17. Diabetic Ketoacidosis (DKA)/ Hyperosmolar Hyperglycaemic State (HHS) Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

BEGIN 16. HYPERGLYCAEMIA ALGORITHM

Ketones in Urine + HCO_3^- < 18mmol/L
Diabetes Ketoacidosis

RBS > 33.3mmol/L + Serum Osmolality > 320mOsm/kg
Hyperosmolar Hyperglycaemic State (HHS)

No Ketones in urine + Serum Osmolality < 320mOsm/kg
Uncomplicated Hyperglycaemia
Go to 16. Hyperglycaemia Algorithm

- **Identify and Treat precipitating illness;** consider ACS, Sepsis
- **Consult a Physician and continue with the Algorithm**

1. Fluid Protocol (Ringer's Lactate)

If **Hypovolaemic Shock**, give fluid boluses at 15 to 20mL/kg; Repeat until BP stable. Consider Inotropes if no response to fluid resuscitation.

If **Hypovolaemic but No Shock**; Give **15 - 20 mL/Kg/hr** Ringer's Lactate

DO NOT give > 50 mL/kg of isotonic solution in the **first 4 hours** of treatment because of the risk of **cerebral oedema.**

If **CORRECTED** serum sodium is **< 135 mmol/L**, continue treatment with Ringer's Lactate at **250-500 mL/hour**

If **CORRECTED** serum sodium is **≥ 135 mmol/L**, continue treatment with **0.45% NaCl** instead of Ringer's Lactate at **250-500 mL/hour**

Success in fluid therapy is reflected by an improvement in hemodynamic and hydration status and pH values, a satisfactory urine output of **1 to 2 mL/kg/hour**, and clinical progress.

2. Potassium Protocol

DO NOT give potassium if patient is **anuric** or **serum K^+ > 5.3mmol/L**

Serum K^+ (mmol/L)	Action
> 5.3	**DO NOT** give K^+, **but** check potassium levels hourly and start replacement when **K^+ < 5.3mmol/L**
3.3 to 5.3	Add 20-30 mmol K^+/1L fluid/hour to IV fluids until **K^+ > 4.0-5.0mmol/L** range
< 3.3	**Hold** insulin. Add 20-30 mmol K^+/1L fluid/hour. Continuous cardiac monitoring until **K^+ > 3.3mmol/L**

3. Insulin Protocol

DO NOT give insulin until you have K^+ levels > 3.3mmol/L

Give **0.3u/kg SC bolus** then **0.2u/kg SC every 2 hours**

- Hourly RBS monitoring
- Target RBS drop **3-4mmol/L/hr**
- If the RBS does not fall by 3-4 mmol/L/hr, give a bolus of **0.1u/kg SC** and continue with the SC doses

Venous Glucose reaches < 11.1 mmol/L (DKA) < 16.7 (HHS)

- Change IV fluid infusion to **5 % Dextrose with 0.45% NaCl** at **150-250mL/hr**
- **Decrease** insulin to **0.1u/kg SC every 2 hours**
- Maintain glucose between **8.3 – 11.1mmol/L (DKA)/ 13.9 - 16.7mmol/L (HHS)** and continue insulin infusion and fluid hydration **until ketosis or hyper osmolality resolves**

Useful formulas in DKA

Anion gap = $Na^+ - [(Cl^- + HCO_3^-)]$

Serum sodium correction = $Na^+_{measured}$ + {(Glucose - 5.5) / 3} (all values in mmol/l).

Serum potassium correction during acidaemia = [K+] - (0.6 mmol/L X (7.4 - measured pH) X 10)

Serum osmolality (mOsm/L) = 2 [Na^+ + K+] (mmol/L) + Glucose (mmol/L) + BUN (mmol/L)

Total body water deficit (L) = $0.6_{men/children}$ or 0.5_{women} x body weight (kg) X [serum Na^+/140 - 1]