

## Prevention of Hypoglycemia in Pre-School Children with Type 1 Diabetes Treated with Multiple Daily Injections

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### COLUMN ARTICLE

Paediatric Diabetes in Italy affects an estimated 160000 people. Several treatments have been proposed to guarantee patients a good glycometabolic control, but, especially in Multiple Daily Injections (MDI) treated patients, in the last decade the risk of hypoglycemia remained elevated. The RT-CGM (Real Time-Continuous Glucose Monitoring) technology, in which patients and/or their caregivers receive glucose alerts for hypo and hyperglycemia helps patients to calibrate insulin therapy and successfully decrease glucose oscillations. RT-CGM comprises a sterile disposable subcutaneous glucose sensor composed of a platinum microelectrode with a thin coating of glucose oxidase beneath several layers of a biocompatible membrane, a connecting cable and a communication device/smartphone enabling data stored in the communication device/smartphone itself to be downloaded to a personal computer. The CGMS analyzes the data every 10 s and reports an average value every 5 min. The sensor is inserted into the subcutaneous tissue using a spring-loaded device and an introducer needle. An electrical current is generated by glucose oxidase catalyzing the oxidation of glucose in the interstitial fluid. This current is stored as an electronic signal by the device, and the strength of the signal is proportional to the amount of glucose present.

RT-CGM systems automatically display glucose readings at regular intervals and utilize real-time alarms when sensor glucose levels reach predefined thresholds regarding hypoglycaemia and hyperglycaemia, as well as rate-of-change alarms for rapid glycaemic excursion. The use of real time-Continuous Glucose Monitoring (rt-CGM) Systems in MDI treated diabetic pre-school children is therefore potentially useful in order to prevent hypoglycemic risk. Several studies have investigated and demonstrated the benefits of RT-CGM use in order to avoid hypoglycemia, but they were conducted mainly on adult patients and/or treated with insulin pumps and not with MDI schemes.

CGM data of 24 pre-school children (M/F- 9/15) with Type 1 Diabetes for at least 1 year, treated with a basal-bolus MDI scheme with different basal insulin (glargine or degludec), were retrospectively evaluated at six months interval (before and after RT-CGM use).

Statistical analysis using the t-Test for paired data showed a significant decrease in time spent in hypoglycemia (< 70 mg/dl): in particular, the time spent in hypoglycemia decreased from 6.78% (SD 1.2) to 2.02 (SD 0.92).

The use of RT-CGM in pre-school DM1 children treated with an MDI scheme is effective in reducing the risk of hypoglycemia, regardless of the basal insulin used [1-8].

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