# Emergency Department Diabetic Ketoacidosis (DKA) Adult Orders

Last Revised: November 2016

Please select orders by placing a ‘✓’ in the associated box

<table>
<thead>
<tr>
<th>Wt _______ kg</th>
<th>Allergies</th>
<th>□ Up to date in Electronic System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date (yyyy-Mon-dd)</td>
<td>Time (hh:mm)</td>
<td></td>
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</tbody>
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**Goals of Care Designation**

- □ Patient has updated Goals of Care in green sleeve
- □ Consider discussion now

## Part 1: SUSPECTED DKA orders

**Laboratory Investigations**

**Hematology**

- □ Complete Blood Count (CBC)

**Chemistry**

- □ Electrolytes (Na, K, Cl, CO₂)
- □ Glucose
- □ Serum b-OHB
- □ Urinalysis
- □ Creatinine
- □ Urea
- □ Osmolality
- □ Hemoglobin A1C

**Other Labs (based on presentation needs of the patient):**

**Blood Gases**

- □ Blood Gas Venous
- □ Blood Gas Arterial

**Hematology**

- □ D-Dimer

**Chemistry**

- □ Magnesium (Mg)
- □ Troponin
- □ HCG Beta
- □ Calcium (Ca)
- □ Lipase
- □ Phosphate

**Microbiology**

- □ Blood Culture

**Urine Tests**

- □ Pregnancy Test, Urine
- □ Urine Culture

**Special Fluids**

- □ CSF Analysis

**Repeating Labs**

*Serum electrolytes should be ordered every 2 to 4 hours during initial resuscitation in order to adjust treatment appropriately.*

- □ Electrolytes (Na, K, Cl, CO₂) – Draw every ______ hour(s)

*If glucose level too high for Point of Care testing (POCT), serum glucose levels should be ordered every 1 to 2 hours until readable on bedside glucose monitors to adjust treatment appropriately.*

- □ Glucose LEVEL - Draw every ______ hour(s)
**DI Investigations**
Order imaging studies if there is clinical concern for a precipitating cause of DKA
- Chest X-Ray 2 projections (posterior-anterior & lateral)
- Chest X-Ray 1 projection portable (posterior-anterior)
- Ultrasound __________________________(area of concern)
- CT Scan __________________________(area of concern)

Order an ECG to identify severe electrolyte abnormalities as well as a potential precipitating cause of DKA
- Electrocardiogram - 12 Lead (ECG)

<table>
<thead>
<tr>
<th>Intravenous Orders: INITIAL RESUSCITATION</th>
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**Severe Dehydration / Unstable Vital Signs:**
- Intravenous Cannula - Insert
- IV Bolus: 0.9% NaCl 1000 mL over 1 hour
- IV Bolus: 0.9% NaCl 1000 mL over _____ minutes
- IV Bolus: 0.9% NaCl 2000 mL over _____ minutes

**Mild to Moderate dehydration:**
- IV 0.9% NaCl infusion 500 mL/hour
- IV 0.9% NaCl infusion 250 mL/hour

**Sodium Bicarbonate**
Not recommended unless severe acidosis (pH less than 7.0) remains despite adequate fluid resuscitation and potassium correction.
- sodium bicarbonate 50 mmol in 200 mL D5W IV once, infuse over 1 hour
- repeat arterial or venous blood gases 1 hour after IV sodium bicarbonate

**Magnesium** (if indicated; infuse over 1 or 2 hours)
- magnesium 2 g IV once, infuse over _____ hour(s)

***Continue to PART 2 if DKA confirmed…***
Part 2: CONFIRMED DKA - Glucose GREATER THAN 15 mmol/L  
(based on clinical picture, lab results)

Intravenous Orders (glucose greater than 15 mmol/L)
Recommend 0.9% NaCl for restoration of normal extracellular fluid volume (establish diuresis) and suggest changing IV solution to 0.45% NaCl (with added KCl) when:
  • Patient mild dehydration or euvoletic; AND
  • Corrected serum sodium greater than 135 mmol/L; AND
  • Plasma osmolality is falling less than 3 mmol/hour

**Maximum amount of fluid recommended is 50 mL/kg TOTAL over first 4 hours including resuscitation fluid given.

□ IV 0.9% NaCl infusion (with KCl as per separate potassium orders) for 4 hours, then reassess
  □ at 250 mL/hour
  □ at 500 mL/hour
□ IV 0.45% NaCl infusion (with KCl as per separate potassium orders) for 4 hours, then reassess
  □ at 250 mL/hour
  □ at 500 mL/hour

Potassium Orders
Most DKA patients are total body potassium depleted at presentation. Hold potassium if no urine output unless potassium less than 3.3 mmol/L, which requires immediate correction. Once diuresis established, each litre of IV solution should contain the following potassium concentration. Maximum rate of potassium is 20 mmol/hour in peripheral IV line.

Adjust potassium chloride supplementation based on MOST RECENT electrolyte results:
✔ Serum potassium of greater than 5.2 mmol/L: DO NOT administer potassium in IV fluid
✔ Serum potassium 3.3 to 5.2 mmol/L and patient has urinary output: select IV fluid with 20 mmol KCl added to each 1 litre bag
✔ Serum potassium of less than 3.3 mmol/L: select IV fluid with 40 mmol KCl added to each 1 litre bag

Insulin (Glucose greater than 15 mmol/L)
Goal is to reduce serum glucose by 10% per hour or 2 to 4 mmol/L/hour. Recommend an initial insulin infusion starting rate of between 0.1 to 0.15 units/kg/hour. Insulin infusion should be continued until acidosis corrected (as assessed by pH/serum bicarbonate level/anion gap).

Note: Patients with insulin pumps should have them discontinued prior to initiating IV insulin infusion.

✔ HOLD insulin infusion whenever serum potassium less than 3.3 mmol/L
✔ Notify physician if glucose is less than 7 mmol/L at any time
□ Regular Insulin (Humulin R or Novolin ge Toronto) at _____ units/hour IV infusion and adjust infusion rate based on q1h glucose results as follows:
  • If glucose decreases by 2 to 4 mmol/L, continue current insulin IV rate
  • If glucose decreases by less than 2 mmol/L after 2 consecutive readings, double insulin IV rate
  • If glucose decreases by more than 4 mmol/L, reduce insulin IV rate by half

***Continue to PART 3 if DKA continues…
Part 3: CONFIRMED DKA - Glucose LESS THAN 15 mmol/L on 2 consecutive hourly readings:

Intravenous Orders (Glucose less than 15 mmol/L)
- IV D5W - 0.45% NaCl infusion (with KCl as per separate potassium orders) to maintain serum glucose of 12 to 14 mmol/L until DKA resolves
  - at 150 mL/hour
  - at 250 mL/hour

Potassium Orders
Adjust potassium chloride supplementation based on MOST RECENT electrolyte results:
- Serum potassium of greater than 5.2 mmol/L: DO NOT administer potassium in IV fluid
- Serum potassium 3.3 to 5.2 mmol/L and patient has urinary output: select IV fluid with 20 mmol KCl added to each 1 litre bag
- Serum potassium of less than 3.3 mmol/L: select IV fluid with 40 mmol KCl added to each 1 litre bag

Insulin (Glucose less than 15 mmol/L)
- Decrease previous insulin IV rate by 50% and adjust to maintain glucose of 12 to 14 mmol/L based on q1h glucose monitoring:

<table>
<thead>
<tr>
<th>Glucose mmol/L</th>
<th>Insulin Adjustment</th>
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<tbody>
<tr>
<td>Less than 7 mmol/L (any time)</td>
<td>Contact physician</td>
</tr>
<tr>
<td>7 to 9.9</td>
<td>Decrease rate by 1 unit/hour</td>
</tr>
<tr>
<td>10 to 11.9</td>
<td>Decrease rate by 0.5 units/hour</td>
</tr>
<tr>
<td>12 to 14</td>
<td>Maintain current rate</td>
</tr>
<tr>
<td>14.1 to 16</td>
<td>Increase rate by 1 unit/hour</td>
</tr>
<tr>
<td>Greater than 16.1</td>
<td>Increase rate by 2 units/hour</td>
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Acidosis resolved (normal pH / normal anion gap / serum CO₂ greater than 20 mmol/L):

Subcutaneous insulin should be initiated once acidosis resolved and patient tolerating oral diet.

- Subcutaneous insulin (type/dose):______________________________
- Continue IV insulin infusion for 2 hours post subcutaneous insulin dose then discontinue DKA protocol
## Patient Care Orders

### Monitoring
- **Vital Signs**: respiratory rate, pulse, blood pressure, temperature, oxygen saturation (re-evaluate when patient stabilizes or in 2 hours, whichever occurs first)
  - as per local standards  [ ]  manual  [ ]  automatic  [ ]
  - every ____ hour(s)  [ ]  manual  [ ]  automatic  [ ]
  - every ____ minutes  [ ]  manual  [ ]  automatic  [ ]
- **Continuous Cardiac Monitoring** *(suggested if patient has unstable vital signs, severe hyper/hypokalemia with ECG changes, suspected acute coronary syndrome as precipitating cause or as per physician discretion)*
- **Bedside glucose monitoring (CBG)** every 1 hour while on insulin infusion
- **Glasgow Coma Scale (GCS), pupillary size and reaction to light with reassessments**
  - as per local standards  [ ]
  - Notify physician if increasing drowsiness or GCS decreases by 2 or more points  [ ]
- **Measure and record output every _____ hour(s)**  [ ]
- **Measure and record input every _____ hour(s)**  [ ]
- **Urinary Catheter - Insert**  [ ]

### Respiratory Care
- **O2 Therapy at _____ LPM by____________ (specify device)** to maintain O2 sat greater than or equal to 92%
- **Notify physician if O2 flow required to be increased by greater than 2 L to maintain the same level of oxygenation or if there is a progressive increase in the work of breathing**

### Activity
- Bedrest  [ ]
- Activity as Tolerated  [ ]

### Diet / Nutrition
- NPO  [ ]
- NPO: May Take Meds  [ ]
- Diabetic Diet  [ ]
- Other Diet: ______________

### Other Orders
- Consult Cardiology  [ ]
- Consult Critical Care  [ ]
- ______________
- ______________
- ______________
- ______________
- ______________