

DKA/HHNS ALGORITHM

INITIAL ADMINISTRATION/ SET UP

(DKA- Diabetic Ketoacidosis or HHNS- Hyperosmolar Hyperglycemic Nonketotic Syndrome)

Signs and symptoms of Diabetic Ketoacidosis:

- A) blood sugar level > 250 mg/dL
- B) Excessive thirst, frequent urination, nausea, vomiting, abdominal pain, weakness, fatigue, shortness of breath, fruity-scented breath, confusion

Signs and symptoms of HHNS (Hyperosmolar Hyperglycemic Nonketotic Syndrome):

- A) blood sugar level >600 mg/dL
- B) excessive thirst/dry mouth, increased urination, warm/dry skin, fever, drowsiness, confusion, hallucinations, vision loss, convulsions, coma

Treatment goals:

Fluid replacement. Replacing fluids lost through excessive urination.

Electrolyte replacement. Electrolytes are minerals in blood that carry an electric charge (Na⁺, K⁺, Cl⁻). The absence of insulin can lower the level of several electrolytes in blood. Thus, monitoring & replacement are necessary.

Insulin therapy.

1. After setup of pump, identify blood glucose level of patient upon initiation.

Review electrolyte panel, if serum potassium is less than 3.3 notify MD prior to starting insulin infusion.

2. Review PRN MAR to identify if Insulin Regular IV Bolus x1 has been ordered. (Follow directions per dosing instructions in MAR. If not already done in ED)

3. Start with Algorithm 1 Standard.
(No exception criteria)

4. Identify the appropriate units/hr according to the current blood glucose using Algorithm 1 Standard.

5. Begin following steps in 'Hourly Ongoing Assessment' Column

HOURLY ONGOING ASSESSMENTS (DKA/HHNS)

Fluid management

Estimating 10% dehydration (100 ml/kg).

A) Review type of fluid every hour per guideline points listed below:

1. Upon initiation, utilize Normal Saline (NS)
2. Change to ½ NS if corrected Na⁺ > 150
3. Change to D5NS or D5 ½ NS when BG < 250.

B) Review fluid rate every hour per guideline points listed below:

1. First 4 hours anticipate about 1 liter/hour.
2. Through hours 5-7 or 5-9 (depending on MD) anticipate 250-500 ml/hour.
3. Post hours 7 or 9 (depending on MD) anticipate 100-250 ml/hour.

Lab monitoring

A) First 24 hours:

- Anticipate monitoring Chem every 6 hours
- Monitor magnesium once.

B) 24-72 hours:

- Monitor magnesium daily (x2 days).
- Continue monitoring venous PH, anion gap, & serum beta hydroxybutyrate (BHBA) as directed.

POC Glucose Monitoring

Check blood glucose every hour and utilize new level to identify the appropriate range as listed below:

A) For POC glucose < 140 x2, move 1 column to left
(If already in ½ Standard (LOW) algorithm, notify MD to consider discontinuation of infusion.)

B) For POC glucose >340 x2, move 1 column to right

For example, if previous POC BG 121 x2 while utilizing Algorithm 1, move to ½ Standard (LOW) and adjust to 0.5 units/hour.

Repeat review steps above hourly until:

- A) POC glucose <140 x2 in lowest algorithm
- B) appropriate to consider transition to subcutaneous insulin. See 'Transition to Subcutaneous Insulin' on back.

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TRANSITION TO SUBCUTANEOUS INSULIN (DKA/HHNS)

1. Criteria for discontinuation includes (but is not limited to):

- A) ½ Standard (LOW) algorithm with POC glucose <140 x2 (hourly)
- B) POC glucose <140 x2 (hourly) and upon discussion with MD

2. All patients must be given subcutaneous basal insulin (such as) at least 2 hours prior to discontinuing insulin infusion.

Basal insulin will help prevent potential rebound hyperglycemia and maintain patient safety upon discontinuation of the insulin infusion.

3. Recommendation to check blood glucose no later than 1 hour after discontinuation of the insulin infusion.

4. Ensure you provide information regarding discontinuation of insulin infusion to oncoming primary RN or transfer RN.

This promotes awareness of potential impact of discontinuation of insulin infusion.

TREATMENT OF HYPOGLYCEMIA (<70 mg/dL) WHILE ON INSULIN INFUSION (DKA/HHNS)

1. Turn off infusion

2. Follow hypoglycemia treatment orders:

- A) administer oral gel or D50 as appropriate to patient
- B) repeat fingerstick every 15 minutes and re-treat until blood glucose >110 mg/dL
- C) notify MD to re-evaluate diabetic orders
- D) if blood glucose remains less than 110 after 2 doses, notify MD immediately

3. Maintain/continue fluid management and lab monitoring per hourly workflow.

Unless otherwise directed by MD.

3. Once blood glucose is >110 mg/dL proceed according to 'Hourly Ongoing Assessment' steps for 'POC Glucose Monitoring'.

Unless directed otherwise directed by MD.