Hyperglycemic Hyperosmolar Syndrome (HHS) Treatment Pathway

### Inclusion Criteria:
- Glucose > 600 mg/dL
- Serum osmolality > 320 mOsm/kg
- Venous pH > 7.25
- Arterial pH > 7.30
- Serum bicarb > 15 mmol/L
- Small ketonuria, absent to mild ketonemia
- Altered consciousness (~50%) – obtundation, combativeness, seizures

### Exclusion Criteria:
DKA – Please use DKA pathway
DKA is defined as (need all 3 criteria):
- Hyperglycemia >200 mg/dL
- Venous pH <7.3 or HCO3 ≤15 mEq/L
- Ketones in serum or urine

### Fluids
- Bolus NS 20 mL/kg
- Repeat until peripheral perfusion established
- Strict I/O
- Insert Foley
- Maintenance IV fluid rate plus deficit over 24-48 hours (12-15% body weight) using ½ or ¾ NS
- 1:1 urine replacement with ½ NS hourly

### Electrolytes
- When K <5 mEq/L
  - Add 20 mEq/L potassium acetate and 20 mEq/L potassium phosphate to maintenance IV fluids

### Insulin Therapy
- Only begin insulin infusion when blood glucose decline is <100 mg/dL each hour, after fluid resuscitation
  - Low dose insulin infusion IV 0.025-0.05 U/kg/hr
  - Titrate insulin by 0.02 U/kg/hr (max 0.1 U/kg/hr) to decrease glucose 50-100 mg/dL/hr

### Mixed HHS and DKA
- Meets all HHS criteria but Beta >3
- May require insulin therapy earlier
- Discuss with Endocrinology consultant

### Electrolytes
- Monitor electrolytes, calcium, magnesium, phosphate, serum osmolality Q4 hours
- Monitor lactate until it normalizes

### Insulin Therapy
- Frequent assessment of circulatory status
- Alter rate and electrolyte concentration of fluids as needed
Metrics
Contributing Members

Dr. Sanjiv Pasala, Critical Care Medicine
Clint Layes, Pharm.D. – Clinical Pharmacist, PICU