Camping with the new Omnipod 5 Automated Insulin Delivery System (AID)

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Objectives:

- Understand the basic functionality of the new Omnipod 5 AID system
- Be able to describe which settings can be adjusted to improve diabetes management at camp
- Understand practical strategies and tips for helping maintain safe glucose levels during camp with the OP5
Automated Insulin Delivery (AID) Systems

- Automated Insulin Delivery refers to insulin pump delivery systems that respond to sensor data in determining insulin delivery moment by moment.
- There are 3 FDA approved systems on the market along with several non FDA approved open-source systems that you will see at camp this summer.
- None of the FDA approved systems are totally independent of the user and all require carbohydrate input.
- The three FDA approved pumps are:
  - Medtronic 670 and 770 G
  - Tandem Control IQ
  - Omnipod 5 (the newest system – which is the topic for today)
Omnipod 5 AID System

- **Pod= tubeless “patch” insulin pump**
  - Holds up to 200u insulin, replaced every 3 days

- **AID algorithm integrated into each pod**
  - CGM communicates *directly* to pod
  - Delivers “microboluses” every 5 min, based on projected glucose trends (60 min prediction horizon)

- **Customizable glucose targets** between 110-150 mg/dL
  - Can program different targets throughout day

- **Smartphone app** to operate pump, view data
  - Omnipod 5 app on compatible smart phone OR Controller (PDM) provided by Insulet
Manual Mode or Automated Mode

**Manual Mode** = conventional insulin pump
- No insulin automation
- Delivers programmed basal rates

**Automated Mode** = Automated Insulin Delivery (AID)
- Algorithm calculates basal insulin using CGM data & based on Total Daily Insulin (TDI)
- Does not use programmed basal rates
Dashboard Screen

- Blue = manual mode
- Purple = automated mode
Switching Modes

• Tap the Menu button

• Tap Switch Mode
CGM Graph

• Can see the last 3 hours of CGM data
• Visual representation of automated insulin delivery

Note: CGM Graph differs slightly in appearance depending on Mode
Omnipod® 5 App
+ Activates Pod
+ Displays alerts/alarms
+ Receives insulin delivery and CGM information

Dexcom G6® app
+ Starts sensor
+ Displays alerts/alarms

Omnipod® 5 Pod
+ Delivers bolus insulin commands from Omnipod® 5 App
+ SmartAdjust™ technology uses CGM values to automatically adjust insulin

Dexcom G6® CGM
+ Sends sensor values to Pod and Dexcom G6® app

Pod receives CGM values
+ The Omnipod® 5 App does not have to be near the Pod for basal insulin delivery in either Manual or Automated Mode.
+ It is recommended to keep the Omnipod® 5 App nearby as it displays important information such as alerts and alarms.
System Communication: Take Home Points

✔ Must use the ***Dexcom G6 app on personal smartphone*** to manage the CGM (start sensor sessions, troubleshoot sensor problems, calibrate sensor if needed)
  - Dexcom G6 app **cannot** be downloaded onto the Omnipod 5 controller

✔ CGM transmitter must be entered into Omnipod 5 App for automated mode to work

✔ Pod receives glucose data directly from the Dexcom CGM transmitter
  - Controller/smartphone with omnipod 5 app **does not** need to be in range of pod for automation to occur
Smart Bolus Calculator

• Bolus calculator may adjust bolus dose based on CGM trend arrow
  • In Automated and Manual Modes
  • May increase calculated dose if trend is up, may decrease if trend is down

• Tap “use CGM” to incorporate CGM value and trend into bolus calculation

• Manually enter CGM/BG value into BG box if desire NOT to incorporate CGM trend into bolus calculation
C.A.R.E.S. - Summary of Clinically Relevant AID Information

https://www.bdcpantherdiabetes.org/device-comparison
Calculate: Omnipod 5

• Automates Basal Insulin delivery ("adaptive basal") based on projected glucose trends (60 min into future) aiming for user-programmed target glucose value

• Automated insulin delivery based on Total Daily Insulin (TDI)

• TDI is updated with every pod change (~ every 72hr), permitting adaptation to changing insulin needs
**Adjust: Omnipod 5**

- **CANNOT** adjust basal rates

- **CAN** adjust **I:C Ratios** (for meal boluses), **correction factors** (for user-initiated correction boluses), **Target Glucose** (110-150 mg/dL), **active insulin time** (for user-given boluses)

- **Activity Feature** to reduce insulin delivery (uses target glucose 150 and restricts algorithm insulin delivery)

- Most useful parameters to change: **I:C Ratios, Target Glucose**
Revert: Omnipod 5

• “Automated: Limited”: static basal rate determined by algorithm.
  • Activates if no CGM communication with pod for ≥ 20 min.
  • Reverts back to full automation when CGM communication resumes

• May revert to manual mode (programmed basal rates) if at min/max delivery for several hours
  • User prompted to confirm CGM accuracy and then can switch back to Automated Mode after ~ 5 min.
Educate: Omnipod 5

- Pre-Bolus for all meals & snacks

- Wear pod and CGM in “line of sight” to optimize pod-CGM communication

- Do not override the bolus calculator for correction boluses
  - May be IOB from AID; increases risk of hypoglycemia

- Treat mild hypoglycemia with 5-10g grams of carbs; insulin delivery will have been suspended if hypoglycemia occurs
Sensor/Share: Omnipod 5

- Dexcom G6 CGM; factory calibrated; 10-day max. sensor wear
- User must use G6 mobile app to start/stop sensor sessions (cannot be done through Omnipod 5 app/controller) & receive CGM alerts
- Can use Dexcom share/follow for remote sharing of CGM data
- Omnipod Display/View app for pump data remote sharing
  - *Not available currently but expected to become available*
Practical Tip: Troubleshooting

Missing CGM values- Automated Mode: Limited

• This means the Pod is not receiving CGM data
  • Expected during sensor warm up after a new sensor is started
• If not in sensor warm-up, could be either
  • Dexcom CGM problem itself
  • Communication problem between CGM and pod
Troubleshooting: Automated Limited

Troubleshoot the source of CGM problem: Check Dexcom App to see if glucose is displaying on Dexcom App.

• If Dexcom app is displaying a CGM glucose value, then the issue is a communication error between the Pod and the Dexcom

• If Dexcom app is not displaying a CGM glucose value, then the issue is the Dexcom sensor itself (i.e. sensor error, sensor expiration)
Target Glucose Setting

- Only way to directly influence automated insulin delivery (AID)
- Used for bolus target for user-given correction boluses as well
- Can program 110-150 mg/dL in 10 mg/dL increments
- Can program different targets for different times of day
Questions?
Omnipod 5 is headed to camp

Key points to know
On camp arrival

- Consider setting activity target for the first few days at camp
- Or adjust the pump to a target range higher than is programmed (for example if the target is 110, consider changing to 130 mg/dl while at camp)
- Optional target values are 110 to 150 in 10 mg/dl increments

- Review insulin to carbohydrate ratios with the family on arrival
- Consider changing them to a less aggressive number as activity is generally higher at camp, and less insulin is needed to cover food
Troubleshooting: Hyperglycemia

Hyperglycemia after meals

- Strengthen I:C ratios to get more bolus insulin for meals
- This should only be done if the trend is consistent (several meals at that time sequentially)
- Make sure to consult with a provider prior to making any pump alterations
- Pre-bolus 15-20 min. prior to eating is helpful, but rarely an option at camp
Hyperglycemia

• If glucose is >250 mg/dl x 2 corrections and not correcting, check for ketones, give an injection of insulin and change the POD

• Consider turning off automation for 2-3 hours to prevent insulin stacking (may not be required – consider hypoglycemia history)
Troubleshooting: Hypoglycemia

• Low glucose values are common at camp due to increased activity
• Consider changing the target or using the exercise mode
• If pattern is generally two hours post a meal, consider making the insulin to carb ratio less aggressive
• If hypoglycemia is after a glucose correction, consider giving a less aggressive correction
• If hypoglycemia overnight, not related to bolus doses
  • Raise Target Glucose overnight
  • If delayed hypo related to exercise, turn on activity feature overnight
• If hypoglycemia is related to exercise
  • Consider trying Activity feature (activate 1-1.5 hours prior to exercise)
Managing hypoglycemia

• Omnipod 5 pauses insulin delivery when predicts glucose will drop below the glucose target

• If hypoglycemia occurs, it is very likely that insulin delivery will have been already been paused for a while

• Treat mild hypoglycemia with less carbs: 5-10g
  • to prevent rebound hyperglycemia, and subsequent hypoglycemia from increased AID
Exercise & Activity Feature

Activity feature:
Sets Target Glucose to 150 mg/dL **AND** additionally reduces automated insulin delivery

- May be useful feature for reducing hypoglycemia when reduced insulin needs/greater hypoglycemia risk is anticipated
  - Aerobic exercise
  - Reduced appetite/GI illness
  - Child away from parents, field trip, camp etc.
Activity feature

• Only available in automated mode

• Can be programmed up to 24 hours

• Can cancel easily after being programmed
Exercise & Activity Feature

• Activity feature may help prevent hypoglycemia with exercise
  • Trial & Error and individualized strategies needed
  • Enable 1-1.5 hrs before start of exercise for best results
  • Most useful for aerobic exercise, may not be needed for anaerobic or exercise that have a mix (soccer, volleyball, gaga ball)

• Be careful of high carb snacks prior to exercise- may result in increased insulin delivery & more IOB at start of exercise

• If Activity Feature is too conservative and high glucose results, try changing target glucose value instead
Case study #1

• Jacob is a 12 year old boy who enjoys reading and his parents state he is pretty sedentary with the exception of walking to and from school when it is in session

• He arrives at camp with his new Omnipod 5

• What would you consider to be a good practice in discussing options for settings in Jacob’s pump on arrival?
Case Study #2

- Janine is a 16 year old camper who is overweight. She enjoys sports, particularly mountain biking.
- Her most recent A1C was 10%.
- At camp she is struggling with lots of high blood glucose numbers, despite being on an Omnipod 5 AID system.
- You note very high glucose post meals, with gradual decline as the pump adjusts to the high values.
Case study #3

• Eleanor is an 8 year old camper who is high spirited and generally doing well with her diabetes management according to her parents.
• Her last A1C was 6.4%
• She is generally active and eats a lot of food
• During camp she is homesick and states she does not like the food so is eating little
• She is having lots of low glucose readings over the first 2 days at camp and adjustments do not seem to be making a difference
Camp and AID systems

• AID systems generally keep children safer than traditional systems
• The statistics demonstrate less hypo and hyperglycemia when using AID systems
• The biggest challenges at camp include:
  • Hypoglycemia due to an increase in activity
  • Infusion site failures which require a change in site
  • Misuse of the pump
Take home messages

- Automated insulin delivery system generally keep campers safer regardless of the system
- In the OP5 system when in automode you can make adjustments in
  - Carb ratios
  - Correction doses
  - Targets
  - Change to activity mode
  - Active insulin time (only impacts bolus insulin)
- While in automode changing basal rate does not impact the basal delivery
- The system automates basal insulin delivery based on the total daily dose
- Generally, settings can remain – except change the target by either using exercise mode (target of 150 mg/dl and reduction in basal rate) OR set target to higher (140-150) during camp
Resources


• https://www.omnipod.com/current-podders/resources/omnipod-5

• https://engage.active.com/landing_page/summercamp_2017

• https://diabetesjournals.org/clinical/article/40/2/168/138902/Clinical-Implementation-of-the-Omnipod-5-Automated
Happy camping!

• Questions?
Evaluation – please click on the survey link to answer 4 questions

https://www.surveymonkey.com/r/Q3DFPDR