

Overview: Severe hyperglycaemia & marked serum hyperosmolarity, without significant ketosis.

Causes

Intercurrent or co-existing illness e.g. MI, infections, CVA, RF, hyperthyroidism, GE, etc.

Medication-induced: e.g. metformin, diuretics, steroids, antiepileptics, EtOH, sympathomimetics

Diabetes related: e.g. First presentation, poor control/compliance, intake of sugary fluids

Epidemiology

Annual incidence ~17.5/100,000 (sl. >DKA). Usually T2DM (some insulin to prevent lipolysis & so no ketosis), but ~30% do not have DM.

Risk factors: Elderly, immunosuppression, dementia, sedative drugs, heat waves.

Presentation

Symptoms: Early generalised weakness, leg cramps or visual impairment. N & V less prevalent than in DKA. Progresses to exhaustion, confusion & seizures (25%). Coma unusual (10%).

Signs: Evidence of disorientation, self-neglect, dehydration. Signs of precipitant. ↑HR, ↓BP, ↑RR, ↑or↓T. Paralytic ileus may occur during the acute phase.

Differential diagnosis: Precipitating conditions, delirium/dementia, acute poisoning.

Investigations

Bloods: BSL(>30mmol/L), UEC (↑ corrected Na ± ↑K, ↑Cr, ↑Ur), serum osmolarity (usually>320), ABG (normal or mild met.acidosis, HCO₃⁻>15mmol/L) + AG, Coags, FBC, CK, TropT, cultures.

Urine: Marked glycosuria with normal or only slightly elevated ketones. M, C & S.

Other: ECG. Consider CXR. LP if meningitis suspected.

Management

Resuscitation: ABCD, O₂, intubate if compromised airway or inadequate and ventilation.

Continuous monitoring. Obtain large-bore IV access (central line may be needed). IDC ± NG.

Fluids: Patients often 10-20% dehydrated. Treat hypovolaemic shock. 0.9% saline ± inotropes.

NB: Correct hypernatraemia (& water deficit) slowly over 48-72hr carefully with 0.45%saline.

Glucose: When BSL<15mmol/L add dextrose infusion to prevent hypoglycaemia.

Insulin: Usually lower doses required than with DKA in adults (see table). Children 0.05-0.1U/kg/hr. Aim for BSL fall of 3-5mmol/L/hr.

Capillary glucose	Soluble insulin (If 50U in 50ml 0.9%NaCl, U/hr = ml/hr)
0-4 mmol/l	0 U/hr
4.1-7.0 mmol/l	1 U/hr
7.1-11.0 mmol/l	2 U/hr
11.1-17.0 mmol/l	3 U/hr
> 17.0 mmol/l	4 U/hr

Potassium: Replace when serum level <5.5mmol/L, P/U, and insulin started.

Anticoagulation: LMW heparin should be given routinely as a significant risk of DVT/PE.

Other: Treat underlying cause if known. Review patient medications, diabetic control.

Complications: Include DVT/PE, ARDS, DIC, multi-organ failure, rhabdomyolysis/RF, cerebral oedema (rare in adults, less so in children), MI or CVA.

Prognosis: Mortality is 10-40%.

Prevention: Education on managing DM, particularly when ill.