Diabetic Ketoacidosis Care Pathway 1

Time of Arrival:_____

Location: _____

Date: _____

Name of patient

Affix label

0-4 hours Emergency Management

Ideally patients with DKA should be managed in a MHDU setting

Aim: To improve the acute management of diabetic ketoacidosis in adults aged 16 years and over within the first 4 hours of presentation (for paediatric management go to **www.bsped.org.uk**)

Definition: Severe uncontrolled diabetes with: a) ketonaemia/ketonuria b) metabolic acidosis c) usually with hyperglycaemia

Severe DKA = pH <7.1 or HCO3 <5mmol/L or H+ > 80mEq/L

Consultant/Senior physician should be called immediately if: • Cerebral Oedema • Severe DKA • Hypokalaemia on admission • Reduced conscious level								
1. Immediate actions								✔
Confirm diagnosis H+ > 45 or HCO3 < 18 or pH < 7.3 on **venous gas or plasma blood**								
Check U&Es and laboratory Blood Glucose								
Check urine or blood ketones								
Confirm patient ≥ 16 years								
Record time of arrival								
2. Management 0-60 mins								
Commence iv 1L Sodium Chloride 0.9% over 1 hour within 30 mins of admission								
Time and sign fluid commencement **(see DKA and fluid prescription chart)**								
Commence soluble insulin IV 6 units/hour within 30 mins of admission								
Time and sign start of insulin (on reverse)								
Record SEWS/MEWS/SIRS score								
Other interventions to be considered (tick box if performed)								
Review ECG or cardiac monitor		Blood cultures						
Record GCS score		Central line						
Insert catheter if oliguric		Chest Xray						
MSSU		DVT prophylaxis						
If protracted vomiting insert NG tube		**If deteriorating, consultant or senior physician called**						
Other interventions to be considered (tick box if performed)								
Record: SEWS/MEWS/SIRS		ECG		GCS				
Time and sign ongoing Sodium Chloride 0.9% replacement (on reverse)								
1L Sodium Chloride 0.9% hour 2 + KCL								
500mls/hour for hours 3-4 + KCL								
Review K+ result – admission or most recent result Prescribe KCl in 500 ml Sodium Chloride 0.9% bag as: None if anuric or K+ > 5 mmol/L 10 mmol if level 3.5-5 mmol/L 20 mmol if level <3.5 mmol/L (tick box if measured)								
Check finger prick Blood Glucose hourly	1hrs		2hrs		3 hrs		4 hrs	
Lab Glucose, U&Es and HC03 at:			2hrs				4 hrs	
If Blood Glucose falls to ≤ 14 mol/L in first 4 hours								
Commence Dextrose 10% 500mls with 20 mmol KCl at 100ml/hour								
Continue Sodium Chloride 0.9% at 400mls/hour + KCL (as per K+ table below) until end of hour 4								
Maintain Blood Glucose >9 mmol/L and ≤14 mmol/L adjusting insulin rate as necessary								
If Blood Glucose <9mmol/L adjust insulin to maintain level >9mmol/L and <14mmol/L								
If Blood Glucose >14mmol/L see supplementary note								
Progress on to second DKA Care Bundle “4 hours to discharge”								

Diabetic Ketoacidosis Care Pathway 2

Time of Arrival:_____

Location: _____

Date: _____

Pathway 1

Name of patient

Affix label

Whenever possible, all patients should be notified to the diabetes team within 12 hours of admission

Aim: To improve management of diabetic ketoacidosis in adults aged 16 years and over more than 4 hours after presentation

Definition: Severe uncontrolled diabetes with: a) ketonaemia/ketonuria; b) metabolic acidosis: c) usually with hyperglycaemia

Subsequent Management	✔
Review Blood Glucose results and U&Es	
Prescribe usual long acting insulin SC if relevant along with iv insulin (Detemir, Glargine, Insulatard Humulin I etc) at patient's usual times	
Continue Sodium chloride 0.9% + KCl at 250 mls/hr until BG <14 mmol/L	
When Blood Glucose falls <14 mmol/L (If not fallen in first 4 hours)	
• Commence 10% Dextrose with 20 mmol KCl 100ml/hour • Reduce Sodium chloride 0.9% to 150mls/hour + KCL (according to K+ table below) • Reduce insulin to 3 units/hour • Maintain Blood Glucose >9 mmol/L and ≤14 mmol/L adjusting insulin rate as necessary	
Review U&Es	
Review K+ result and replace KCl in 500 ml 0.9% Saline bag as: • None if anuric • 10 mmol if level 3.5-5 mmol/L • 20 mmol if level <3.5 mmol/L	
Measure and record lab glucose, U&Es and HCO3 4 hourly for 24 hours (Measure lab BG 2 hourly if BG >20mmol/L)	
At 8 Hours [ ] 12 hours [ ] 16 hours [ ] 20 hours [ ] 24 hours [ ]	
Convert back at next convenient meal time to usual sc insulin regimen when: • HCO3 within normal reference range • Patient eating normally Stop iv fluids and iv insulin 30 mins after usual injection of pre-meal sc insulin	
Phone/refer for specialist diabetes review before discharge. If not available, ensure specialist team receives a copy of the discharge summary	
Do not discharge until HCO3 normal, established on usual sc regimen and eating normally	
If Blood Glucose rises >14 mmol/L after glucose commenced	
Continue 10% Dextrose with 20mmol KCL at 100ml/hour • Continue Sodium chloride 0.9% + KCL as per protocol • Increase insulin to maintain Blood Glucose > 9 mmol/L and ≤14 mmol/L • When Blood Glucose ≤ 14mmol/L adjust insulin rate as necessary to maintain Blood Glucose >9 and ≤14 mmol/L	
Good Clinical Practice	
Record SEWS/MEWS/SIRS and GCS score. Finger prick Blood Glucose hourly	
Review other investigations	
If not improving at start of this bundle/after 4 hours: • Check that equipment is working • Confirm venous access is secure • Check non-return valve on pump • Replace 50ml syringe with fresh saline & insulin Call consultant/senior physician if all the above is working and patient still deteriorating	

Supplementary Notes

1. **Continuation of Insulin** It is reasonable to use a point-of-care blood glucose meter to monitor blood glucose level if the previous laboratory blood glucose value is less than 20 mmol/L.
2. **Consider Precipitating Factors**
   Common causes include:
   - Omissions of insulin
   - Infection
   - Newly diagnosed
   - Myocardial infarction
   - Combination of the above. Some or all of the following may have contributed to the DKA episode:
   - Errors in insulin administration
   - Faulty equipment
   - Practical problems.

3. DKA Blood Specimen set is found on trakcare under 'order sets'

4. If patient is pre or peripubertal the paediatric DKA protocol should be used

5. Refer for Specialist Diabetes review as soon as possible

For local diabetes Service:

• Insert No here_____

Ensure insulin is prescribed before patient leaves hospital

DKA FLUID AND INSULIN PRESCRIPTION CHART

Name of patient

Affix label

Fluid Advice:

Total volume of fluid in DKA

- 1000 mls/hour for 2 hours
- 500 mls/hour for 2 hours
- 250mls/hour thereafter

1. Start with Sodium Chloride 0.9%
2. Once BG < 14mmol/l start 10% Dextrose with KCL 20mmol (100 mls/hour)
3. IV glucose should continue until patients stops IV fluids
4. Ensure that the 100mls of Glucose is subtracted from total amount of fluid

Potassium

Review K+ result – admission or most recent result
Prescribe KCl in 500 ml Sodium Chloride 0.9% bag as:

- None if anuric or K+ > 5 mmol/L
- 10 mmol if level 3.5-5 mmol/L
- 20 mmol if level <3.5 mmol/L

Fluid (potassium) prescription sheet

Time	DATE	FLUIDS	KCL(see notes above)	Vol (ml) Dose (mmol)	Duration	Signature	Serial No Batch No	Time begun	Given by
		Sodium Chloride 0.9%		500ml	30mins				
		Sodium Chloride 0.9%		500ml	30mins				
		Sodium Chloride 0.9%		500ml					
		Sodium Chloride 0.9%		500ml					

Remember if on 10% Dextrose subtract the 100mls/hr from the volume of 0.9% Sodium Chloride so the total volume of fluid is as detailed above.

ONCE BG<14 mmol start 10% Dextrose with KCL 20mmol as charted

		Sodium Chloride 0.9%		500ml					
		Sodium Chloride 0.9%		500ml					
		Sodium Chloride 0.9%		500ml					
		Sodium Chloride 0.9%		500ml					
		Sodium Chloride 0.9%		500ml					

Once Blood Glucose <14mmol start 10% Dextrose in addition to Sodium Chloride 0.9%

		10% Dextrose	KCL 20 mmol	500ml	5 hours (100ml s/hr)				
		10% Dextrose	KCL 20 mmol	500ml	5 hours (100ml s/hr)				
		10% Dextrose	KCL 20 mmol	500ml	5 hours (100ml s/hr)				
		10% Dextrose	KCL 20 mmol	500ml	5 hours (100ml s/hr)				

Continue IV 10 % Glucose until IV fluids are stopped

Name of patient

Affix label

Intravenous Insulin Prescription

DATE TIME	INSULIN RATE (units/hr)	TYPE OF INSULIN	SIGNATURE	GIVEN BY
	6units/hour	ACTRAPID (50 units Actrapid in 50mls of NaCl 0.9%)		
	3 units/hour	ACTRAPID		
Thereafter adjust Actrapid up or down by 1 unit/hr to keep in target blood glucose of 9 – 14 mmol/l				
If patient usually on subcutaneous basal insulin (Humulin I, Insulatard, Levemir , Lantus) please ensure this is continued.				