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Utilization and Challenges of Continuous Glucose Monitoring in Sensor-Augmented Pump Therapy: A Patient Experience Analysis

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We write this letter as a brief report of our personal observation on utilization and challenges of continuous glucose monitoring (CGM) in sensor-augmented pump (SAP) therapy.

Studies showed that augmenting insulin pumps with CGM result in improving glycemic control.[1,2] However, multiple barriers leading to underuse of CGM are identified. These include pain, skin complications related to adhesive strips, alarm fatigue, concerns about accuracy, loss of sensor connectivity, discrepancies compared to capillary glucose readings, and interference with daily activity and exercise.[3]

We describe our observation in a cohort of patients in relation to frequency of utilization of CGM in SAP therapy and patients' views of its advantages and limitations.

We report our observation on 50 children and adolescents with type 1 diabetes using SAP therapy. Participants were interviewed using a questionnaire to assess frequency of use, advantages and limitations of CGM. Mean age (SD) was 12.29 (3.8), with a mean duration of diabetes of 5.7 (3.3) and mean duration for pump use of 2.4 (1.96) years. Mean (SD) HbA1c was 8.62 (1.47).

Over half of patients interviewed used CGM in a suboptimal frequency. We found that although 14% used it daily, 86% did not. We also found that 14 (28%) used it for 2-3 days/week, 14 (28%) used it for few days a month, and 15 (30%) had never used CGM to augment their pump therapy. There was a statistically significant difference in the HbA1c and the frequency of CGM use ($P = .001$) (Table 1). We found no correlation between the frequency of CGM use and age or duration of diabetes. However, we observed a trend toward higher frequency of CGM use in patients with shorter duration of pump use. The main advantage of CGM expressed by the majority was the instant availability of glucose readings. Of participants, 25% found alarms on low readings useful while 10% considered alarms for high reading as a major advantage. Trend arrows, whether for low or high glucose trends, were the main advantage of using CGM in 16% of patients with 10% scored the automatic switch off for hypoglycemia high. The major limitations for using the CGM were a discrepancy between capillary and sensor readings and alarm fatigue. Cost was not a major reason for noncompliance with the CGM use. Other disadvantages of sensor use were reported to include allergy to adhesives leading to redness and itching, pain on insertion, sensor falling off, and bleeding/bruising.

Table 1. HbA1c and Frequency of Sensor Use.

Frequency of CGM use	Number	Mean HbA1c	SD
Daily	7	7.92	1.8
Weekly	14	7.85	0.60
Few days/month	14	8.53	1.16
Never	15	9.75	1.54
Total		8.62	1.47

Our observations are in agreement with international studies that confirmed the effectiveness of CGM in improving glycemic control.[1,2,4] In addition, and in agreement with other studies, we observed that CGM is underutilized by children and adolescents.[5] The cost of CGM has been reported to be a barrier to the consistency of CGM use.[6] However, underutilization or decline in CGM use has also been observed in centers where expenses are covered by national insurance programs like ours.

We conclude that CGM use to augment pump therapy is underutilized and its frequent use of is associated with a positive impact on glycemic control.

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Abbreviations

CGM, continuous glucose monitoring; HbA1c, hemoglobin A1c; SAP, sensor-augmented pump; SD, standard deviation.

Declaration of Conflicting Interests

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