

Know Your Options: Insulin for Youth with Diabetes



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Every family is unique and must decide the insulin preparation, schedule, and delivery device that allows them to achieve optimum glycemic control for their child.

Insulin preparations

Human insulin preparations are categorized by peak and duration of action, and known as:

- rapid (lispro, aspart),
- short (regular),
- intermediate (neutral protamine hagedorm, lente),
- long (ultralente), and
- basal (glargine).

An intermediate insulin combined with a rapid insulin is the most common combination used in youth.

What are the basal-bolus insulin requirements?

The basal insulin requirement is 50% of the total daily dose (TDD) for most youth and must be given under all circumstances. The TDD is usually 0.6 $\mu\text{kg/d}$ to 0.9 $\mu\text{kg/d}$ in children and up to 1.5 $\mu\text{kg/d}$ in teens. The basal insulin dose is given as an intermediate (or long-acting) insulin once at bedtime or split between morning and bedtime.

What about insulin schedules?

Subcutaneous insulin can be given two to four times/day or by continuous subcutaneous insulin

infusion (CSII), also known as the pump. At diagnosis, many families start with a two- or three-dose regimen with fixed carbohydrate intake at meals. Some families move to flexible basal-bolus regimens soon after diagnosis.

Table 1 Subcutaneous Insulin Injection Devices

- Syringe
- Pen
- Assisted injection device
- Jet Injector
- Indwelling Catheter
- Pump

How important is monitoring?

Most children require more than four blood glucose levels daily to achieve optimum blood glucose control. Ketogenesis is precipitated by insulin deficiency. The insulin deficiency can be relative, if inadequate insulin is given during a sick day, or absolute, if insulin is omitted.

How can we prevent DKA?

Insulin omission is the most common cause of diabetic ketoacidosis. Youth at high risk for DKA can be identified for a targeted prevention strategy using the following criteria:

- A1c > 11% on one occasion,
- A1c > 9% on three consecutive visits,
- unexplained weight loss, and
- frequent missed appointments.

Management of DKA in children and adolescents is different than in adults because of the higher risk of cerebral edema. Algorithms have been developed to reduce the risk by focusing on judicious use of fluids, low-dose insulin, no bicarbonate, and careful monitoring. CME



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