

# ACUTE HYPERGLYCEMIC EPISODES

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## 1<sup>st</sup> - RULE OUT HYPERGLYCEMIC CRISIS

### Diabetic Ketoacidosis (DKA)

Absolute Insulin Deficiency

### Shared Pathophysiology:

- Hyperglycemia → Osmotic Diuresis → Volume Depletion
- Depletion of Counterregulatory Hormones:

Glucagon

Epinephrine

Cortisol

Catecholamines

### DKA specific:

- Uncontrolled lipolysis and ketogenesis

## PATHOPHYSIOLOGY

### DKA SYMPTOMATOLOGY - A SPECTRUM

#### Asymptomatic

Polyuria

Dehydration

Abdominal pain

Nausea / Vomiting

AMS

GU

GI

CNS

### LABS

#### DKA

UA  
Serum Ketones  
VBG / ABG

#### DKA + HHS

Fingerstick glucose  
BMP

### Diagnosing DKA

- **D** - Diabetes, glucose >250 mg/dL
  - **K** - Ketonemia/ ketonuria
  - **A** - Acidemia  
(pH < 7-or-bicarb < 18\*)
- \*-must consider patients baseline bicarbonate

### Diagnosing HHS

- **H**- Hyperglycemic (glucose > 600)
- **H**- Hyperosmolar (osmolality >320)\*  
\*=  $(2 \cdot \text{Na}) + (\text{glucose}/18) + (\text{BUN}/2.8) + (\text{ETOH}/4.6)$   
(degree of hyperosmolarity guides HHS severity)

### FLUID RESUSCITATION

- IV Isotonic Saline

### INSULIN REPLACEMENT

- Continue the insulin infusion until metabolic derangements resolve
- If glucose < 60mg/dL give dextrose fluid

### ELECTROLYTE REPLETION

- Monitor for Potassium shifts
- **If K<sup>+</sup> <3.3 mg/dL - give IV K<sup>+</sup> prior to insulin**
- If baseline pH <6.8 - give IV bicarb during correction

### DKA SPECIFIC

- Treat underlying precipitant

Exogenous

Endogenous

- Intoxication
- Non-compliance
- Iatrogenic
  - e.g. Glucocorticoids

• Infection

• Inflammation

• Ischemia

**REMEMBER:** You are treating the **METABOLIC DERANGEMENTS**, not the glucose level.

### STUDIES

#### The effect of hyperosmolarity on glucose metabolism

Isotonic Saline increases insulin responsiveness by lowering the plasma osmolality (Posm), reducing vasoconstriction and improving perfusion, and reducing stress hormone levels.

Thirty years of personal experience in hyperglycemic crises: diabetic ketoacidosis and hyperglycemic hyperosmolar state

Euglycemic (<250 mg/dL) DKA is described in patients with poor oral intake, treatment with insulin prior to arrival in the emergency department, pregnant women, and with use of SGLT2 inhibitors.

