

Weekly Pharmacy Pearl: Managing Insulin Pumps in the Emergency Department

Situation

- ~ 30-40% with T1DM utilize some sort of insulin pump or continuous glucose monitor¹
- ED providers should understand how to manage and utilize these devices

Background

- **Insulin pumps** are continuous subcutaneous insulin infusion (CSII) devices that **deliver a continuous infusion of rapid acting insulin** subcutaneously
- **Continuous glucose monitors:** devices that measure subcutaneous interstitial glucose levels throughout the day, most of which communicate wirelessly to a receiver or a phone that displays the current interstitial level and recent trends
- Neither are completely automated and require patients and healthcare providers to:
 - Monitor and adjust insulin therapy according to blood sugar readings
 - Assess insulin pump for signs of malfunction

Assessment

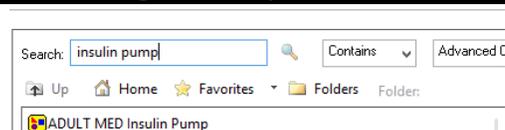
Contraindications to continuing insulin pumps:

- **Impaired level of consciousness or confusion**
- **Critical illness requiring ICU admission**
- **DKA or HHS**
- **Psychiatric illness or suicidal ideation**
- **Unable to use hands and/or physically manipulate pump due to injury or medical condition**
- **Refusal or unwilling to participate in self-care**
- Lack of pump supplies or mechanical pump malfunction
- Lack of trained healthcare providers or available diabetes specialists to supervise pump therapy

Discontinuing the Pump

- Check endocrine notes for potential emergency off-pump insulin plans
- Discontinue insulin pump
- Transitioned to a subcutaneous insulin injection regimen consisting of basal bolus insulin regimen, or continuous IV insulin infusion
 - If switching to basal bolus insulin injections, the pump should be discontinued 2 hours after the first dose of long-acting insulin is given.
 - Mealtime coverage should be given as rapid acting insulin boluses (lispro or aspart)
- Patients in DKA or HHS should be treated according to standard DKA/HHS protocol
- Once patient is medically stable, inpatient team will restart pump and make necessary adjustments to insulin rates prior to discharge

Continuing the Pump



- Patient must sign both the Atrium Health Insulin Pump Therapy Contract and the Patient Use of Home Medical Equipment form
 - Link in ADULT MED Insulin Pump PowerPlan
- Ensures that appropriate nursing communication and tasks are assigned so that insulin pump settings can be documented in the EMR
 - Ad Hoc Charting → General Nursing → Home Insulin pump and continuous glucose monitoring form

- All blood sugars checked in ED should be done by the bedside nurse with the hospital's glucometer. The nurse will then communicate each result to the patient.
- The pump should only be removed immediately prior to MRI, CT scan or X-ray. **The patient should stop the pump immediately prior to test** and the patient should disconnect the tubing and pump. The pump and tubing will be placed in a patient belonging bag with the patient's name on the bag and will be stored immediately outside the procedure room and will be reconnected immediately after the scan. If the test will take longer than 1 hour, RN to check blood sugar every hour and supplemental doses of insulin can be given as needed.

Adjustments for specific scenarios

Acute Kidney Injury	Decrease basal and bolus settings
NPO	Decrease basal rate by at least 20%
Decreased appetite or change in dietary habits	Decrease basal and bolus settings
Steroid use	Consult endocrinology for help decreasing the insulin sensitivity factor setting or stopping the pump
Weakness or impaired vision or hand strength	Evaluate pump management skills
Narcotic or anesthetic use	Evaluate pump management skills

Patient Requires Urgent Surgery

- Make sure surgeon and anesthesiologist are aware of the insulin pump
- **Consult endocrinology for insulin pump plan**
- < 1 hour surgery duration: keep pump on patient to manage corrections pre- and post-operatively
- 1-3 hours anticipated duration and **periop blood sugar normal**: patient can give 1 hour's worth of basal insulin as bolus and then remove pump prior to procedure
- 1-3 hours anticipated duration and **periop blood sugar extremely high**: remove pump and start IV insulin infusion
- > 3 hours: remove pump and start IV insulin infusion

Recommendation

- Continue insulin pumps if patient does not meet any of the contraindications to doing so
- Check for off-pump insulin plans in recent endocrinology notes if discontinuing the pump
- Consult endocrinology if continuing the pump to help with adjusting basal, bolus or insulin sensitivity factor settings for various disease processes

References:

1. Umpierrez GE, Klonoff DC. Diabetes technology update: use of insulin pumps and continuous glucose monitoring in the hospital. *Diabetes Care*. 2018;41(8):1579-1589.
2. Galindo RJ, Umpierrez GE, Rushakoff RJ, et al. Continuous glucose monitors and automated insulin dosing systems in the hospital consensus guideline. *J Diabetes Sci Technol*. 2020;14(6):1035-1064.
3. Thompson B, Korytkowski M, Klonoff DC, Cook CB. Consensus statement on use of continuous subcutaneous insulin infusion therapy in the hospital. *J Diabetes Sci Technol*. 2018;12(4):880-889.