

Children with Type 1 Diabetes on Insulin Pump Therapy: Guidelines for Emergency Room Management

This document was created by the pediatric endocrinologist at the Alberta Children's Hospital, Calgary, Alberta, Canada and is intended as a brief overview of insulin pump therapy (IPT) and treatment guidelines for physicians who are not familiar with this therapy.

It is recommended that patients print and carry this document when they are traveling in the event that they need to be treated in a center that is unfamiliar with IPT.

A continuous insulin infusion pump maintains a constant infusion of rapid acting insulin and allows for boluses of rapid acting insulin each time food is ingested and for corrections of elevated blood glucose levels. The patient does not receive long-acting insulin and the blood glucose levels can rise quickly if the pump fails, or the infusion cannula falls out or is improperly inserted. Insulin therapy via pump should be maintained except in the circumstances described below.

Diabetic Ketoacidosis (DKA)

Patients using insulin pumps can ***very quickly*** become ketotic and acidotic, so rapid assessment and treatment are essential. Patients presenting to the emergency room feeling unwell (lethargy, nausea, vomiting, abdominal pain, intercurrent illness, etc.) need to be immediately assessed for DKA. This includes blood glucose, ***urine/serum ketones***, electrolytes and capillary blood gas.

If DKA is confirmed, the insulin pump should be ***disconnected*** and ***not relied upon*** for treatment of the DKA. The patient should be treated using closely monitored intravenous insulin and fluid rehydration. For management of pediatric DKA refer to one of several published protocols available.

Severe Hypoglycemia

Severe hypoglycemia will need to be managed in the same way as other children with type 1 diabetes. In addition, the ***insulin pump must be disconnected***. If the patient is unconscious or seizing, he/she will require:

1. Bolus IV dextrose if IV access available at dose of 0.5 – 1.0 gram of dextrose/kg (2-4 ml/kg of D25W) up to an adult dose of 25 grams of dextrose (100 ml of D25W). This can be repeated as necessary.

OR

2. Glucagon (0.5 mg im/sc if <5 years old, 1 mg im/sc if >5 years old).

Insulin pump therapy can be restarted when the blood glucose is >6 mmol/L and the patient/family are prepared to resume monitoring blood glucose. Following the severe hypoglycaemic episode, the patient should reduce their basal and bolus doses of insulin by approximately 20% for several days **and** contact their Diabetes Clinic/ Diabetes Education Center. Their insulin regimen should be reassessed by their usual endocrinologist.

Infection at Infusion Site

If an infection develops at the site of the infusion set, the set should be removed and reinserted immediately at a different site. Appropriate measures for the skin infection will depend on the severity of the infection (cleansing, topical antibiotics, systemic antibiotics). Blood glucose will need to be closely monitored and timely corrections made by syringe or pump boluses, ***as hyperglycemia is common with infections. If ketones are present with hyperglycemia then corrections must be given by syringe or pen.***

Pump Failure

All families are instructed on how to “trouble-shoot” problems and manage their particular brand of pump. If the pump has failed, it is extremely important that the patient ***stop using*** the pump and begin administering ***rapid acting insulin by subcutaneous syringe injection*** until the pump can be repaired or replaced.

These patients can rapidly develop DKA, therefore, it is necessary to begin subcutaneous insulin by syringe injection if a high blood glucose is not corrected within 4 hours of treating it using the pump. Initial treatment with syringe injection should always be done using ***rapid acting analogues*** e.g. Humalog™, NovoRapid™ or Apidra™.

If a back-up insulin pump is not available for >24 hours, the patient may need to commence a basal/bolus insulin regimen by injection using an intermediate or long acting insulin e.g. Humulin N™ Novolin NPH™, Lantus™ or Levemir™.

If you require further information, contact the patient’s attending endocrinologist.