Inpatient Insulin Pumps Require Expert Management and Preparedness

Written by Wayne Kuznar

The complexity of insulin pump therapy requires expertise when managing insulin pumps used in patients admitted to the hospital, said Eileen R. Faulds, NP, CDE, Ohio State University, Columbus, Ohio, USA.

Continuing insulin pump therapy in the hospital may be appropriate for some patients, but they may require supervision or adjustment of their pump settings while they are hospitalized. Patients who are admitted to the hospital with severe hypoglycemia and altered mental status should not be continued on insulin pump therapy. Other reasons for discontinuing pump therapy include critical illness or sepsis, suicide risk, a request for a "pump holiday," caregiver unavailability when the patient relies on a caregiver for pump management, the need for magnetic resonance imaging or computed tomography (temporary discontinuation), surgery, and an inability to provide one's own pump supplies.

The most important indicator for identifying appropriate and inappropriate patients for continued pump therapy is available when reviewing the data from the insulin pump. The data may notify the educator that changes in pump settings (ie, adjustments in the basal–bolus ratio) are needed prior to inpatient use, even in patients whose blood glucose is well controlled, because blood glucose targets in the inpatient setting are generally higher (> 100 mg/dL) than those in the outpatient setting. These data can also be helpful in identifying the cause (eg, nonadherence to glucose monitoring or pump management, or insulin infusion-site issues) of diabetic ketoacidosis.

The main advantages to continuing pump therapy in the hospital are patient satisfaction and the control it provides the patient over their care. Pump therapy often provides superior glycemic control to multiple daily injections, especially in patients with low insulin requirements. The controlled environment in which pump settings are adjusted adds a level of safety.

A number of hospital situations present specific challenges for insulin pump users that must be managed. When patients are not allowed to eat, a temporary basal rate must be started. Faulds advised that in a patient with type 1 diabetes, the basal insulin should be reduced by 20% to 30%. The basal rate should be reduced by 20% to 50% in patients with type 2 diabetes.

Another issue is the use of glucocorticoids, which can cause increased insulin resistance. A longer-acting steroid has a relatively flat effect on glucose and requires a 20% to 100% increase in basal insulin. A shorter-acting steroid has a nonlinear effect. Providers have several options, including increasing the amount of prandial and correction insulin at breakfast, using a temporary basal rate timed to mimic the duration of the steroid, or giving an injection of neutral protamine Hagedorn insulin with administration of the steroid. Temporary basal rates are also useful in meeting the increased insulin needs associated with stress hyperglycemia. These temporary rates can be decreased gradually as stress hyperglycemia improves. For patients with renal failure, the duration of insulin action should be increased to 5 to 6 hours to mimic the reduction of insulin filtration by the kidneys.

If a patient must transition to multiple daily injections, 20% more basal insulin is typically required. Basal insulin requires 4 hours to take full effect, so the pump cannot be immediately discontinued. In transitioning back, the pump can be restarted 24 hours after injection of basal insulin.

The pump may be continued in the operating room for procedures lasting < 3 hours; however, a reduction in basal insulin rates may be necessary if the patient is not allowed to eat. Basal rates should be returned to home settings once the procedure is completed and the patient is ready to eat and drink. Supplemental insulin must be provided when the insulin pumps are discontinued for more than 1 hour.

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