Sick Day Management in Children with Diabetes

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Special Guest

- Holly Van Domelen, RN
- Diabetes Educator
- Type 1 diabetes since age 12

Introduction

- We do not expect children with diabetes to be sick more than other children
- However when they are ill they have an increased risk for diabetic ketoacidosis (DKA)
- The goal of sick day management is to prevent DKA
What is DKA?
- DKA is an insulin deficient state
- Because of insufficient insulin cells are deprived of glucose
- Body resorts to using ketones to supply energy needs of cells (ketones are produced from the breakdown of fats)
- Ketones are acids which lower the pH of the blood (body needs pH at 7.4 for normal functioning)
- Patients with DKA have pH less than 7.3

DKA is Dangerous
- Untreated DKA can be life-threatening
- However because patients become so sick it is rarely not recognized
- The most feared complication of DKA is cerebral edema
- Cerebral edema results from fluid shifts into the brain during correction of DKA

Features of DKA
- Dehydration and increased thirst because of excessive urination, is always present
- Abdominal pain
- Rapid respirations in severe DKA is the body’s mechanism for correcting the pH
- Mental confusion or even coma due to dehydration and acidosis

Common Causes of DKA
- Missing injections of insulin
- Illness
- “Bad” insulin
- Trauma
- Pump malfunction

Who Is Most Likely to Get DKA?
- Teenagers!

Keep Your HgbA1c in Target
- People with chronically poor control have increased risk of DKA when they do get sick
Good News: DKA Can Almost Always Be Prevented

- If you had DKA at diagnosis it was not your fault
- If you practice good diabetes care you can avoid DKA

Ketones Make You Sick

- If you feel nauseated or you have vomiting you must check the ketones
- Picking it up early is the key…then it is reversible at home

Here’s How to Avoid DKA

- If you are running higher blood sugars or you are sick check urine or blood ketones
- If urine ketones are small or greater call your diabetes team and give extra doses of short-acting insulin (NovoLog, Humalog, Regular, or Apidra) every 2-3 hours until the ketones are gone

More Good News

- You will not likely progress to DKA so rapidly that you can not intervene
- Usual progression: hyperglycemia…… then ketones…… then acidosis

Bottom Line

- Don’t get confused by the details. If you are spilling ketones your body needs more insulin

Details

- Give extra doses of short-acting insulin every 2-3 hours based on the total daily dose (TDD)
- Small ketones 5% of TDD
- Moderate ketones 10% of TDD
- Large ketones 15-20% of TDD
- Drink large amounts of fluids
- If there is no vomiting don’t stop eating…carbohydrate covered by insulin may help the cause
What If I Use A Pump?
- Change the set!
- Give extra doses by injection even after you change the set

High Blood Sugar Correction
- If the blood sugar is really high the correction might be more than the calculation for ketones
- Give whichever is more

Blood Ketone Testing
- Blood ketone testing is available with the Precision Xtra blood glucose meter (just use the ketone strip instead of the glucose strip)
- This can be very useful for infants and toddlers and others

Blood Compared to Urine Ketones
- Beta-OH B (mmol/l)
  - 0.0 - 0.3: Negative
  - 0.3 - 0.5: Trace
  - 0.6 - 1.5: Small
  - 1.6 - 3.0: Moderate
  - > 3.0: Large

Common Mistakes
- “My child just has stomach flu. We don’t need to check ketones”
- “The blood sugar is in target so my child could not have ketones present”

Summary
- If you are sick or running high blood glucose you are at risk for DKA and you must check ketones
- If urine ketones are small or greater you need extra doses of short-acting insulin every 2-3 hours until the ketones are gone
- Call the diabetes team for help
Historical Perspective

“The Discovery of Insulin”

- Michael Bliss 1982
- The University of Chicago Press