

Preventing Diabetic Ketoacidosis in a Child on Insulin Pump Therapy

Diabetic ketoacidosis (DKA) can develop very quickly on insulin pump therapy because only rapid-acting insulin is used. If the flow of insulin is interrupted because of problems with the pump, tubing, or infusion set, the blood sugar will rise quickly and the body will start burning fat for energy. When fat is burned, ketones are produced. If left untreated, life-threatening DKA can develop in 4–6 hours. To prevent DKA, follow these guidelines:

1. Check the blood sugar at least 4 times per day.
2. Check urine or blood for ketones if nauseated, vomiting, or when the blood sugar is 14 mmol/L or higher.
3. Give a correction by injection (syringe or pen) if:
 - the blood sugar is 14 mmol/L or higher and the ketones are positive
 - you have corrected the high blood sugar with the pump but the blood sugar went higher after 2 hours
 - the blood sugar stays high after 2 corrections with the pump
4. When the blood sugar is 14 mmol/L or higher and the ketones are positive your child will need at least **50% more correction insulin** than normal. You can give extra insulin using one of the following methods.
 - Give a correction that is **50% more** than what your bolus calculator recommends. For example: If it recommends 6.4 units, give 3.2 units more for a total of 9.6 units. Round off to 10 units and give 10 units by **injection**.
 - Use a correction formula to calculate the dose.

$$\frac{\text{current blood sugar} - \text{target blood sugar}}{\text{insulin sensitivity factor}} \times 1.5$$

Example: If blood sugar is 22.8, ketones are ++, insulin sensitivity factor is 3, and the target blood sugar is 7.

$$\frac{22.8 - 7}{3} \times 1.5 = 7.9 \text{ Round off and give 8 units by } \mathbf{injection}.$$

5. Give corrections every 2 hours until the ketones have cleared or the blood sugar is less than 14 mmol/L.
6. Once insulin has been given with syringe or pen, change the infusion set. You may also need to change the cartridge and insulin. Do not try to find out the cause of the high blood sugar and ketones until you have given insulin by syringe or pen.
7. Push fluids to prevent dehydration. Your child should have at least $\frac{1}{2}$ –1 cup (125–250 mL) of fluids per hour. Fluids should be sugar-free if the blood sugar is high.

Remember:

Give a correction by injection (for high blood sugar and ketones).

When in doubt, change it out (infusion set for unexplainable high blood sugar).

This material is for information purposes only. It should not be used in place of medical advice, instruction and/or treatment. If you have questions, speak with your doctor or appropriate healthcare provider.