SUPPLEMENTARY DATA

Education on basal/bolus insulin regimen

At the time of inclusion, all the patients received reinforced education on target glucose values, insulin dose management, insulin to carbohydrate ratios and correction factors and were asked to perform SMBG at least three times daily

Patient education can either be achieved in-hospital or via out-patient care. Although the educational program will vary from team to team, it should include:

- **TARGETED RANGES OF GLUCOSE LEVEL(1)**
  Preprandial capillary plasma glucose 90–130 mg/dL (5.0–7.2 mmol/L)
  Peak postprandial capillary plasma glucose† <180 mg/dL (<10.0 mmol/L)

- **GUIDELINES FOR ADAPTING INSULIN DOSES**

- **Projected adaptation**

Insulin doses are modified according to the previous days' glucose levels.
Patients learn to separately adapt the basal and prandial insulins.

Patients treated with subcutaneous pumps

- The nocturnal basal rates are adapted to middle-of-the-night and awakening glucose levels (times need to be established for each patient). The daytime basal rates are set according to pre-prandial lunch and pre-dinner glucose levels or in the course of a day of carbohydrate-free diet (partial or total).
- The meal bolus is based on the post-prandial glucose levels (two hours after the start of the meal).

Patients treated with multiple insulin injections (three rapid analogs + one or two basal (or long-acting) insulin analogs

- The basal insulin is equivalent to the pump basal rate and is adjusted to middle-of-the-night and awakening glucose levels.
- The rapid analogs are adjusted the same way as are the bolus.

Changes in insulin doses are usually made by adding or subtracting about 10% of the dose the patient received on preceding days.
With regard to prandial bolus for patients practicing functional insulin therapy, the setting is not on the total prandial dose, but rather on the "CHO ratio" or "units per portion or grams of carbohydrate".
In case of any impaired glucose control, it is best to wait a few days to confirm the impaired control before increasing the insulin dose.

SUPPLEMENTARY DATA

Compensatory Adaptation

Compensatory adaptation provides corrections for any unusual rise in glucose (variations of food intake, obstructed catheter….).

Rapid insulin analog is used in varying doses according to glucose levels. This is in addition to the usual insulin dose.

Some centers provide patients with their compensatory dose, that is, the rapid insulin dose required to lower blood glucose by 100 mg/dL.

The presence of ketonuria or ketonemia is investigated if the blood glucose is greater than 250 mg/dL. If ketone is detected, a variable insulin dose is administered. Patients treated with an insulin pump receive this by injection. This procedure is repeated two to four hours later.

- **LEARNING TO COUNT CARBOHYDRATES**

Patients will receive training in assessing carbohydrates. This can be achieved in two ways:

- as part of functional insulin therapy education or
- as part of a fixed meal plan. In this case, patients will have a fixed allocation of daily carbohydrates.

SUPPLEMENTARY DATA

Specific education on how to analyse and make use of the CGM data

Patients were instructed to adjust basal insulin doses according to the nocturnal values of CGM stored in the device memory. Each morning, the patients had to review the nocturnal values stored in the monitor memory and write on a notebook the lowest value between midnight and 4 am and the lowest value between 4 and 8 am. The basal nocturnal insulin doses had to be adjusted when the recorded values were outside the targeted range (90–130 mg/dL or 5.0–7.2 mmol/L).

The patients were also asked to adjust prandial insulin doses according to the postprandial glucose values supplied by the CGM device, especially the highest one. Before lunch, dinner and at bed-time, the patients had to review the post prandial values stored in the monitor memory corresponding to the preceding meal and to write the highest postprandial value on the notebook. The fast-acting insulin/carbohydrate intake ratio had to be adjusted when the postprandial values fell outside the targeted range (<180 mg/dL or <10.0 mmol/L).

At each sensor change, the patients had to indicate, on a specific summary sheet (cf Appendix 3), their conclusions about needed dose adjustments, i.e., the changes of basal and prandial insulin amounts.

CGM data stored in the device memory were downloaded at each visit to a computer equipped with a specific software. Graphs of CGM were supplied to help the physicians and the patients to further adapt the therapy.

SUPPLEMENTARY DATA

Conclusions on the CGM data

PATIENT SUMMARY SHEET for sensor n°….

- You have worn the device for 5 days. During these 5 days, your insulin doses were:
- Basal insulin (or basal rate):
- Prandial Insulin (or bolus):

Morning: Afternoon: Evening:

- At the end of this sensor, what decisions did you take:

1. Basal insulin or basal rate:

Am I within my nighttime goals? YES NO
Am I within my late afternoon goals? YES NO

If you have answered "no", the modification of your basal insulin dose is:

2. Prandial insulin or bolus :

Am I within my morning goals? YES NO
Am I within my lunchtime goals? YES NO
Am I within my evening goals? YES NO

If you have answered "no", the modification of your prandial insulin is:
Morning: Afternoon: Evening:

- Specific situations

PHYSICAL ACTIVITY:
Type of activity:
Time of Activity:

Modifications:
- Decreased rapid acting insulin beforehand
- Decreased rapid acting insulin afterwards
- Sugar intake

Are measures during the activity good? YES NO
Are measures after the activity good? YES NO

If no, the changes are:

Down less
Down more
Increased sugar intake
Decreased sugar intake

SUPPLEMENTARY DATA

RICH MEAL

Time of meal:
Compared to my usual dose, by how many units was my dose of rapid insulin increased?
Are measurements good 3 h after meals? YES NO
If no, list modifications:

REFERENCES

1. American Diabetes Association. Standards of medical care in diabetes--2011. Diabetes Care 2007; 30:S4-41