Information is Power: Using Real-Time Data to Track Blood Glucose Trends of Cellnovo Mobile Diabetes Management System Users

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Background and aim

The Cellnovo Diabetes Management System comprises an insulin micro pump, an activity monitor, a mobile-enabled wireless touch-screen handset with integrated blood glucose meter, and automatic connectivity to a secured server.

A retrospective analysis of data stored on the Diabetes Management portal and collected between January 2013 and September 2017 was undertaken. Here we highlight some of the results.[1]

Methods

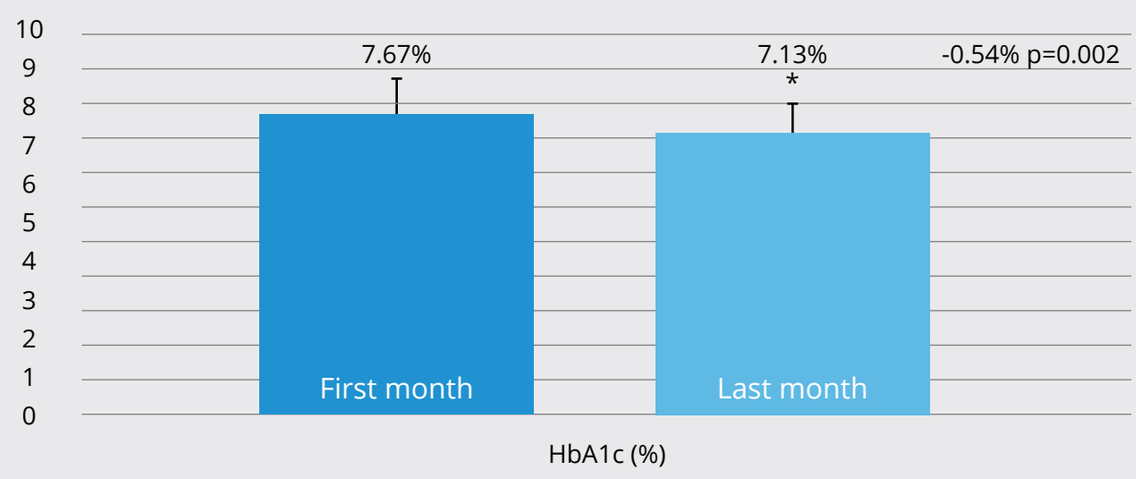
We retrieved a cohort of 166 patients who had used the pump for at least 6 months and had recorded their BG at least 3 times a day on average. The median follow-up time for this cohort is one year (range 6-41 months). Where we compared first and last months' data we used paired Student's t-test or Wilcoxon rank-sum test as appropriate. $p < 0.05$ was taken to indicate significance. We present a comparison of first and last month data of:

- HbA1c values where available
- Mean and standard deviation (SD) of BG
- Number of hypoglycaemic events per week

Results

- Among 30 adults with HbA1c values available (mean follow-up time 10 months) we found a significant reduction in HbA1c of 0.54% (from 7.67% to 7.13%, p=0.002). The higher the value for HbA1c at baseline, the greater the improvement (p=0.0007) *(Figure 1)*
- Glycaemic data available for the 166 patients (median follow-up time of one year), demonstrated:
  - Of 143 adults, 23 (16.1%) had a significant improvement in mean BG levels of between 13.4mg/dl and 158.1mg/dl
  - BG variability decreased between 0.4mg/dl and 51.6mg/dl in 53 (37%) adults *(Table 1)*
  - In adults (n=143), there was a significant decrease in the number of hypoglycaemic events; 1 event less per week (from 3.4 to 2.4 events/week, $p<0.00001$) with 93 (65.03%) patients having fewer events *(Figure 2)*
  - In children (n=16) there is some decrease in the number of hypoglycaemic events per week between the first and last month of data collection (from 3.7 to 3 events/week, p=0.27) with 11 (68.75%) children having fewer hypoglycaemia events
  - In the adolescent group, hypoglycaemic events decreased almost significantly (from 3.8 to 2.3 events/week, p=0.05)

Figure 1: Overall HbA1c outcome
Mean follow up duration: 10 months, n = 30 adults



Conclusion

The preliminary results from the data of a cohort of Cellnovo System users showed real-life data that indicates a decrease in HbAc1 level and in the number of hypoglycaemic events in HbA1c for adults. Similar results were demonstrated in a previous case study[2].

Figure 2: Hypoglycaemia frequency, events/week

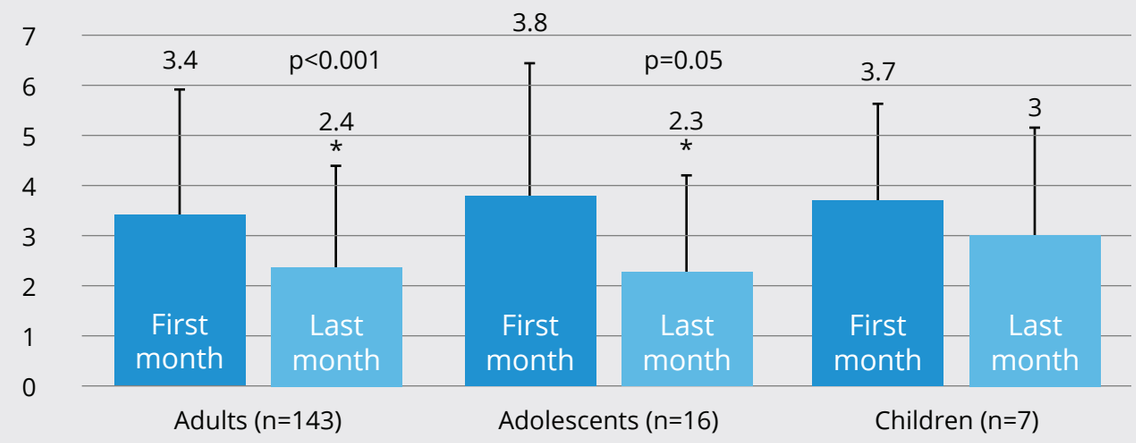


Table 1: Clinical Parameters from Baseline to Final Month of Data Analysis (Mean±SD)

	Children (n=16)			Adolescents (n=7)			Adults (n=143*)		
	Baseline to and of first month	Last month	p	Baseline to and of first month	Last month	p	Baseline to and of first month	Last month	p
BG (mg/dl)	178±23.6	182.6±32.7	0.55	159.7±32.3	166±36.3	0.46	162.7±30.3	169±30	0.01
Standard deviation of BG (mg/dl)	83±19	86±13.6	0.4	75.6±8	75±24	0.9	72.6±16	76±17	0.007

SD = Standard Deviation
BG = Blood Glucose
* some data values missing from System

References

1. Hautier-Suply O, Friedmann Y, Shapley J. A retrospective review of the clinical characteristics and blood glucose data from Cellnovo System users using data collected from the Cellnovo Online Platform. *European Endocrinol*, 2018;14(1):Epub ahead of print
2. Kelly P. Achieving effective glycaemic control using an insulin micro-pump. *British Journal of Community Nursing*. 2017. 22; 2:66–75