The impact of CGM availability: Real world data from a population-based clinic

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Background

In April 2017, continuous glucose monitoring (CGM) was fully subsidized in Australia for Type 1 diabetes under the age of 21 years.

Three quarters of the population-based clinic cohort in Western Australia adopted CGM following its availability.

Aim

The aim of the study is to explore diabetes outcomes (HbA1c and severe hypoglycaemia) following the availability of CGM in clinical practice.

Methods

Observational longitudinal study
-children and adolescents (<18 years)
-commenced CGM (Dexcom or Medtronic),
-demonstrated optimal CGM use of >75% and
-had at least one clinical visit pre- and post-CGM

Data collected
-Glycaemic data from Western Australian Children's Diabetes Centre Database (WACCD)
-Collected 21 months before and after CGM commencement

Clinical Outcomes
HbA1c and severe hypoglycaemia

Sta*tistical analysis*
-Linear mixed models including random intercepts and slopes were employed to explore the effect of CGM on HbA1c over time and to explore differential effects based on clinical and demographic characteristics.
-Generalised estimating equation was used to compare the likelihood of achieving ISPAD glycaemic target of 7%.

Results

Table 1 describes the demographics of the cohort at CGM start

Characteristic	N=873
Age (yrs)*	11.9 (4.0)
Males (%)	50
Duration of diabetes (yrs)*	4.3 (3.9)
HbA1C (%)*	7.9 (1.3)
Insulin regimen (% CSII)	50
HbA1c categories % (mmol/mol)	
<7% (< 53 mmol/mol)	22.3
7 to <9% (53 to < 75 mmol/mol)	60.3
>9% (>75 mmol/mol)	17.4

* Mean (SD)

Table 2 describes the change in HbA1c* by subgroups of HbA1c and age

	Pre CGM	Post CGM	Difference	p
Cohort HbA1c	8.17 (0.04)	7.87 (0.04)	-0.31 (0.04)	<0.001
Baseline HbA1c				
< 7%	6.83 (0.07)	6.72 (0.09)	-0.12 (0.08)	0.133
7 to < 9%	8.07 (0.04)	7.84 (0.05)	-0.23 (0.05)	<0.001
>9%	10.0(0.07)	9.24 (0.10)	-0.76 (0.08)	<0.001
Age group				
< 12 years	8.01 (0.05)	7.83 (0.06)	-0.18 (0.05)	0.001
> 12 years	8.29 (0.05)	7.87 (0.06)	-0.42 (0.05)	<0.001

* Mean (SE)

Figure 1

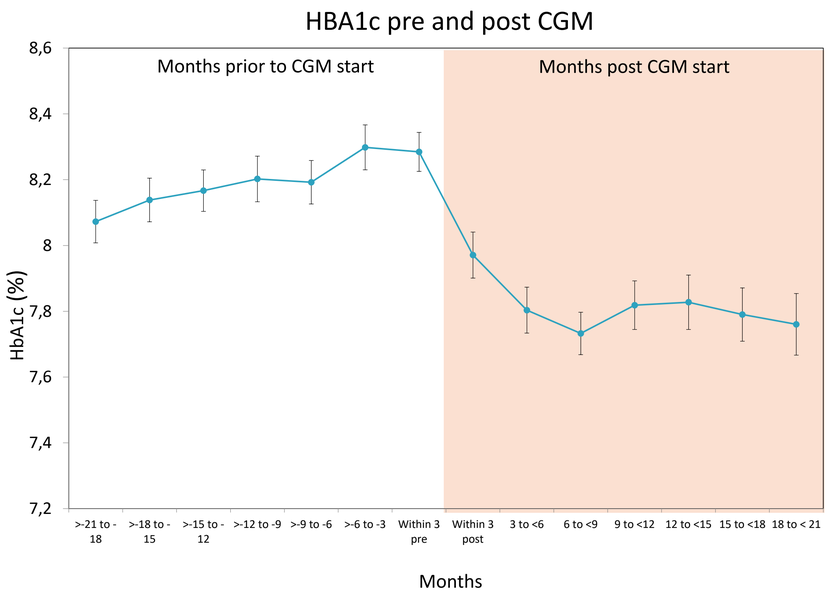

Figure 1 demonstrates mean (SE) HbA1c in the whole cohort of children with optimal CGM use

HbA1c
A reduction in HbA1c was demonstrated in the whole cohort although the effect was largest in individuals with higher HBA1c at CGM start.

HbA1c reduction was immediate and stable over time.

Children over 12 years of age also showed a greater reduction in HbA1c compared to those <12 years.

Post CGM start, children were 43% more likely to achieve a target HbA1c of <7% or 53mmol/mol. OR (95% CI): 1.43 (1.28, 1.61)

Severe hypoglycaemia rates
Pre CGM:3.02 per 100 patient years
Post CGM: 2.76 per 100 patient years (p=0.73)

Conclusion

This real-world population based study following CGM roll-out demonstrates an improvement in glycaemic control.

Background rates of severe hypoglycaemia were too low in our cohort to demonstrate change during the study period.

It is vital to maintain follow-up to demonstrate the benefits of CGM and translate into improved health economics in the long term.

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58ESPE P1-035
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Poster presented at: ESPE 2018 VIENNA
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