



What every caregiver should know about DKA and the Type 1 patient.....

Diabetes Ketoacidosis (DKA) is characterized by a reduction or absolute deficiency of circulating insulin, elevation in counter-regulatory hormones, hyperglycemia (> 250 mg/dl) and metabolic acidosis due to ketosis. DKA most often occurs in the Type 1 patient but can occur in a sub-set of patients with Type 2 Diabetes. This guide is to promote awareness in the treatment plan and characteristics to monitor for the DKA patient; it is NOT to be used as physician orders. YOUR ATTENTION TO DETAIL WHILE TREATING DKA WILL LEAD TO EFFECTIVE TREATMENT AND RESOLUTION OF ACIDOSIS.

What this means for my practice:

- **Pay close attention to the Potassium, start insulin infusion only if serum $K^+ \geq 3.3$** Rationale: to avoid a further lowering of the serum K^+ and life threatening arrhythmias and respiratory muscle weakness.
- **Potassium replacement should begin when serum $K^+ 5.2$ mmol/L with adequate urine output**
- **Dextrose should be added to IVF when glucose reaches 250 to 300 mg/dL**
- **Confirm that DKA has been resolved prior to discontinuation of the insulin infusion**
 - Blood Glucose less than 200 mg/dl.
 - Acidosis is resolved, confirmed by 2 of the following criteria:
 - Serum Bicarb ≥ 15 mmol/Liter
 - Venous pH > 7.3
 - Anion Gap ≤ 12
- **With DKA, transition to SubQ insulin should always include an order to administer basal insulin dose 2 hours prior to the discontinuation of the insulin infusion. Basal insulin needs may be met in the following ways with SubQ insulin:**
 - Lantus 1-2 doses per day
 - Levemir 1-2 doses per day
 - NPH, multiple doses per day
 - Rapid Acting insulin per patient insulin pump. Provider may order discontinuation of insulin infusion 1 hour after starting pump, due to the onset of action of this insulin.
- **Understand the insulin needs of the Type 1 patient:**
 - Makes little or no insulin
 - Relies completely on exogenous insulin
 - Must have basal insulin to prevent ketosis
- **Know when to contact the provider to prevent Hyperglycemia/DKA in the Type 1 Patient**
 - Interruption in the insulin infusion
 - No order to administer the basal insulin 2 hours prior to the discontinuation of the insulin infusion



What every physician should know about DKA and the Type 1 patient.....

Diabetes Ketoacidosis (DKA) is a serious acute metabolic complication of diabetes. Recent epidemiological studies indicate that hospitalizations for DKA are increasing. The prognosis is substantially worse with advanced age, coma, hypotension and severe co morbidities.

Key points to avoiding the pitfalls of DKA treatment:

Hyperglycemia corrects faster than ketoacidosis. Know the strategies of supporting the glucose levels until the acidosis has time to resolve:

- The provider may add Dextrose IVF when the glucose reaches 250 to 300 mg/dL
- Review your insulin infusion orders at this time to assess need for reduced rate, usually by 50% or as directed by the provider

Maintain the insulin infusion until all of the following are achieved:

- Medically stable
- Underlying cause of DKA addressed
- Blood Glucose less than 200 mg/dL
- Acidosis resolved

Proactive Potassium Replacement

- Replace K⁺ as soon as serum K⁺ is lower than 5.2 mmol/L with adequate urine output

Prevent Hyperglycemia/Recurrence of DKA .

Never under estimate the impact of an insulin-free period in a patient with DKA

- DKA occurred due to a reduction or absolute deficiency of circulating insulin
- These patients require basal insulin at all times.
- Rapidly address any interruption in the IV insulin infusion.
- Provide orders to administer SubQ basal insulin 2 hours prior to discontinuation of insulin infusion . The half-life of IV insulin is 7 to 10 minutes. Without this order, the patient will quickly become acidotic again.

Kirabchi, Miles, Umpierrez, Fisher. Hyperglycemic Crises in Adult Patients With Diabetes,; Diabetes Care, volume 32, number 7, July 2009