



Diabetic ketoacidosis

Clinical management pathway

Relevant links

Full Endocrinology Department protocol:

[Management of diabetic ketoacidosis](#)

ED guideline/ resources:
[Intravenous fluid therapy](#)
[DKA fluid calculator](#)

Suspected DKA?		
Symptoms	Signs	Biochem prior to arrival
Polyuria	Weakness	Elevated BGL (>11mmol/L)
Polydipsia	Vomiting	Acidaemia (pH<7.3)
Weight loss	Confusion	Ketones in urine or blood
Abdominal pain		

Confirm diagnosis of DKA
BGL
Blood gas (venous is sufficient)
Blood ketones and formal UEC

Is the patient shocked/ haemodynamically unstable?
Reduced peripheral pulse volume
Altered GCS or coma
Tachycardia +/- hypotension
pH < 7.2 and/or HCO ₃ < 10mmol/L
NB: Do not give sodium bicarbonate

Resuscitation
Airway - assess and manage +/- NG tube
Breathing 100% O ₂
Circulation - 2 x IV cannulas
<ul style="list-style-type: none"> Give IV 0.9% sodium chloride 10ml/kg as a bolus Reassess response; consider the need to repeat boluses to a maximum of 20ml/kg Discuss with Emergency or PICU Consultant if more is thought to be required Contact PICU and Endocrinology teams regarding PICU admission When haemodynamically stable, including normal BP, change the fluid rate to maintenance with deficit as per below

See ED Guideline: [Approach to the critically ill child](#)

Ongoing emergency management

Contact Endocrine team

Ongoing fluids (maintenance + deficit)
Assess the degree of hydration Aim to replace the deficit over the next 48 hrs
1. First calculate the deficit (D)
Deficit = weight (kg) x % dehydration x 10ml
Maximum dehydration for calculation is 5%
Deficit (D) = _____ mls
2. Then calculate total maintenance fluids (M)
3 – 10 kgs 100mls/kg/24 hrs
10 - 20 kgs 1000mls + (50ml/kg per 24 hrs for each kg > 10kg)
> 20 kgs 1500mls + (20ml/kg per 24 hrs for each kg > 20kg)
Maintenance total (M)* for 24 hrs _____ mls
* (M) is doubled in equation below for 48 hr total
3. Now calculate the hourly rate:
$\frac{D + (2 \times M) - \text{Resus fluids}}{\div \text{ by } 48}$
Hourly rate = _____ mls/hr
Types of fluid:
<ul style="list-style-type: none"> Use 0.9% NaCl +/- KCl until BGL is < 15mmol/L When BGL is < 15mmol other fluid may be required so:
Contact Endocrinology to discuss
Changing fluid rates
<ul style="list-style-type: none"> Fluid rates should only be changed in response to significant changes in clinical state (improvement or deterioration)
Contact Endocrinology to discuss

Insulin
Subcutaneous insulin
Recommended for those:
<ul style="list-style-type: none"> being treated outside PMH or tolerating fluids ± pH>7.2
<ul style="list-style-type: none"> 0.1 units/kg every 2 hours until the acidosis is corrected Continue insulin according to Endocrinology advice

Intravenous insulin
Recommended for those with:
<ul style="list-style-type: none"> pH < 7.2 those who are medically unstable
Do not give an IV insulin bolus
<ul style="list-style-type: none"> Run infusion at 0.1 units/kg/hr (maximum total is 5 units/hr) Do not reduce insulin infusion rate while acidosis persists, instead increase glucose concentration if BSL falls Preparation: Add 50 units of Actrapid Hm or Humulin R to 50mL of 0.9% NaCl Flush the line with 20mL of the solution to prevent insulin binding to the tubing

When the metabolic acidosis is corrected (pH >7.3) reduce the infusion rate as per Endocrinology protocol: [Management of diabetic ketoacidosis](#)

Potassium
Add Potassium chloride (KCl) to all non-resuscitative fluids unless the child is:
<ul style="list-style-type: none"> anuric or serum potassium is > 4.5 mmol/L
Preparation and infusion rate
<ul style="list-style-type: none"> Add 20mmols KCl to a 500mL bag Minimum requirement for KCl is 2mmol/kg/24hrs with no more than 6mmol/kg/24hrs
Note:
<ul style="list-style-type: none"> If a higher concentration of KCl is required:
Contact PICU to discuss

Monitoring
1. Hourly neurological observations
<ul style="list-style-type: none"> Anticipate and monitor for early signs of clinical cerebral oedema Headaches are often one of the earliest symptoms Treat early in consultation with ICU Risk factors for cerebral oedema: low pH, elevated serum urea and low CO₂ at presentation
2. Hourly fluid balance
3. Hourly BGL and blood ketones
4. Two hourly blood gas
Keep line open for sampling
5. All urine for glucose and ketones