The Accu-Chek® Solo tubeless micropump improves glycemic control and quality of life in adult and pediatric patients with type 1 diabetes: a pilot study

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Introduction:

- Insulin pump improves glycemic control and quality of life compared to basal-bolus therapy in Type 1 diabetic subjects (T1D).
- Some patients reject the use of pumps due to: use of a catheter, discomfort, lack of discretion, inability to practice some sports, etc.
- Accu-Chek® Solo (ACS) is the first tubeless patch pump available in Spain. It features a modular design, a 200U reservoir, and management through a Bluetooth-connected device.

Aim: To report the first experiences in Spain with ACS in adults and children with T1D.

Patients and Methods:

- Pilot study of 9 T1D patients from 7 centers of excellence in Spain (6 on basal-bolus therapy and 2 on conventional pump), being all of them users of flash glucose monitoring
- Device satisfaction in multiple aspects was evaluated using a 7 question ad hoc questionnaire
- Follow up: 1-12 months.

Results (1):

The reasons for starting with ACS in adults were:

- nocturnal hypoglycemia or hypoglycemia unawareness
- low insulin requirements
- poor glycemic control
- high physical activity
- refusal to use the catheter

The main reason for starting with ACS in pediatric patients where:

- greater discretion in pre-adolescence

Results (2):

- No technical issues were observed.
- Patients showed high degree of satisfaction
- The most valued characteristics were: absence of catheters, small size, and remote and discreet control.
- The aspects that could be improved were: mobile remote control, smaller size, larger capacity of insulin reservoir and integration with a continuous glucose sensor.

Patients		Adults							Pediatric patients					
Subject		1	2	3	4	5	6	Subtotal	7	8	9	Subtotal	Total	p
Age (years)		52	47	47	24	50	56	45.8 ± 11	12.6	13	12	12.5 ± 0.5	34.7 ± 18.8	
Gender		M	F	F	F	M	M		F	F	M			
Prev. therapy		MDI	MDI	MDI	MDI	Pump	Pump		MDI	MDI	MDI			
BMI (kg/m^2)		32.9	21	22.8	19.4	24.5	30	25.1 ± 5.3	23	21.2	20.5	21.5 ± 1.3	23.91 ± 4.5	
Diabetes duration (years)		2	6	37	17	20	40	20.3 ± 15	1	1.5	3	1.8 ± 1.04	14.2 ± 15.4	
HbA1c (%)	Before	7.1	7.5	7.8	7.4	7.6	6.6	7.3 ± 0.4	7.4	7.4	6.9	7.2 ± 0.3	7.3 ± 0.3	
	After	6.6	5.8	8.2	6.9	6.9	6.1	6.8 ± 0.8	6.0	6.6	6.7	6.4 ± 0.4	6.6 ± 0.7	0.037
GMI (%)	Before	7.1	7.1	7.6	7.4	6.8	7.0	7.2 ± 0.3	7.4	7.7	6.9	7.3 ± 0.4	7.2 ± 0.3	
	After	6.5	5.7	8.0	7.0	71.	6.6	6.8 ± 0.8	6.0	7.3	6.6	6.6 ± 0.7	6.7 ± 0.7	0.048
TIR (%)	Before	54	72	53	55	71	72	62.8 ± 9.7	75	41	44	53.3 ± 19	59.6 ± 13	
	After	78	95	74	70	66	88	78.5 ± 11	91	61	81	77.7 ± 15	78.2 ± 11	0.011
TBR (%)	Before	10	12	7	3	5	0	6.2 ± 4.4	7	0	8	5.0 ± 4.3	5.8 ± 4.2	
	After	4	2	2	1	2	0	1.8 ± 1.3	2	1	2	1.7 ± 0.6	1.8 ± 1.1	0.017
CV (%)	Before	41.1	42.2	43	40.6	36.6	35.3	39.8 ± 3.1	38	32.5	44.1	38.2 ± 5.8	39.2 ± 3.9	
	After	34.3	22.7	32.7	35.5	34.7	23	30.5 ± 6	31	32.3	33.7	32.3 ± 1.4	31.1 ± 4.8	0.008

MDI: multiple daily insulin injections; BMI: body mass index; GMI: glucose management indicator; TIR: time in range; TBR: time below range; CV: coefficient of variation. Data from flash glucose monitoring were obtained 4 weeks before ACS and in the last 4 weeks of the follow up.

Conclusions:

This study suggests that ACS is an effective and safe pump therapy option, as well an alternative to conventional pump therapy, being associated with improved glycemic control and high degree of satisfaction in adults and children with T1D.

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