Patient Safety Alert

Patient-owned Insulin Pumps

Introduction

In 2024, the Academic Medical Center Patient Safety Organization (AMC PSO) received a request from a member organization to convene regarding the inpatient management of patients with insulin pumps. Over the course of four months, a Task Force of frontline nurses and physicians in endocrinology, hospital medicine, surgery, emergency, and quality and safety assembled to review policies, education, and risks for managing patient-owned insulin pumps. The frontline experts identified three major buckets of risk associated with patient-owned insulin pumps: identification, assessment, and contingency planning. The following section outlines each area and the respective mitigation strategies identified by the Task Force. These recommendations are not meant to be all-inclusive strategies and should be used in accordance with organizational policies and safety goals.

DISCLAIMER

This document reflects the Task Force's recommendations for assessing current practices and developing interventions for mitigating risks associated with insulin pump management. These consensus recommendations were developed within the Patient Safety Evaluation System of the AMC PSO. They are for informational purposes and should not be construed or relied upon as a standard of care. The AMC PSO recommends that institutions review these guidelines and accept, modify, or reject them based on their own institutional resources and patient populations. Additionally, institutions should continue to review and modify these recommendations as the field evolves.

CASE EXAMPLE

Post-op Communication Confusion

A patient with type 1 diabetes mellitus, managed with an insulin pump, and peripheral vascular disease was admitted for a femoral-popliteal bypass graft. After the procedure, the patient was transferred to the post-operative care unit. Despite having type 1 diabetes and being on an insulin pump, endocrinology was not consulted. Without orders from the surgeon, the nurse instructed the patient's spouse to turn off the pump because the patient was sedated and unable to self-bolus. The patient was to be covered with sliding scale insulin (SSI), and about an hour later, their blood sugar was above 180. The surgeon was called, and they asked the nurse practitioner to order insulin; however, due to competing demands, the insulin was never ordered or given. These discussions were not documented.

When transferred to the floor, the patient's blood sugar was above 250, and the surgeon was not called. It is unclear whether the admitting team knew the insulin pump was off. Transfer orders included SSI along with finger sticks with meals and at bedtime, so they were given one unit of insulin (type unknown). No further testing was done until the following morning when the patient's blood sugar was above 400. A rapid response team was called, an insulin drip was started, and the patient was transferred to the intensive care unit for diabetic ketoacidosis. Serial cardiac enzymes indicated the patient had suffered a myocardial infarction.

Area of Risk: Identification

RISKS

Patient-owned insulin pumps are particularly challenging to identify in the following scenarios:

- In the Emergency Department (ED) during provider and nursing assessments
- During patient transitions of care handoffs to other care settings, e.g., to inpatient units, where patient-owned insulin pumps are often omitted
- Preoperative and procedure areas

MITIGATION STRATEGIES

- Structured discussions with patients to identify home medications and devices
- Clear documentation and communication of planned management of insulin pre, peri, and post-operative/procedure
- Pharmacist engagement in the medication reconciliation process to support identification of insulin products used by the patient
- Frontline clinician education regarding insulin delivery devices
- Enhancing electronic medical record (EMR) with the following:
  - ED Triage prompts related to diabetes and associated devices
  - Past medical history listing diabetes and associated devices
  - Flag or trigger to identify patient-owned devices and/or patients at risk for hyper- or hypoglycemia, e.g., type 1 diabetes
  - For hospitals with appropriate resources, auto consult for Endocrinology for patients with their own device
  - *(see also: EMR Considerations)*

Area of Risk: Assessment

RISKS

- Ambiguity on what to do during changes of clinical status and how frequently patients should be reassessed by clinicians, including, but not limited to, pre-op/pre-procedure planning
- No standardized policy for the management of patients with insulin pumps
- Lack of understanding across all care teams and roles of the different types of diabetes and insulin, and use of technology

MITIGATION STRATEGIES

- Establish policies and steps for how to care for patients with insulin pumps, including frequency and documentation of patient mental status, frequency and documentation of point-of-care glucose monitoring, contraindications for pump use (e.g., diabetic ketoacidosis, prolonged surgery, suicidal ideation), responsibility of patient to provide supplies, and a process for when the pump needs to be turned off and reinitiated (e.g., for magnetic resonance imaging)
- Hold annual training/education for all staff who care for patients with diabetes

Area of Risk: Contingency Planning

RISKS	MITIGATION STRATEGIES

• Requiring an Endocrinology consultation may not be feasible at all institutions
• Variability of on-staff endocrinologists to provide oversight
	• Develop an escalation protocol guide, inclusive of pathways for care and plans on what to do in different scenarios (e.g., during changes in clinical status, when the pump needs to be removed)
	• Address backups based on resources and Endocrinology availability at your institution
	• EMR opportunities
	  • Add contingency protocols and notes under orders in EMR to guide clinical teams on appropriate actions when a pump is discontinued and to provide an escalation of care protocol
	  • *(see also: EMR Considerations)*

EMR Considerations

Several members have recommended enhancing EMR functionalities to support the care of patients with insulin pumps. Such enhancements could be crucial to improving communication among care teams. It may help to ensure the staff is aware that the patient has a pump and can support escalation of care prompts for changes in clinical status. The AMC PSO hosted an additional meeting of Chief Medical Information Officer (CMIO) stakeholders to discuss the feasibility of some of the Task Force recommendations pertaining to EMR. This group has experience primarily with the EPIC and Cerner platforms, though most EMRs can be configured or custom-coded to support many of the recommendations made by the Task Force. For example, ED assessments can include a question regarding type 1 diabetes: if the response is "yes," the EMR will trigger a series of follow-up questions, such as insulin regimen and whether a pump and/or continuous monitor is present. The group also supported the use of actionable alerts. For example, if a patient was ordered insulin at any point during hospitalization but did not receive it within a predetermined time frame, the EMR can generate an alert indicating the need to reassess the patient and/or reorder insulin. The EMR could also include links to policies.

Despite these EMR opportunities, identification, assessment, and contingency planning remain challenging for this patient population, and system-level solutions should continue to be evaluated. One recommendation includes performing a proactive assessment of the patient journey through the health care system to identify potential risks and associated EMR-related mitigation strategies.

Summary

A Task Force of clinical experts convened under the auspices of the AMC PSO to discuss challenges associated with managing patient-owned insulin pumps and to share approaches to addressing these challenges. The Task Force identified three main risk categories as well as potential mitigation strategies. While not exhaustive of all concerns or strategies, the consensus recommendations of this group may aid in conversations and initiatives to improve safety for managing patient-owned insulin pumps in an inpatient setting.

REFERENCES

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