

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

- Consult Endocrinology
- NPO until GCS 15, then sugar free clear liquids
- Chemical DVT prophylaxis (link to Lovenox order set)
- Q1 hour neuro checks

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

- Correct serum Na level for hyperglycemia
- Avoid central venous access due to increased thrombosis risk

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

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

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

- Frequent assessment of circulatory status
- Alter rate and electrolyte concentration of fluids as needed

Metrics

Contributing Members



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References

1. Wolfsdorf, J., Glaser, N., Agus, M., Fritsch, M., Hanas, R., Rewers, A., Sperling, M., & Codner, E. (2018). ISPAD Clinical Practice Consensus Guidelines 2018: Diabetic Ketoacidosis and the Hyperglycemic Hyperosmolar State. *Pediatric diabetes, 19 Suppl 27*, 155-177.
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