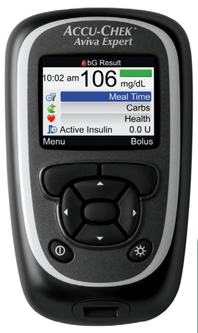
METABOLIC CONTROL AND GLYCEMIC VARIABILITY IN PEDIATRIC PATIENTS WITH TYPE 1 DIABETES IN MULTIPLE DAILY INJECTIONS THERAPY USING AUTOMATED BOLUS ADVISOR GLUCOMETER

Murillo-Vallés M.[1], Vázquez San Miguel F.[2], Martínez-Barahona M.[1], Bel-Comós J.[1]
[1]Pediatric Endocrinology Unit. [2]Multipurpose Clinical Research Unit, Unidad Polivalente de Investigación Clínica (UPIC).
Universitat Autònoma de Barcelona. Germans Trias i Pujol Hospital. Badalona, Barcelona, Spain.

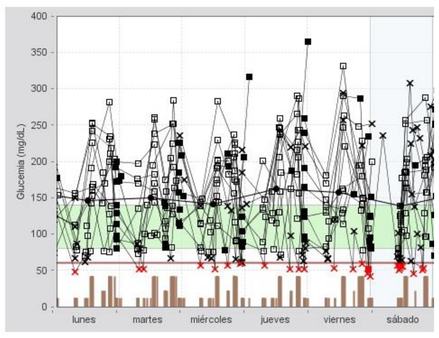
BACKGROUND, AIMS AND OBJECTIVES:

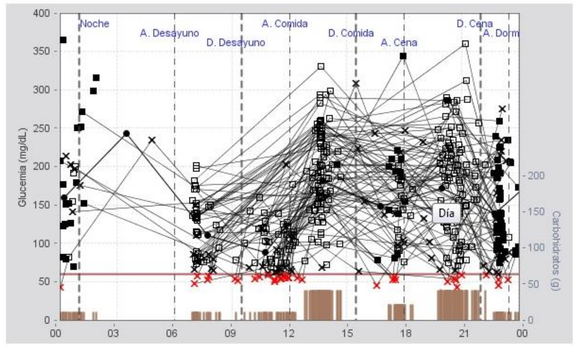
The management of DM1 in children is complex, requires a multidisciplinary team and knowledge of the benefits that can bring new technologies such as insulin bolus advisor glucometer. In patients on multiple daily insulin injection (MDI), insulin bolus advisor offer an opportunity to better adjust the insulin dose administered, as well as to evaluate and make more accurate monitoring of metabolic parameters of the patient through information they offer.
The aim of this study is to assess if there is an improvement in the control of diabetes using the glucometer-bolus advisor Accu-Check Aviva Expert® and define which patients might benefit most from this device.

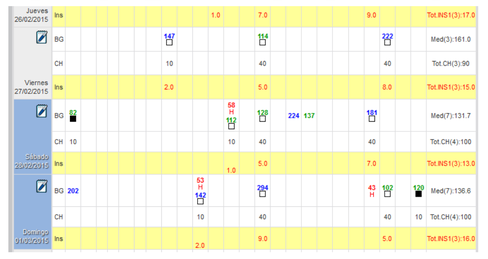
METHODS:



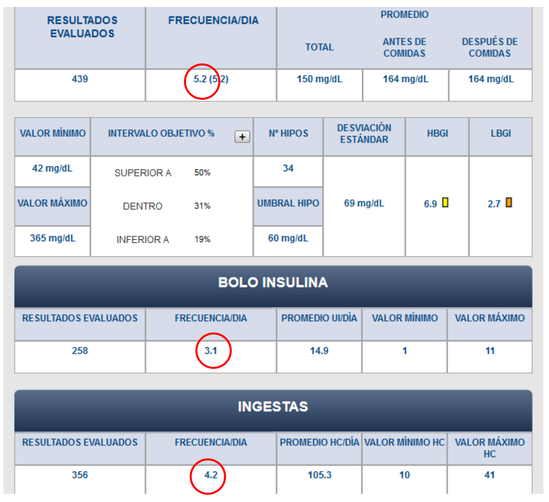
Diabetic patients on MDI → Monitoring visits to 3, 6 and 12 months → At each visit: capillary HbA1c (DCA, Siemens®), data uploaded via the portal Emminens eConecta







Metabolic control:
-HbA1c
Glycemic variability:
-standard deviation of glucose (SD)
-mean blood glucose (MG)
-No. of hypoglycemia in three months



RESULTADOS EVALUADOS	FRECUENCIA/DIA	PROMEDIO TOTAL	PROMEDIO ANTES DE COMIDAS	PROMEDIO DESPUÉS DE COMIDAS
439	5.2 (5/2)	150 mg/dL	164 mg/dL	164 mg/dL

VALOR MÍNIMO	INTERVALO OBJETIVO %		Nº HIPOS	DESVIACIÓN ESTÁNDAR	HBGI	LBGI
42 mg/dL	SUPERIOR A	50%	34	69 mg/dL	6.9	2.7
VALOR MÁXIMO	DENTRO	31%	UMBRAL HIPO			
365 mg/dL	INFERIOR A	19%	60 mg/dL			

BOLO INSULINA

RESULTADOS EVALUADOS	FRECUENCIA/DIA	PROMEDIO UI/DÍA	VALOR MÍNIMO	VALOR MÁXIMO
258	3.1	14.9	1	11

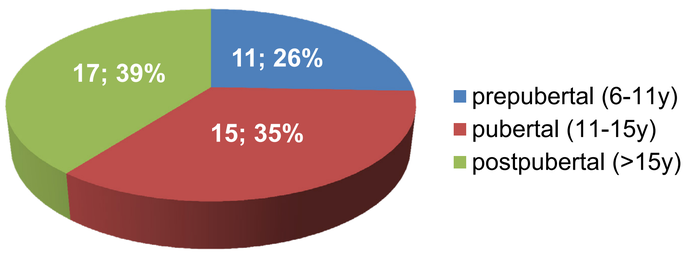
INGESTAS

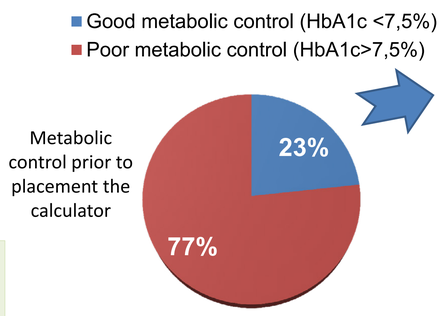
RESULTADOS EVALUADOS	FRECUENCIA/DIA	PROMEDIO HC/DÍA	VALOR MÍNIMO HC	VALOR MÁXIMO HC
356	4.2	105.3	10	41

-**Autocontrol:** frequency of self-management blood glucose (SMBG) tests performed daily
-**Adherence to the device:** number of intake values and number of bolus insulin uploaded per day

RESULTS:

Distribution of patients by age:





Patient characteristics:
-n: 43 patients
-Age average: 14 ± 3.5 years, 51,2% male.
-in 16,3% the reason to place was for hypoglycemia , in the rest (82.9%) was placed to improve control or to motivate the patient.
-The 86% of patients were caucasians, 11,6% from Latin America and 2,3% from Maghreb.

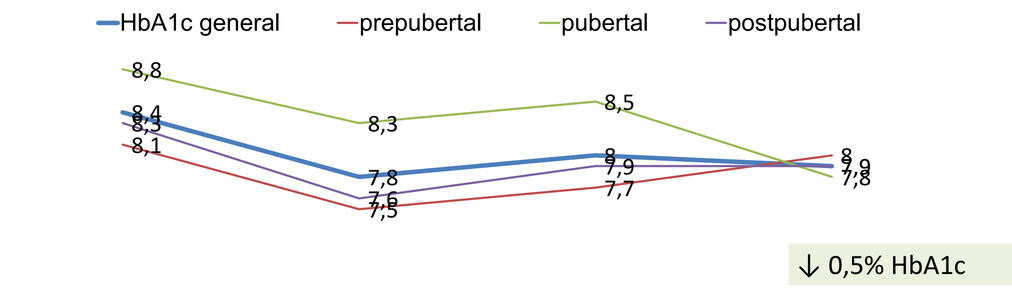
	HbA1c (%)	SD of glucose (mg/dl)	Mean blood glucose (mg/dl)	Number of hypoglycemia in 12 weeks
Basal (n: 43)	8,4±1,3	--	--	--
3 months (n: 39)	7,8±0,9	82±15	181±21	11,4
6 months (n: 37)	8,0±1	84±17	183±27	11,7
12 months (n: 24)	7,9±0,7	82±17	187±32	9

Evolution of HbA1c and glycemic variability parameters in all patients

	HbA1c	SD of glucose (mg/dl)	Mean blood glucose (mg/dl)	Number of hypoglycemia in 12 weeks
Poor metabolic control basal (n: 33)	8,9±1,1*	---	---	---
Good metabolic control basal (n: 10)	6,9±0,5*	---	---	---
Poor control 3m	8,1±0,9*	86±10*	187±20*	9,8
Good control 3m	7±0,6*	68±12*	161±12*	16,6
Poor control 6m	8,3±1*	87±15*	189±25*	12
Good control 6m	7,2±0,5*	71±12*	160±14*	15,2
Poor control 12m (n: 20)	8±0,7	88±18	189±33	10,5
Good control 12m (n: 4)	7,4±0,9	76±23	177±13	8,7

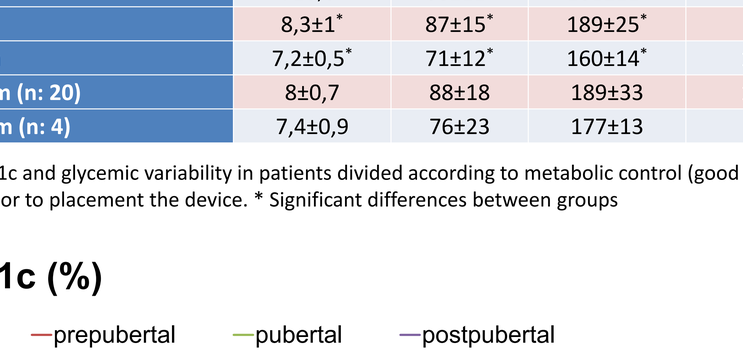
Evolution of HbA1c and glycemic variability in patients divided according to metabolic control (good control, HbA1c <7.5%) prior to placement the device. * Significant differences between groups

Evolution of HbA1c (%)



	Total daily insulin (U/kg/day)	Ratio basal/bolus (%)	ISF (Insulin Sensitivity Factor, mg/dl per U)
Prepubertal basal (n: 11)	0,95	57/43	65
Prepubertal 6m (n: 10)	0,76	54/46	60
Prepubertal 12m (n: 5)	0,80	58/42	63
Pubertal basal (n: 15)	1,08	57/43	38
Pubertal 6m (n: 12)	1,08	58/42	33
Pubertal 12m (n: 8)	1,03	59/41	30
Postpubertal basal (n: 17)	0,93	58/42	30
Postpubertal 6m (n: 15)	0,92	59/41	29
Postpubertal 12m (n: 11)	0,95	58/42	28

Evolution insulin requirements after placement the device according to the different ages



•No episodes of severe hypoglycemia or hyperglycemic decompensation was recorded during this time.
•We found no predictor of HbA1c and glycemic variability parameter since there were no correlations between them with age, years of evolution frequency of SMBG tests performed or frequency of intake values or number of bolus insulin per day

CONCLUSIONS:

- In our study using the insulin bolus advisor it has proved to be a good tool to improve metabolic control (HbA1c decreased), especially in patients over 12 years.
- The glycemic variability has not improved, perhaps due to the low number of patients and would lack baseline data because such data do not have to put the device.

ESPE 2015 762-P3
Diabetes 2
Marta Murillo
DOI: 10.3252/pso.eu.54espe.2015
Poster presented at: ESPE 2015 BARCELONA