**Diabetic Ketoacidosis Care Pathway 1**

***Name of patient***

***Affix label***



Time of Arrival:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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**

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| **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” **Pathway 2** |  |

**Diabetic Ketoacidosis Care Pathway 2**

***Name of patient***

***Affix label***



Time of Arrival:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Pathway 1**

Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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

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| **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 |
| ***Name of patient******Affix label*****DKA FLUID AND INSULIN** **PRESCRIPTION CHART** |
| **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 (100mls/hr) |  |  |  |  |
|  |  | 10% Dextrose  | KCL 20 mmol | 500ml  | 5 hours (100mls/hr) |  |  |  |  |
|  |  | 10% Dextrose  | KCL 20 mmol | 500ml  | 5 hours (100mls/hr) |  |  |  |  |
|  |  | 10% Dextrose  | KCL 20 mmol | 500ml | 5 hours (100mls/hr) |  |  |  |  |
| **Continue IV 10 % Glucose until IV fluids are stopped** |

***Name of patient***

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| **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** |
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| If patient usually on subcutaneous basal insulin (Humulin I, Insulatard, Levemir , Lantus) please ensure this is continued. |