Use of Continuous Glucose Monitoring in an Adolescents Poorly Controlled Type 1 Diabetes

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Conflict of Interest Disclosure

Conflicts of Interest
None

A conflict of interest exists when an individual is in a position to profit directly or indirectly through application of authority, influence, or knowledge in relation to the affairs of PENS. A conflict of interest also exists if a relative benefits or when the organization is adversely affected in any way.
Objectives

- Describe use of continuous glucose monitoring in children with diabetes.
- Describe role of CGM in adolescents with poorly controlled diabetes.
- Describe advantages and disadvantages of CGM use in adolescents with diabetes.

Case Study

- BR is a 13 year old male with type 1 diabetes for 3 years
- HbA1c has been in the 11% range for the last year
- He is currently on insulin pump therapy (started by another practice)
- Tests his blood sugar 2–3 times per day

Significance of the Problem:

- Second most common chronic childhood illness
- 215,000 children under the age of 20 with diabetes in the United States
- Large majority of children, adolescents and young adults with type 1 diabetes are not adequately controlled
- Poorly controlled diabetes can lead to a number of chronic complications
Continuous Glucose Monitoring CGM has been shown to lower HbA1c by 0.5–1% in adults and children with diabetes.

In patients at goal of control (HbA1c < 7.5%), CGM decreases hypoglycemia while lowering HbA1c.

CGM is only effective when worn 6 days a week or longer.

CGM lowers HbA1c when started in combination with insulin pump therapy more than pump therapy alone.

Clinical practice guidelines recommend CGM when HbA1c > 7.0% and patient can wear device 6 or more days per week (AACE).
CGM Devices Available in US

- Medtronic Guardian with Softsensor
- Medtronic 530G with Enlite Sensor
- Dexcom G4 with Share
  - adult and pediatric versions
- Animas Vibe insulin pump

Medtronic Guardian with Softsensor

- Sensor changed every 3 days
- Approved ages 9 and up
- Sensor is largest in size of other CGM devices
- Stand alone CGM device
- Newest Sensor is Medtronic Enlite
Medtronic 530G with Enlite Sensor

- Enlite sensor changed every 6 days
- Approved ages 16 and up
- Only available integrated into insulin pump
- Threshold suspend for hypoglycemia that is not corrected by patient

Dexcom with Share
Dexcom with Share

- Sensor change every 7 days
- Pediatric approval down to age 2 years
- Adult version has newer algorithm to give more accurate results

Animas Vibe Insulin Pump

- Approved for ages 18 and older
- Sensor is same as Dexcom
- No pump suspend for hypoglycemia
Patient and possibly family member always have a trend of blood glucose level

Studies have shown to improve glycemic control without worsening hypoglycemia

Costs: start up and ongoing monthly costs can be high, insurance coverage is limited but improving

Not all devices are approved for pediatrics

Extra thing to wear, patients may push back
Case Study

- BR was placed on a continuous glucose monitor in addition to his insulin pump
- At 3 months his HbA1c had improved from 11.0% to 8.9%

Recommendations

- CGM monitoring should be considered in children and adolescents with poorly controlled diabetes.
- Continuous glucose monitoring improved glycemic control in this adolescent with poorly controlled diabetes

Clinic Protocol for CGM use

- Any patient that is interested and has insurance that will cover CGM
- All patients do a trial of CGM for 7 days with the Dexcom sensor
- Educate them to make sure they understand that this is a trending device and fingerstick blood sugars must be done for insulin dosing


References

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