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Continuous Glucose Monitors to Reduce ED Burden

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A continuous glucose monitor (CGM) is a small wearable device that tracks blood glucose levels throughout the day and night to give users real-time information on their blood sugar. At any moment, without pricking one's finger, patients can see what their blood glucose level is and the direction it's headed in with simple up, down, or sideways arrows. CGMs can alert the user to high or low levels while charting the blood glucose levels in five intervals, allowing for patients and providers to track them. CGMs measure glucose in the interstitial fluid of body fat as a proxy to the glucose in the blood. By giving real-time results, CGMs provide a plethora of information that can have a huge impact on diabetes management, helping patients make thoughtful decisions around food, exercise, insulin, and medications. These insights have significant potential to help improve patient safety by providing earlier recognition of rising or decreasing blood glucose levels. This holds special value, especially for older adults with Type 1 Diabetes (T1DM) who are more prone to experiencing adverse effects of a hypoglycemic event and subsequently need emergency medical care.

For those with T1DM, reaching and maintaining a target A1C level can be challenging, in part because of the associated risk of hypoglycemia, both mild and severe.[1] Results from a large, randomized control trial showed that CGM use in T1DM adults was associated with a significant reduction in A1C (mean = 0.5%) without an increase in hypoglycemia.[2] Furthermore, recent survey data has suggested that CGM use is associated with key quality of life improvements,

with most patients reporting that they feel more in control of their diabetes and safer from severe hypoglycemia.[3]

Use of continuous glucose monitoring (CGM) systems have become the standard of care for type-1 diabetics, particularly in children and adolescents. Currently, this expanding technology is being widely used in older adults with T1DM and, to a lesser extent, those with insulin-dependent type 2 diabetes.

Many barriers may prevent people from having or using this novel technology, including device cost (which can range from $100-300 depending on insurance coverage), skin discomfort, and social factors.[7,8] Clinicians' perceptions of the barriers faced by people with diabetes in their clinic may affect their willingness to prescribe CGM devices and support their use among people with diabetes. They tend to perceive barriers as being more significant than the reality for older adults with T1DM.[9] CGM provides an abundance of data, which sometimes creates challenges in self-management decisions, especially in older adults. In addition, the constant attention needed to interpret and react to CGM readings can be burdensome when other competing medical conditions or socio-economic problems arise.

In older adults with diabetes, Medicare covers the CGM. However, Medicare requires a limitation on the use of glucometers to only 3 fingerstick checks per day, and some patients require more frequent checks. Moreover, certain CGM devices have a few hour warm-up period where the patient is left in the dark regarding their glucose levels. And unfortunately, certain devices have range limits. For example, if glucose levels fall outside of <80 mg/dL or >250 mg/dL, the glucose level might read as high or low since CGM accuracy is reduced in these ranges.

Furthermore, as mentioned in the insulin delivery system discussion, cognitive and physical decline, decreased dexterity, and visual impairment can be a challenge for older adults. In addition, hearing impairment may interfere with alert notifications. These characteristics of our elderly can cause distress and impact the use of CGM systems.

On the other hand, CGMs have the potential to significantly improve the lives of older adults with diabetes, as they have show to be effective at decreasing the risk of hypoglycemia. Older adults with T1DM, especially those living alone and with advanced age, have higher rates of hypoglycemia and more glycemic variability than younger adults. [4,5,6] Not to mention elderly that suffer from hypoglycemia are associated with higher mortality, falls, myocardial infarctions, arrhythmias, and cognitive impairment. [6,10,11,12] Interestingly, the elderly with diabetes tend to land in the hospital more for hypoglycemia than for hyperglycemia. [6] Lastly, older adults have a high risk of hypoglycemia unawareness and do not recognize episodes of mild to moderate hypoglycemia, as they are asymptomatic. [13,14]

The ability to link CGM devices with smartphones allows users to share their data with designated individuals or clinicians who can monitor glucose levels remotely on compatible smart devices. This data-sharing capability can be helpful to families and caregivers, possibly leading to early intervention and a saved trip to the emergency department.

From 1990 to 2018, the number of US patients with diagnosed diabetes more than quadrupled, from 6.5 million to 26.8 million.[15] It is estimated that diabetes costs the US $237 billion, representing approximately 1 in 4 healthcare dollars spent.[15] Consequently, technology resulting in better control and reduced hospital visits could decrease costs, but the true value of these systems is yet to be determined.

With the aging of diabetics, there is an increased opportunity to use novel technologies to track and inform patients suffering from abnormal readings. One limitation will be that CGM devices can be difficult for certain patients, especially those with cognitive and physical decline. Yet, as similar technologies continue to advance, it is likely that CGM devices will lead to cost savings and decreased hospitalizations in the near future.

The authors have no conflicts to report.

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