Is living a dolce vita with diabetes possible? – metabolic control and quality of life in patients treated with 640G system

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Introduction

- SmartGuard technology was designed to reduce a number of hypoglycemia episodes and improve metabolic control.
- Pediatric population is not homogenous, as child matures the diabetic challenges also change.

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Study group

- 26 girls, 18 boys with diabetes mellitus type 1
- Median age: 9.32 years old (SD=3.93)
- Median diabetes duration: 48 months (SD=37)
- Median age at diagnosis: 4.46 years (0.75-14.6.)
- Mean HbA1C before 640G therapy: 7.61% (SD=1.81)
- All patients were treated with 640G insulin pump after had been treated with other insulin pump
- Median time of 640G pump usage: 10 months (SD=6.48)
- Patients divided in 3 age groups: I(3-6 y/o), II(7-10y/o) III(11-19y/o)

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Methods

Data collected from pump memory:

- time of suspension before low
- time of suspension on low
- time of sensor use
- average blood glucose
- basal insulin dose
- time in desired glucose level (AUC=70-140 mg/dl)
- AUC <70

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Results

Analyzed correlation	All age groups	I age group	II age group	III age group
Blood glucose variability vs AUC in target range	-0,69*	-0,82*	-0,46	-0,72*
Blood glucose variability vs HbA1C	0,47*	0,18	0,50	0,64*
SusBL vs age	-0,32*	0,26	0,09	-0,09
Blood glucose variability vs SusBL	0,04	-0,69*	0,36	0,19
Complex boluses vs AUC in target range	0.32*	0.20	0.52*	0.08

Values marked with * are statistically significant p<,05

Blood glucose variability measured as systemic deviation of blood glucose value
SusBL- suspension before low
BG- blood glucose

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Results

- Metabolic control defined as a mean level of HbA1C improved, from 7.61% pre 640G to 6.71% on 640G therapy
- Stastically in all age groups factor that lowered time within desired glucose target (AUC= 70-140mg/dl) was higher glucose variability
- The older the child is, the less SusBL appears
- Usage of complex boluses increases AUC in target

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Quality of life

- The points in each section are correlated with the deteriorating impact of diabetes on particular area of life.
- Patients worry less about complicaitons and while using 640G communicate more open about their diabetes.
- Although patients are impressed with 640G therapy, the everyday symptoms are still a factor that impedes the quality of life.

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Aims

- Evaluation of glycemic control before and after introduction of Medtronic Minimed 640G personal insulin pump system measured by HbA1C in patients treated previously with insulin pump.
- Evaluation of quality of life in patients treated with 640G system in different age.

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Methods

- Clinical data: age, HbA1C before and after introduction 640G
- Data collection from 30 day period from pump memory
- Glycemic thresholds set for low and high blood glycemia: 70-140 mg/dl
- Quality of life was measured by PedsQL 3.2 and authorial questionnaire made by our psychologist
- Statistical analysis were performed for age groups and all patients using Statistica 13 Statsoft Software

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Results

Analyzed parameter	All patients	I age group	II age group	III age group
Age (years) (M'+sd)	9.32 (3.93)	5.50 (1.15)	8.00 (1.17)	13.00 (2.05)
HbA1C (%) before 640G (M+SD)	7.61 (1.80)	7.46 (0.92)	6.91 (0.62)	8.46 (2.63)
HbA1C (%) after 640G (M+SD)	6.71 (1.42)	6.72 (0.32)	6.46 (0.86)	7.44 (1.05)
Time of suspension before low (minutes/day) (M'+SD)	196.00 (103.78)	242.50 (101.13)	197.00 (95.87)	110.00 (93.13)
Time of suspension on low (minutes/day) (M'+SD)	3.50 (7.22)	6.00 (5.97)	3.00 (6.23)	0.00 (9.04)
Time of sensor use (M'+SD)	152.00 (52.79)	154.00 (60.73)	157,50 (42.50)	146.00 (56.94)
Average blood glucose (M' +SD)	152.00 (32.20)	139.00 (24.11)	152.00 (24.27)	158.00 (39.92)
Time in desired glucose range (AUC=70-140 mg/dl) (M'+SD)	79.60 (16.31)	82.10 (10.32)	74.60 (14.96)	79.60 (20.69)
AUC <70 (M+SD)	0.30 (0.31)	0.50 (0.38)	0.37 (0.30)	0.30 (0.24)
Blood glucose variability (M'+SD)	61.00 (18.89)	62.50 (14.97)	58.00 (18.49)	52.00 (13.73)

M- mean M'- median

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PedsQL survey results

	Mean	SD	Min.	Max.	Points range
Diabetes	761.21	187.63	250	1050	0-1100
Treatment I (pain, shame, diet)	265.52	100.76	0	400	0-400
Treatment II (injections, exercises, measurements)	525.00	154.39	225	700	0-700
Worry	168.97	97.89	0	300	0-300
Communication	206.03	101.03	0	300	0-300

	R	p
Time on 640G & Diabetes	0.304	0.139
Time on 640G & Treatment I	0.535	0.005
Time on 640G & Treatment II	0.498	0.011
Time on 640G & Worry	0.409	0.042
Time on 640G & Communication	0.514	0.008

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Results

- Higher glucose variability impredes time in range for age groups I and III
- Higher variability increases HbA1C in age group III
- Time of suspension before low was negatively correlated with glucose variability in age group I
- Age group II benefited from using complex boluses due to imcreased time in range

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Conclusions

- 640G improves metabolic control in patients of all age.
- 640G improves perceived quality of life in all age.
- 640G is an effective treatment option in all age groups.

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