IMPLEMENTATION OF AN INTEGRATED MANAGEMENT PROGRAM FOR TYPE 1 DIABETES ENABLED BY DIGITAL TECHNOLOGIES IN A SPANISH TERTIARY-LEVEL HOSPITAL

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BACKGROUND

■ Optimal type 1 diabetes (T1D) management imposes a considerable burden on patients, health care providers and payers.

■ Recent advances in the medical technology field have shown clear benefits in diabetes care.

■ The use of digital technology represents a step forward towards increased patient's self-confidence and engagement for diabetes management and offers health care systems the opportunity to measure and potentially improve patient performance and optimize resource consumption.

OBJECTIVE

■ The aim is to assess the impact of adopting digital technologies enabling an integrated care program for patients with T1D on insulin pump therapy alone or in combination with an interstitial fluid glucose monitor.

METHODS

■ INCAP (INtegrated CAre Program) represents an innovative approach to an integrated care management program for T1D enhanced by technology-assisted remote patient monitoring, mobile application and self-management educational programs.

■ It was funded by EIT Health (N° 19406) and had a duration of 18 months (started in January 2019). It was developed in Hospital Universitario Puerta de Hierro, Madrid-Spain, partnering with Medtronic Ibérica, Universidad Politécnica de Madrid, and Technische Universiteit Delft.

■ Information collected through the insulin pump´s software is classified in a color code, by an algorithm, based on a protocol developed in agreement with European clinical guidelines.
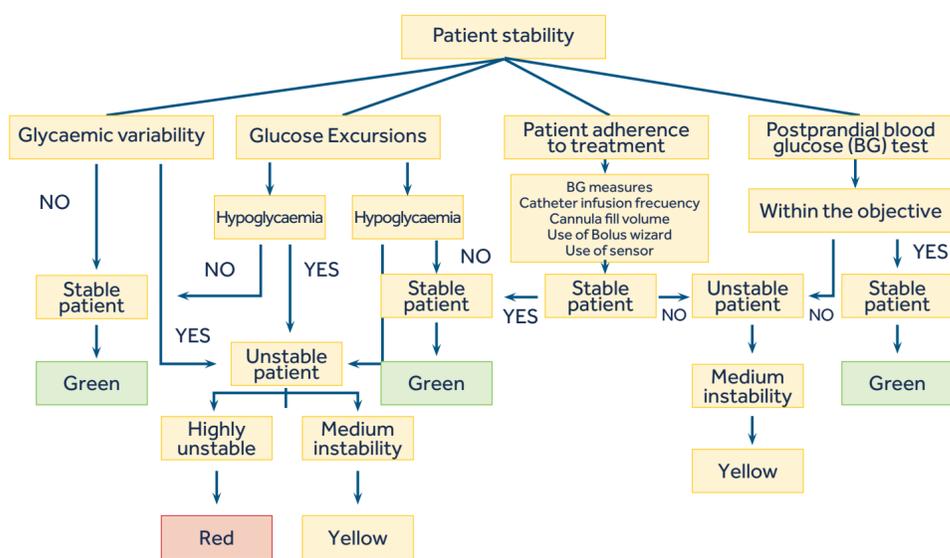

Figure 1. protocol for patient classification

■ Patient-centered outcomes measurement has been enabled through the patient app via questionnaires, i.e. Diabetes Treatment Satisfaction Questionnaire-status (DTSQs), Problem Areas In Diabetes (PAID) and Pediatrics Quality of Life (PedsQL) at baseline, and Diabetes Treatment Satisfaction Questionnaire-change (DTSQc), PAID and PedsQL at the end of the follow-up period.

RESULTS

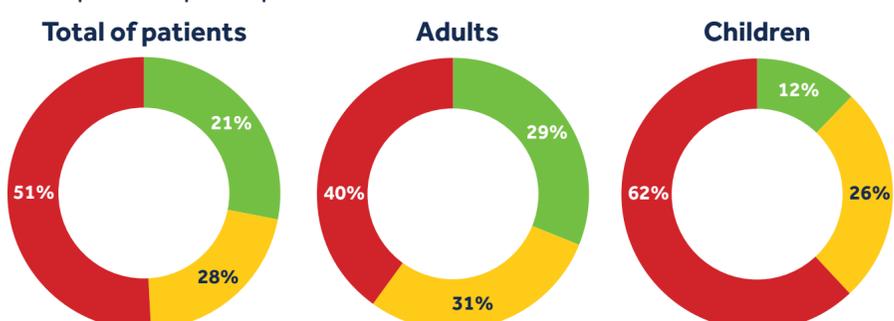■ 66 patients participated, of which 39 were adults and 27 children.

Figure 2. classification of the downloads

■ Red: Highly unstable   ■ Yellow: Medium instability   ■ Green: Stable

■ By the end of the project a total of 475 downloads had been analyzed (256 from adults and 219 from children).

■ There were 94 visits with the doctor (36 in adults and 58 in children) and 44 with the educator (30 in adults and 14 in children). In children, 9 visits were postponed and 15 were marked as expendable, for good patient control.

■ 420 questionnaires were received (225 adults and 195 children).

■ The Support Center made 153 telephone calls to patients (86 to adult patients and 67 to children) to ensure their adherence to the program.

■ In-office visits decreased from 1 hour to 20 minutes.

■ A clear improvement was seen in the patients at the end of the project, as shown in Figures 3 and 4, improving their self-management of the disease.
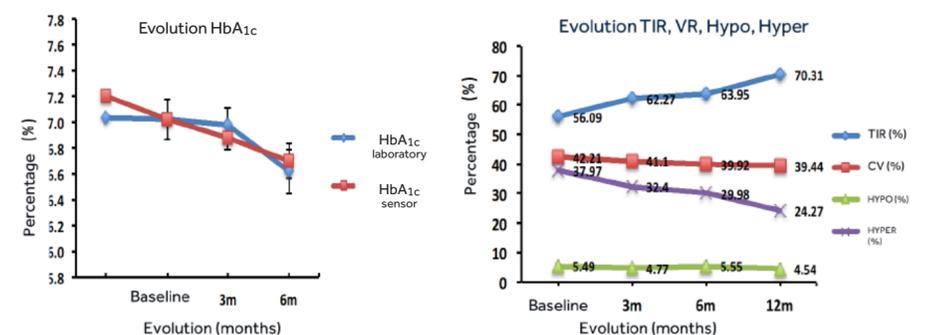
TIR: time in range   Hypo: time in hypoglycaemia   Hyper: time in hyperglycaemia   CV: coefficient of variation
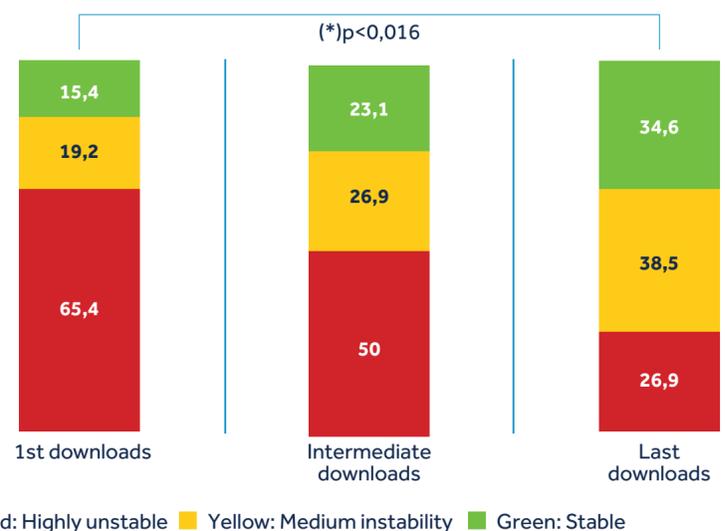
Figure 3. evolution of the parameters

■ Red: Highly unstable   ■ Yellow: Medium instability   ■ Green: Stable

Figure 4. evolution of the classification of the downloads

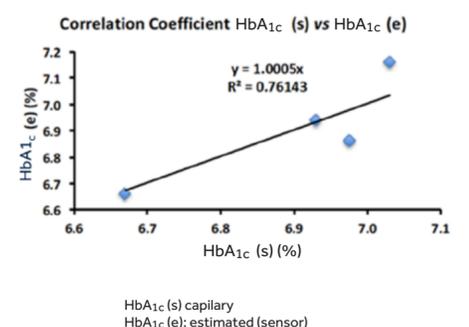■ Correlation between laboratory HbA_{1c} and sensor estimate was demonstrated (R2= 0.76143)

Figure 5. correlation HbA_{1c} capillary vs estimated

HbA_{1c} (s) capilary
HbA_{1c} (e): estimated (sensor)

CONCLUSIONS

■ The implementation of an integrated solution for this patient profile in a hospital or hospital network, has been shown to optimize the entire care process, making it more efficient, and has a positive impact on patient health outcomes.

■ In addition, patients increase their knowledge and self-management of the disease as well as their empowerment and satisfaction due to the feedback they receive from their physicians after every download of their insulin pump.