Guidelines for the Management of patients with DKA and HHS in the ED

**DIAGNOSIS**

<table>
<thead>
<tr>
<th>Diabetic Ketoacidosis (DKA)</th>
<th>Hyperosmolar Hyperglycaemic State (HHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGL &gt; 15mmol/L</td>
<td>BGL Often high &gt; 28</td>
</tr>
<tr>
<td>pH &lt; 7.15</td>
<td>pH &gt; 7.3</td>
</tr>
<tr>
<td>HCO3 &lt; 15mmol/L</td>
<td>HCO3 &gt; 15</td>
</tr>
<tr>
<td>Serum/urine ketones elevated</td>
<td>Ketones can be present but low</td>
</tr>
<tr>
<td>Euthycaemic DKA can occur in:</td>
<td>Osmolarity &gt; 320 mosmol/L</td>
</tr>
<tr>
<td>- pregnancy</td>
<td>Undiagnosed or known type II DM</td>
</tr>
<tr>
<td>- insulin</td>
<td>Hyperglycaemia in 50% cases</td>
</tr>
<tr>
<td>- reduced oral intake</td>
<td>ALOC spectrum confusion to coma</td>
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**INITIAL EVALUATION**

- Resuscitation within the ABCDE system assumed, ask for help
- Initial protocols
- Confirm ABCDE, titrate fluids
- Ongoing monitoring
- ABCDE system applied
- Pain relief
- Pain relief
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- Pain relief

**TRENDS**

- Vital signs
- Temperature (Temp) PR BP SatO2 ongoing
- Glucose
- (VBG, ABG, Fingerprick) – qH
- Lab electrolytes/
- K, Ca
- Glucose
- Ketones
- qH until clearance (blood levels give more immediate result

**FLUIDS**

1. Fluid overload in elderly / cardiac / renal patients – Consider CVP
2. Difficult iv access consider external jugular vein, intraosseous or central access initially
3. Fluid deficits = 5-10L are common in DKA and HHS adults
4. Monitor haemodynamics, hydration, and urine output

**INSULIN**

1. Give fluids, resuscitate
2. Delay in pts with severe K+ (<3.3)
3. No Bolus
4. Check pump hourly
5. HHS pts may be very sensitive to exogenous insulin
6. Patients with SC insulin pump
   - safer to disconnect pump, start iv insulin
   - for mild DKA, interrogate pump/flow issue, may discuss with endocrinologist
7. Monitor – hourly BGL, fluid status

**POTASSIUM**

**REPLACEMENT**

- K+ >5
- 20 mmol/L in replacement fluid
- K+ 4 – 5
- 30-40 mmol/L in replacement fluid or via separate infusion pump
- K+ 3 – 4
- 40-60 mmol/L in replacement fluid or via separate infusion pump, central access if >10 mmol/L
- K+ ≤3
- Nil

**OTHER THERAPIES**

- Consider: HCO3 replacement, generally NO
- Consider if pH < 6.9 (in setting of high K+ or arrhythmias or HCO3 ≤ 5), consult widely
- Heparin for HHS cases
- Note that large vessel arterial thrombosis and embolisation are common events
- Low dose heparin provided no clinical evidence of thrombosis

**REPLACEMENT**

| Lab electrolytes/
| K, Ca
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**OTHER THERAPIES**

- Hypo/HyperNa
- Stabilize circulation with N/Saline
- Then consult senior ED, endocrine, ICU
- (corrected Na+ = [(Glucose – 10) ÷ 3] + measured Na+)
- (Lab “Tame techniques”)
- Phosphate / Magnesium replacement
- PO4<0.32 – K2PO4 20mmol over 6 hours
- Mg<0.6 – MgSO4 2g over 4h
- Empirical/directed Antibiotics with sepsis

**OTHER THERAPIES**

- See Sepsis guidelines (link)

**MAIN CAUSES OF DEATH**

- Aspiration (gastroperosis)
- Hyper/hypokalaemia
- Cerebral oedema (extremely rare in adults, 0.3-1% in children).

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