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PENS 2015 National Conference

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 illness¹
- › 215,000 children under the age of 20 with diabetes in the United States²
- › Large majority of children, adolescents and young adults with type 1 diabetes are not adequately controlled³
- › Poorly controlled diabetes can lead to a number of chronic complications⁴

Summary of literature search

- ▶ 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

Summary of literature search

- ▶ 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

Summary of Findings

- ▶ 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



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



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



Animas Vibe Insulin Pump

- ▶ Approved for ages 18 and older
- ▶ Sensor is same as Dexcom
- ▶ No pump suspend for hypoglycemia

CGM Advantages

- ▶ Patient and possibly family member always have a trend of blood glucose level
- ▶ Studies have shown to improve glycemic control without worsening hypoglycemia

CGM Disadvantages

- ▶ 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

Accuracy of current CGM devices

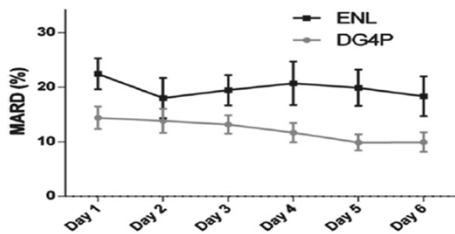


Figure 4. Average continuous glucose monitoring accuracy per day (mean absolute relative difference (MARD) \pm 95% confidence interval) for the Dexcom[®] G4 Platinum (DG4P) and the Medtronic Paradigm Veo Enlite (ENL) systems

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 adolescents 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

Questions?

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