DKA & HHS

The two hyperglycaemic emergencies · 2024 consensus

FLUIDS *first*

DIAGNOSE

beta-hydroxybutyrate (BHB) is the key marker

Parameter	DKA	HHS
Glucose	≥ 200 mg/dL	≥ 600 mg/dL
Ketones (BHB)	≥ 3.0 mmol/L	< 3.0 mmol/L
pH (venous)	< 7.3	≥ 7.3
Bicarbonate	< 18 mEq/L	≥ 15 mEq/L
Osmolality	variable	effective > 300 mOsm/kg
Mental state	variable	often obtunded

DKA SEVERITY

route depends on severity

Severity	BHB	pH	Bicarbonate	Mental state
Mild	≤ 6 mmol/L	> 7.25	≥ 15	Alert
Moderate	≤ 6 mmol/L	7.0 - 7.25	10 - <15	Alert / drowsy
Severe	> 6 mmol/L	< 7.0	< 10	Stupor / coma

Ketones alone don't separate mild from moderate - grade by pH / bicarbonate / mental state. Mild / uncomplicated moderate DKA can use subcutaneous insulin; severe DKA and all HHS need an IV infusion.

THE THREE PILLARS

FLUIDS

- 0.9% saline or balanced 500-1000 mL/h for 2-4 h
- Switch to 0.45% if corrected Na normal / high
- Add dextrose 5-10% once glucose < 250 mg/dL
- HHS: slower, glucose fall ≤ 90-120 mg/dL/h

INSULIN

- DKA: fixed-rate 0.1 U/kg/h, no bolus
- HHS: 0.05 U/kg/h (defer until fluids stall glucose)
- Keep glucose ~200 until resolution
- Continue insulin to clear ketosis

POTASSIUM

- Measure at baseline, 2 h, then every 4 h
- K < 3.3: HOLD insulin, give KCl 10 mEq/h
- K 3.3-5.0: add 20-40 mEq KCl per litre
- K > 5.0: no potassium, recheck in 2 h

ORDER OF PLAY

Confirm Dx › **Fluids** › **Check K** › **Insulin once K ≥ 3.5** › **Dextrose when glucose < 250** › **Resolution → subcut**

RESOLUTION & MONITORING

- **DKA resolved:** BHB < 0.6 (or pH > 7.3 & HCO_3 ≥ 18) AND glucose < 200, eating
- **Transition:** overlap basal insulin 1-2 h BEFORE stopping IV; TDD 0.3-0.6 U/kg/day
- **Monitor:** glucose 1-2 hourly; K, BHB & venous pH every 4 h

COMPLICATIONS TO WATCH

- **Hypokalaemia:** commonest cause of death - never give insulin if K < 3.3
- **Cerebral oedema:** young; headache / ↓ GCS → hypertonic saline; avoid rapid osmolar drop
- **Hypoglycaemia:** add dextrose early; do not stop insulin
- **VTE + aspiration:** anticoagulate (esp HHS); NG tube if drowsy

PEARLS & PITFALLS

- Never give insulin before checking potassium - insulin drives K into cells and can be fatal.
- HHS is not just severe DKA: slower fluids, lower insulin, higher overcorrection and VTE risk.
- Do not stop insulin when glucose falls; add dextrose and keep clearing ketones.
- Euglycaemic DKA (SGLT2 inhibitors, pregnancy): diagnose on ketones and acidosis, not glucose.

References: ADA/EASD Hyperglycaemic Crises Consensus 2024 · JBDS-IP DKA 2023 · JBDS HHS 2022.

Educational aid; verify doses against local protocol and patient factors.