

# ADULT DIABETIC KETOACIDOSIS (DKA) SUMMARY CLINICAL GUIDELINE

BY 24HRS KETONAEMIA AND ACIDOSIS SHOULD HAVE RESOLVED. SEEK SENIOR REVIEW OR DIABETES TEAM INVOLVEMENT IF NOT IMPROVING

Reference No.: CG-T/2023/052

**ALL THREE OF THE FOLLOWING MUST BE PRESENT TO CONFIRM DKA**

- 1) **CAPILLARY BLOOD GLUCOSE (CBG) >11.0 mmol/L OR KNOWN DIABETES**
- 2) **CAPILLARY BLOOD KETONES >3.0 mmol/L OR 2+ KETONURIA (on urinary ketone sticks)**
- 3) **VENOUS pH <7.3 and/or VENOUS BICARBONATE <15 mmol/L**

## IMMEDIATE ACTIONS

- ABC assessment including all routine observations including GCS,
- Capillary blood glucose check and capillary ketone check
- Obtain urgent IV access and commence fluids (as per Box A action 2)
- Venous bloods obtained for U&E, bicarbonate, FBC and venous blood gas, blood cultures.
- Urinalysis for ketones (if capillary ketones not available)
- **VTE prophylaxis – hyperosmolar state – unless contraindicated**

**Severe DKA is a life-threatening emergency**  
If ketone/glucose levels do not fall as expected, call for senior advice  
**HDU bed is needed if:**

- Hypokalaemia (K<sup>+</sup> <3.5 mmol/L)
- Young (18-25)
- Pregnant (ketones kill babies, **NOT** glucose)
- GCS < 12
- Shocked; pulse > 100 or SBP < 90
- All other DKA admission as the main problem preferably to Ward 310/16

## Potassium chloride (KCl)

**CONTINUOUS MONITORING OF K<sup>+</sup> LEVELS IS ESSENTIAL**

With VBG testing  
(at 2,4,6,12 and 18hours)

Venous potassium level (mmol/L)	Potassium Chloride (KCl) replacement
> 5.3	NONE
3.5 – 5.3	10mmol/hr senior advice
< 3.5	senior advice

To be added to each Litre bag of NaCl according to the current measured K<sup>+</sup> level

Life threatening hypokalemia can occur with insulin infusion.

If K<sup>+</sup> infusion is greater than 10mmol/hr cardiac monitoring is recommended. Senior advice should be sought if cardiac monitoring unavailable.

**DO NOT GIVE KCL IF PATIENT IS ANURIC**

\*\*Long acting insulins that should be continued during treatment:

Humilin I <sup>®</sup>	Tresiba/Degludec <sup>®</sup>
Insulatard <sup>®</sup>	Tujeco <sup>®</sup>
Insuman Basal <sup>®</sup>	Levemir <sup>®</sup>
Lantus <sup>®</sup>	Semglee <sup>®</sup>
Glargine <sup>®</sup>	Absaglar <sup>®</sup>

## IV FLUIDS

### ASSESS VOLUME STATUS

Assess patient for Bag 1 of fluids

#### PATIENT SHOCKED?

SBP < 90mmHg / HR > 100  
1L 0.9% NaCl over 15 minutes  
SBP still < 100 mmHg  
Give another 500ml bolus NaCl

#### PATIENT NOT SHOCKED HR/SBP – NORMAL RANGES

1L 0.9% NaCl over 1 hour

Continue Fluid resuscitation as follows

Bag 2 - 1L 0.9% NaCl +/- 20mmol of KCl over 2 hours OR  
1L 0.9% NaCl +/- 40mmol of KCl over 4 hours

Bag 3 - 1L 0.9% NaCl +/- 20mmol of KCl over 2 hours OR  
1L 0.9% NaCl +/- 40mmol of KCl over 4 hours

Bag 4 - 1L 0.9% NaCl +/- KCl over 4 hours

Note: caution in elderly, CCF, ESRF, adolescence, pregnancy

At 6 hours, reassess patient in terms of HR, BP, JVP, chest auscultation. If appropriate, prescribe the following:

Bag 5 – 1L 0.9% NaCl +/- KCl over 4 hours

Bag 6 - 1L 0.9% NaCl +/- KCl over 6 hours

If at any point, capillary blood glucose < 14.0 mmol/l, start 10% glucose at 125ml/hr ALONGSIDE the 0.9% NaCl bag. Adjust rate of the 0.9% NaCl to reduce the risk of fluid overload if concerned.

## INSULIN

### CHECK K<sup>+</sup> >3.5 mmol/L

NO?  
Seek ITU/HDU advice urgently

Use the 30units in 30ml pre-filled syringe @ RDH  
Use 50units Actrapid in 50ml NaCl @QHB  
Start fixed rate insulin infusion at 0.1units/kg/hr  
Maximum infusion rate 15units/hr  
**CONTINUE LONG ACTING S/C INSULIN\*\***  
Disconnect all continuous insulin pumps and do not reconnect without specialist advice

### CONTINUE FIXED RATE INSULIN UNTIL

Ketones < 0.6 mmol/L  
Venous bicarbonate > 15 mmol/L +/- PH>7.3

**Patient eating and drinking**  
Switch to patients subcutaneous insulin regime  
Stop fixed rate 30 minutes after administration of SC insulin (with meal)

**Patient not eating and drinking or another indication for IV insulin (eg severe sepsis/ MI)**  
Switch to variable rate insulin

Refer early to diabetic specialist nurses  
Consider starting long acting in new diabetics such as Levemir<sup>®</sup> at 0.25 units/kg divided as twice as a day (refer to New Type 1 DM pathway)

## MONITORING

Monitoring should be performed as follows

CBG/blood glucose – 1 hourly  
Fluid balance – 1 hourly  
EWS – 1 hourly  
VBG (venous) : 2, 4, 6, 12, 18 hours  
U&E: 6, 12, 24 hours

## AIMS

### TARGETS

- 1) Fall in CBG of > 3mmol/L/hour
- 2) Fall in ketones of > 0.5mmol/L/hour
- 3) Rise in venous bicarbonate of > 3.0mmol/L/hour

If numbers are not improving check the patency of lines and infusion pumps before considering increasing FRII by 1-2units/hour

## EXIT CRITERIA

### RESOLUTION OF DKA

- 1) Resolution of ketonaemia – ketones < 0.6 mmol/L and Venous bicarbonate > 15 mmol/L and
- 2) Diabetes controlled with subcutaneous insulin and patient eating and drinking and
- 3) Patient has been seen by the diabetes team or there is a plan to do so
- 4) OR exit from the DKA pathway has been recommended by the diabetes team