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LETTER

Letter to the Editor Regarding: Continuous Glucose Monitoring in Type 2 Diabetes Mellitus Patients in Primary Care

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Dear Editor,

It was very interesting to read the manuscript "Continuous glucose monitoring: a brief review for primary care practitioners" written by Ajjan et al. [1] on the topic of continuous glucose monitoring (CGM). As claimed in the paper published in *Advances in Therapy*, data on CGM use in type 2 diabetes mellitus (T2DM) (especially without insulin therapy, which is the most prevalent in primary care) are scarce. So, we decided to share our own experience based on a previously conducted study that was approved by The Medical Ethics Committee of the Medical School, University of Zagreb and all participants gave informed consent.

In our study 20 primary care practitioners (PCP) recruited 100 patients with T2DM treated with oral antidiabetics. The median (min–max) age of PCPs, working experience, number of enlisted patients, T2DM in care, and daily visits were 51.5 (42–62) years, 26 (16–36) years, 1980 (1550–2100) patients, 139 (48–318) patients, and 73 (66–82) patients/day, respectively. Patients were monitored with a professional CGM device (iPro^{TM}2 Medtronic; sensor life 6 days). Both the patient and physician were blinded for the CGM data until after the data were downloaded. Indications for CGM were clinical suspicion of hypoglycemia (30%) or disproportion between actual levels of glycemia and A1C levels (70%). A total of 41 male and 59 female patients with T2DM and a median age of 65 years (range 40–86) were included in the study. At recruitment the median hemoglobin A1C, age, T2DM duration, and body mass index of the patients were 7% (5.7– 11.5%), 65 (40–86) years, 7 (1–36) years, and 30.04 (21.30–41.45) kg/m^2 respectively. The majority of patients (74%) were treated with one (33%) or two (41%) oral hypoglycemic drugs while three agents were used in 23% and four in 3% of patients. Metformin was used in 90%, sulfonylurea in 49%, pioglitazone in 13%, dipeptidyl peptidase 4 (DPP4) inhibitors in 35%, and sodium/glucose cotransporter 2 (SGLT2) inhibitors in 7% of patients.

CGM data of 94 patients were analyzed. CGM of six participants revealed no data: in four cases the sensor itself was not applied properly (probably because of poor durability of the adhesive used for attachment of the sensor to the skin during extremely hot summer days)

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and in two cases there was no record on the system upload for no obvious reason. A total of 38 participants had at least 1% of time and/or blood glucose area under the curve (AUC) below 3.9 mmol/l. In 32 participants these events were in the time period between 23:00 and 06:00 (percentage of time range 2–100). More than half of patients had median fasting blood glucose level above 7.2 mmol/l. A total of 18 participants had blood glucose level above 8.3 mmol/l in the time period between 23:00 and 06:00 for more than 50% of the time. Measured mean standard deviation was 1.9. Among patients with registered hypoglycemia, ten patients had monotherapy (nine of them were on metformin), 19 patients had dual therapy (58% had metformin plus oral insulin secretagogues prescribed), and nine had triple therapy (56% with metformin plus oral insulin secretagogues plus DPP4 inhibitor) prescribed. Only 12 patients registered subjective sense of hypoglycemia in their respective diaries.

With an almost 40% detection rate, more hypoglycemia than we suspected was found. Since there was no record of severe hypoglycemia and most hypoglycemia happened during the night, without use of CGM, these events would otherwise go unnoticed. In order to reduce the risk and fear of hypoglycemia, hypoglycemia unawareness, and hypoglycemic events, improved patient and physician education on optimal detection and understanding of hypoglycemia and the benefits of detailed blood glucose measurement, such as CGM, is needed [2]. Unexpectedly, about a quarter of patients with registered hypoglycemia were treated with metformin as monotherapy. Metformin does not usually cause hypoglycemia when administered as monotherapy. In those rare cases hypoglycemia was suspected to be caused by additional blood glucose-lowering effects of the angiotensin-converting enzyme inhibitor and the non-steroidal anti-inflammatory drug possibly combined with suboptimal nutrition and/or too strong exercise [3].

We conclude that by using professional CGM to track patterns of glucose values in patients with T2DM in primary care offices it is possible to identify hypoglycemia unawareness, nighttime hypoglycemia, and fluctuations of glucose that would otherwise go unnoticed. In order to provide their patients with T2DM a treatment as individualized as possible, PCPs should embrace new technologies such as CGM.

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Compliance with Ethics Guidelines. This article is based on previously conducted studies and does not contain any studies with human participants or animals performed by any of the authors.

Peer Review. Please note, contrary to the journal's standard single-blind peer review process, as a Letter to the Editor this article underwent review by a member of the journal's Editorial Board.

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