General Education for all AID Systems

PID
(proportional-integral-derivative)
The insulin infusion rate is calculated according to the difference of the measured value to the glucose target value

MPC
(model predictive control)
The insulin infusion rate is determined from the predicted future glucose values based on trends in the immediate past

Fuzzy logic
"fuzzy" logic continuously adapts pump settings to the situation

AID mode

Basic prerequisites for stable glucose trends

- maximise time in AID mode
- allow the algorithm to work autonomously
- no external intervention by the user
  - such as entering fake carbohydrates
  - such as manual correction bolus
  - such as overriding recommended bolus dose
- monitoring glucose control
  - metabolic imbalance
  - verify CGM glucose values with finger sticks, even with factory calibrated sensor
- always enter carbohydrates and bolus before a meal
  - ideally 10 to 20 minutes before the meal
  - The insulin-to-carb ratio number in AID can be slightly lower for slightly larger bolus than in manual mode (see also Manual mode)
  - if applicable, split carbohydrate amounts >100 grams if the AID system does not do this by itself, otherwise postprandial hypoglycaemia is possible
  - if possible, mark meals rich in fat
- managing a missed meal bolus:
  - if <1 h after meal, bolus for 50% gCHO
  - if >1 h after meal, give correction dose only (possibly only at a glucose value ≥300 mg/dl resp. 16.7 mmol/l)

- hypoglycaemia management
  - consider treating with less carbohydrates (5 to 10 g)
- exercise
  - set up higher glucose target at least 1 h before exercise
  - **intake of consume** fast acting carbohydrates, if necessary, only near the start of exercise that lasts an hour or less
- disconnection of the insulin pump >15 minutes
  - always stop insulin delivery, otherwise algorithm malfunction is possible
- be patient and trust in the algorithm
  - the glucose trend changes more slowly than in manual mode
    - after correction for hyperglycaemia
    - after correction of hypoglycaemia
    - in everyday situations
- **insulin** action time is not always to be considered physiologically in some AIDS, like Minimed
  - differs, depending on whether it can be adjusted or is already predefined
  - to do this, refer to the tips in the relevant AID manual
  - Longer IATs reduce insulin stacking

To-dos

Become familiar with AID systems and their differences

General information

Revert

Revert to "manual mode"

certainly necessary in special situations
- with ketoacidosis, moderate ketosis, or unexplained higher glucose, immediately replace infuslin set and reservoir. Larger correction boluses will be needed due to lost basal insulin

maybe necessary in special situations*
- illness, especially an infection
- when taking glucocorticoids
- sports or extreme sports, or alternately, set up an alternate profile with lower basal and higher I:CR

after changing to manual mode
- use higher insulin-to-carb ratio if this was lowered in auto mode or you can enter 10 to 20 g fewer carbs

* abrupt changes in insulin requirements: to lower glucose without including insulin in the calculation of the basal rate and therefore lowering the latter.

Educate

Key education points

before switching to an AID system
- understand basic diabetes management
- practice estimating carbohydrates
- ketoacidosis training

after switching to an AID system
- know your AID's special features
- maximise time in AID mode
- always bolus for carbohydrates before the meal (otherwise the basal insulin delivery will already be increased by the algorithm; when a meal bolus is delivered late, insulin stacking and hypoglycaemia may occur)
- allow the algorithm to work autonomously and actively observe the effects