the device did not do follow the advice to do a fingerprick test to confirm a hypo or high as had been recommended.

Discussion & Conclusion: The FGS system offers a non invasive alternative of glucose monitoring . It is cheaper than Continuous Glucose Monitoring while still offering some of its advantages. Our work has shown a significant decrease in average HbA1c level in children and young people with 3 months continuous usage. Future work is needed to look at whether this benefit is sustained, impact on quality of life and reductions in level of hypoglycaemia may further inform its use.

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Diabetes and insulin

Aisha Zahid

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