

Tele-monitoring of type 1 pediatric diabetes patients by use of an optimized CGM dashboard: experiences from patients and health care professionals

Background and aims

Interpretation of CGM data is difficult and time consuming for both patients and health care professionals (HCP). We want to report experiences of patients, parents and HCPs on bi-weekly tele-consultations and its effect on metabolic regulation, while using our in-house developed Interpret-Dia dashboard.

Methods

CGM data from 44 T1DM patients (3–18 years) on a Guardian Connect were automatically uploaded in the patient health records of the hospital (see Fig. 1 below) between April 2017 and October 2017. Our Interpret-Dia dashboard visualized the necessary information for efficient tele-consultations: automatic ranking of patients according to calculated HbA1C, calculated HbA1C trend, trends in metabolic control over time, and alarms to the HCP in case of data loss. Bi-weekly, or more frequently in case of metabolic dysregulation, patients were contacted by phone to adapt their therapy.

HbA1C was measured with a BIO-RAD D100 system. Area Under Curve (AUC) in range is defined as 70–160 mg/dl.

Statistics were calculated with SPSS 25 and the paired-samples T test.

Results on system, complications and QoL

Fig 1: Mobile Health data flow for efficient tele-consultations

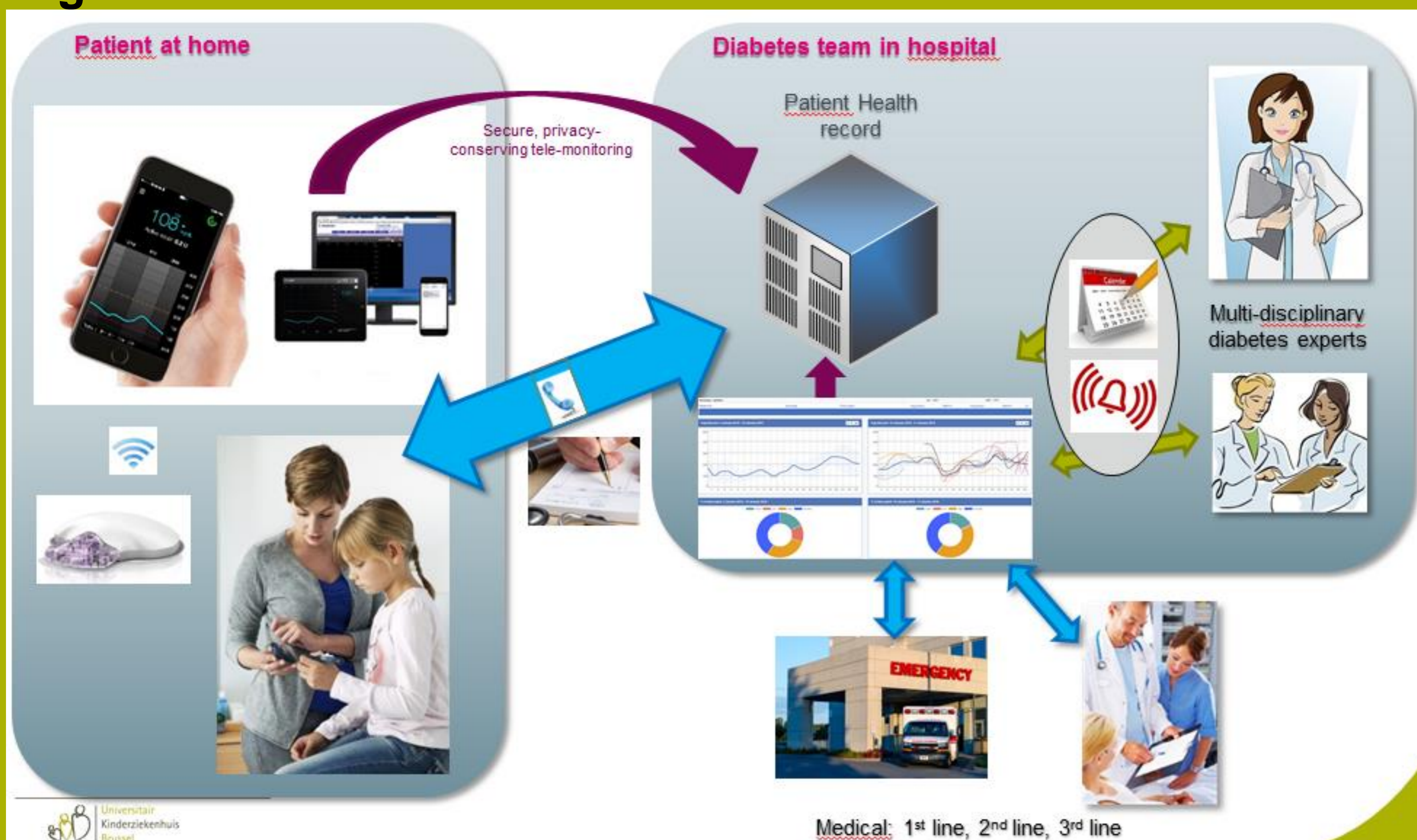


Table 1: Complications and QoL of consultations

N = 44		6 months without tele-consultations	6 months with tele-consultations	
Serious hypo (number)		9	1	
Hospitalisation (number of days)		29	9	
QoL (PDQOL/DQOLY)	Without tele-consultations	With tele-consultations	Significance	
Parents	12.7 ± 6.4	11.8 ± 5.6	0.273	
Adolescents	66 ± 29	60 ± 26	0.193	

70%: felt tele-consultations were very useful
76%: expressed a feeling of better diabetes control
78% reported an improvement of self-control
82% of participants would opt for future tele-consultations.

Results on metabolic control

HbA1C > 7.5%: improvement in 60% of patients (avg. -0.56)
HbA1C > 7.5% + compliant: improvement in >80% of patients (-0.8)
compliant = patient follows tele-advice of therapy (micro) adjustments
All patients had a decrease of time in hypo

Table 2: Total group of patients

	Before	☎	Sig.	N
HbA1C (%)	7.7±1	7.8±1	0.441	44
AUC in range (%)	41±15	42±11	0.575	32
AUC in hypo (%)	8±6	5±3	0.005	32
AUC in hyper (%)	51±16	52±12	0.480	32

Table 3: Patients with HbA1C > 7.5% at start

	Before	☎	Sig.	N
HbA1C (%) M3	8.3±0.6	8±0.7	0.024	25
HbA1C (%) M6		8.1±1	0.176	
AUC in range (%)	35±10	38±7	0.074	19
AUC in hypo (%)	8±7	5±3	0.037	19
AUC in hyper (%)	57±11	56±7	0.801	19

Table 4: Compliant patients, HbA1C > 7.5% at start

	Before	☎	Sig.	N
HbA1C (%) M3	8.1±0.5	7.6±0.4	0.029	8
HbA1C (%) M6		7.3±0.3	0.001	
AUC in range (%)	38±13	44±5	0.062	8
AUC in hypo (%)	6±6	4±3	0.348	8
AUC in hyper (%)	57±11	52±6	0.070	8

Table 5: Patients with HbA1C < 7.5% at start

	Before	☎	Sig.	N
HbA1C (%)	6.9±0.7	7.3±0.8	0.001	19
AUC in range (%)	50±17	48±14	0.541	13
AUC in hypo (%)	7±5	5±2	0.054	13
AUC in hyper (%)	42±19	47±15	0.245	13

Conclusions

Regular tele-consultation with remote analysis of CGM data by the medical team improved significantly the metabolic outcome of compliant patients with an HbA1C above target. Tele-consultation was very well accepted by patients and parents, and decreased the number of severe complications and hospitalisations. Using diversified therapy and therapy methods based on patient profiles will lead to value based health care where we use the right approach for every patient in a cost efficient way.