

Supplementary Appendix

Table of contents

No	Content	Page No
1	Inclusion/ exclusion criteria (background on the parent study)	2
2	EPIC search approach	3
3	Baseline characteristics	4
4	Number of participants by CGM groups over 7-year follow-up	5
5	Number of participants on insulin pump therapy by CGM groups	6
6	Differences in A1c over 7-year follow-up between three CGM groups	7

Background information for the parent study

Criteria for the original study: 1) diagnosis of type 1 diabetes (age 1-35 years) between January 2013 and December 2015, 2) patients who had more than two clinic visits per year for 3 years, 3) were not pregnant and did not become pregnant during the study period, and 4) patients on diabetes technology (CGM) continued to use technology for at least 70% of the time (defined as CGM use during 70% of clinic visits; i.e. 3 out of 4 clinic visits) during study period. Those who changed insulin delivery system (e.g., multiple daily injection [MDI] to CSII) after 1 year and before 2 years of T1D diagnosis and started CGM after 1 year of T1D diagnosis were excluded.

The objective of parent study was to two fold; a) to evaluate effect of early CGM initiation on glycemic outcomes, and b) to evaluate differential glycemic outcomes by insulin delivery system (MDI vs Insulin pump). As published earlier (Diabetes Technol Ther. 2019 Jan;21(1):6-10), early CGM initiation was effective in lowering and maintaining A1c up to 3 years in patients with T1D and there was no difference in glycemic control by insulin delivery in the CGM users.

Criteria for Extension Study: Patients included in the original study and have been continued to be seen at the BDC until December 31, 2020. Patients were divided in three groups.

- 1) CGM Group- Those who were using CGM in the original study and continue to use CGM up to December 31, 2020.
- 2) No-CGM group- Those who were not using CGM in the original study and continue NOT to use CGM till December 31, 2020
- 3) New-CGM group- Those who were not using CGM in the original study and started using CGM at the end of the original study till December 31, 2020.

The intention of the extension study was to evaluate glycemic lowering effect of CGM over time in a real-life situation and therefore, all subjects from the parent study irrespective of their CGM compliance were included. On review of CGM compliance later, all subjects included in the extension phase were using CGM 70% of time (i.e. 3 out of 4 clinic visits).

There were four patients who initiated Freestyle Libre in the new-CGM group and were excluded for two reasons 1) it is difficult to know their CGM compliance such as frequency of scanning and 2) to have clean data with only real-time CGM.

EPIC search approach

EPIC search methodology was published earlier (Reference: Mulinacci G, Alonso GT, Snell-Bergeon JK, Shah VN. Glycemic Outcomes with Early Initiation of Continuous Glucose Monitoring System in Recently Diagnosed Patients with Type 1 Diabetes. Diabetes Technol Ther. 2019 Jan;21(1):6-10)

Following data were collected from EMR for this extension study and analysis:

- Data collection period: From date of onset of T1D (between January 2013 and December 2015) to last date of data collection 12/31/2020
- Age at diagnosis
- Sex (male/ female)
- Race/ethnicity
- CGM use: Yes/ No at each visit. If yes, CGM type- Dexcom, Libre, Medtronic etc.
- A1c at each clinic visit
- BMI at each clinic visit
- Insurance at baseline and the last visit

- Celiac disease any time before 12/31/2020 (Yes/ No)
- Thyroid disease any time before 12/31/2020 (Yes/ No)

Chart Review process

The data team manager (Bing Wang) retrieved all patients' data, and then each patient's chart was manually reviewed for CGM use (Yes/No) and CGM type by Anagha Champakanath. Two chart reviews were done to collect complete and clean data.

Table 1: Patient Characteristics

	Characteristics at the baseline (2013-2015)			Characteristics at the last visit		
	CGM users (n=81)	CGM non-users (n=315)	P-value	CGM users	CGM non-users	P-value
Age at diagnosis (years)	10.4 ± 7.0	10.2 ± 4.7	0.84	NA	NA	
Sex (N [%] male)	48 (60)	162 (52)	0.18	NA	NA	
Race/Ethnicity (N [%]) Hispanic Non-Hispanic Black Non-Hispanic White Other	4 (5) 1 (1) 65 (81) 10 (13)	73 (23) 20 (6) 187 (60) 34 (11)	<0.0001	NA	NA	
Insurance type (N [%]) Private Medicaid Other	77 (96) 3 (4) 0 (0)	175 (56) 133 (42) 6 (2)	<0.0001	74 (92) 3 (4) 3 (4)	167 (53) 137 (44) 9 (3)	<0.0001
Presence of autoimmune diseases#, N (%)	4 (5)	6 (2)	0.1492	13 (16)	47 (15)	0.8
A1c at diagnosis (%)	11.5 ± 2.3	11.6 ± 2.3	0.52	NA	NA	
Number of visits	-	-		24 ± 7	24 ± 7	0.9
Follow-up interval (years)	-	-		5.8 ± 1.0	6.0 ± 1.2	0.045

Autoimmune diseases included were hypothyroidism, hyperthyroidism, and celiac disease.

Data presented as mean ±SD or N (%)

Table 2: Number of participants over 7-year follow-up by three CGM groups

Time	CGM Group	New-CGM Group\$	No-CGM Group	CGM discontinuation**
At onset #	81		315	0
< 6 month	81		315	0
6-month	81		315	0
1-year	81		315	0
18-month	81		315	0
2-Year	81		315	0
30-month	81		315	0
3-Year	70*	55	236	6
4-Year	66*	80	203	3
5-Year	65*	109	148	0
6-Year	27*	78*	87	0
7-Year	7*	47*	37	0

Onset date is between January 2013 and December 2015

*Reduced participant numbers due to variable length of follow up

** Discontinuation number is only for those who were in the CGM group, and are new discontinuations from the previous time period. A total of nine people discontinued CGM use, 6 in year 3 and 3 in year 4; However, four individuals who discontinued CGM use restarted CGM use at a later time point, and are counted in the 'CGM Group' for that later time point.

Table 3: Number of participants on insulin pump therapy by CGM groups.

Time Point	CGM group	New-CGM group	No-CGM group
At onset, N (%)	64 (79%)	N/A	90 (29%)
< 6 month, N (%)	64 (79%)	N/A	90 (29%)
6-month, N (%)	64 (79%)	N/A	90 (29%)
1-Year, N (%)	64 (79%)	N/A	90 (29%)
18-month, N (%)	64 (79%)	N/A	90 (29%)
2-Years, N (%)	64 (79%)	N/A	90 (29%)
30-month, N (%)	64 (79%)	N/A	90 (29%)
3-Year, N (%)	62 (82%)	41 (61%)	115 (44%)
4-Year, N (%)	59 (82%)	58 (67%)	111 (49%)
5-Year, N (%)	55 (85%)	81 (70%)	80 (50%)
6-Year, N (%)	22 (82%)	64 (79%)	48 (52%)
7-Year, N (%)	6 (86%)	43 (86%)	22 (56%)

Percentage value were rounded.

Attrition in number of pump users over time were due to variable length of follow up

Difference in pump use between CGM group and No-CGM group was statistically significant for all years (P<0.01 for all).

Table 4: Differences in A1c over 7-year follow-up between three CGM groups^{\$}

Time Point	CGM group	No-CGM group	New-CGM group	p-value*	p-value#
At onset	12.5 ± 0.25	12.2 ± 0.19	N/A	0.18	N/A
< 6 month	8.1 ± 0.25	8.4 ± 0.19	N/A	0.17	N/A
6-month	8.1 ± 0.25	8.8 ± 0.19	N/A	0.002	N/A
1-Year	8.3 ± 0.25	9.2 ± 0.19	N/A	<0.0001	N/A
18-month	8.5 ± 0.25	9.6 ± 0.19	N/A	<0.0001	N/A
2-Years	8.4 ± 0.28	9.7 ± 0.19	N/A	<0.0001	N/A
30-month	8.4 ± 0.26	10.0 ± 0.20	N/A	<0.0001	N/A
3-Year	8.4 ± 0.26	10.0 ± 0.19	9.5 ± 0.25	<0.0001	0.0002
4-Year	8.4 ± 0.27	10.3 ± 0.20	9.4 ± 0.23	<0.0001	0.0003
5-Year	8.5 ± 0.27	10.3 ± 0.21	9.6 ± 0.22	<0.0001	<0.0001
6-Year	8.4 ± 0.34	10.6 ± 0.23	9.7 ± 0.24	<0.0001	<0.0001
7-Year	8.5 ± 0.56	10.5 ± 0.30	9.2 ± 0.27	0.0009	0.2

Data is presented as least square mean ± standard error of mean

* CGM group vs No CGM group; # CGM group vs. New CGM group

\$ adjusted for age, sex, insulin delivery methods, ethnicity and insurance status