

# Management of Diabetic Ketoacidosis in first 24 hours in adults

## Establish diagnosis using following three criteria:

1. Blood ketones  $\geq 2$  mmol / L or Ketonuria  $\geq 2+$  on standard blood & urine sticks respectively.
2. BM  $> 11$  mmol/L or known Type 1 Diabetes
3. Venous bicarbonate  $\leq 18$  mmol and / or pH  $< 7.3$

## Perform following tests:

FBC, renal, LFTs, venous bicarbonate, plasma glucose, blood cultures only if septic and febrile, ECG, CXR, and Urinalysis (for infection screen and for ketones). HbA1c in a known diabetic patient if it has not been done during last 3 months.

Quick ABC assessment, 2 cannulas

## Give IV fluid NaCl 0.9%

These patients usually have 5-6 L fluid deficit. Commence IV NaCl 0.9% at 100mL/kg in first 24 hrs. For eg, a 60 kg patient might require 6L in 24 hours. Infusion rate should take into account co-morbidities, particularly cardiac status. If appropriate, use saline as below.

- NaCl 0.9% 1L - 1 hour
- NaCl 0.9% + KCl 1L - next 2 hrs
- NaCl 0.9% + KCl 1L - next 2-4 hrs
- NaCl 0.9% + KCl 1L - next 4 hrs
- NaCl 0.9% + KCl 1L - next 4-6 hrs (If still dehydrated)
- NaCl 0.9% + KCl 1L - next 6 hrs (If still dehydrated)

## Give IV Fixed Rate Insulin

50 units of Actrapid made up to 50 mL with NaCl 0.9%. Infuse at **fixed rate** of 0.1unit/kg/hr. For example give 6units/hr in 60 kg patient. If patient is currently on basal insulin e.g. Levemir or Lantus, continue this at usual dose and times. Rarely, if BMs is not coming down the rate of insulin infusion need increasing (make sure the infusion set is working).

## Give IV KCL

Add Potassium Chloride to N/Saline as follows:

Serum K <sup>+</sup> (mmol/L)	Add KCl (mmol/L)
>5.5	Nil
3.5-5.5	40
<3.5	Senior review

## Once BM $\leq 14$ mmol/l,

Through a separate line, start 10% dextrose @ 125ml/hr. Continue N/saline if still dehydrated. Continue fixed rate insulin until criteria below is met. Dextrose rate can be increased if BMs drop below 4mmol/l. Rarely, BMs can go above 14 mmol/l. Increase the rate of insulin infusion (don't stop dextrose infusion)

## Further Management:

Prescribe DVT prophylaxis if not contraindicated. It is not uncommon to see high WBC count in DKA. This usually settles down without antibiotics. Ensure mandatory hand-over to on-call team. Inform ITU if pH  $< 7.0$  and / or venous bicarbonate is  $< 10$  mmol/L.

## Stop IV Fixed Rate Insulin when the following criterion is met:

Blood ketones  $< 0.3$  (or urine free of ketones) and venous pH  $> 7.3$ . Venous bicarbonate level is unreliable. There is no need for ABGs if patient is improving.

## Insulin Sliding Scale

Blood Glucose (mmol/L)	Infusion Rate (mL/hr)
<4	0.5 + increase dextrose rate
4.1-7.9	1
8.0-10.9	2
11.0-14.9	3
15.0-19.9	4
>20	6

Target blood glucose: 6-10mmol

## If patient is not yet eating and drinking:

Switch to **variable rate** (sliding scale) insulin according to table on left. 50 units of Actrapid or Humulin S made up to 50 mL with NaCl 0.9%. Check capillary glucose hourly initially then 2 hourly. If blood glucose regularly is out of this range, reassess insulin doses.

## If patient is eating and drinking:

Re-commence short-acting subcutaneous insulin at meal time. Stop IV insulin one hour after starting short-acting insulin. If this is first presentation of Type 1 DM, discuss with DSN/ SpR Endocrinology / Consultant.