STANDARD TREATMENT WORKFLOW (STW)

Diabetic Ketoacidosis

Anil Bhansali¹, Eesh Bhatia², B Ganpathi³, Maj Gen Narendra Kotwal⁴, Rajesh Rajput⁵, Ravinder Goswami⁶, Subhankar Choudhary⁷, V Mohan⁸

¹Postgraduate Institute of Medical Education and Research, Chandigarh; ²Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow; ³St John’s Medical College Hospital, Bengaluru; ⁴Army Hospital Research and Referral, New Delhi; ⁵Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak; ⁶All India Institute of Medical Sciences, New Delhi; ⁷Institute of Post-Graduate Medical Education and Research, Kolkata; ⁸Dr. Mohan’s Diabetes Specialities Centre, Chennai

CORRESPONDING AUTHOR
Dr. Anil Bhansali, Department of Endocrinology, Postgraduate Institute of Medical Education and Research, Chandigarh
Email: anilbhansali_endocrine@rediffmail.com

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**Diabetic Ketoacidosis**

**Standard Treatment Workflow (STW)**

**Diabetic Ketoacidosis**

**ICD-10-E11.10**

**Assess**
- Sensorium (GCS), pulse rate, blood pressure, respiratory rate, temperature
- Signs of dehydration (dry tongue, sunken eyes, skin turgor, urine output)

**Assess Severity of DKA**

<table>
<thead>
<tr>
<th>Level of Sensory</th>
<th>Alert</th>
<th>Mild</th>
<th>Stupor</th>
<th>Coma</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.25-7.3</td>
<td>7.0-7.25</td>
<td>&lt;7.0</td>
<td></td>
</tr>
<tr>
<td>HCO₃⁻</td>
<td>15-18</td>
<td>10-15</td>
<td>&lt;10</td>
<td></td>
</tr>
</tbody>
</table>

**Look & Address for Precipitating Factors**
- Skipping/missing insulin doses
- Fever/cough/loose stools/burning micturition

**Investigations**
- Spot capillary blood glucose (venous blood preferable in case of shock)
- Serum ketone/urine ketone by dipstick
- VBC (for pH, bicarbonate, anion gap)
- Na⁺/K⁺/BUN/Creatinine/EKG

**Monitoring**
- Strict input/output charting: every 1 hour
- Report if urine output is <30ml/hour for 2 consecutive hours
- One hour after starting the treatment: Till resolution of DKA
- BP and vital signs: every 1 hour
- Blood glucose every 1 hour
- Venous pH, Na⁺, K⁺, HCO₃⁻: 2-4 hourly
- Blood ketones (if available)/Urine for ketones: 12 hourly
- After resolution of DKA: Blood glucose monitoring every 4 hours

**Management**
- Replace fluids – 1 L of 0.9% saline over first hour followed by 250-500 ml/hour (10-20ml/kg/hour initially for children)
- Administer regular insulin – 0.1 IU/kg IV then 0.1 IU/kg/hour IV infusion
- Double infusion rate if less than 10% fall in blood glucose after 1 hour
- When blood glucose < 250 mg/dl, add 5% dextrose @ 50 ml/hour
- Supplement potassium before insulin if serum K⁺ < 3.3 mEq/L (or ECG changes)
- Replace potassium @ 10-20 mEq/hour with insulin infusion if serum K⁺ < 5.5 mEq/L
- If pH < 7.0, add sodium bicarbonate: 50 mmol in 200 ml sterile water over 2 hour
- Bicarbonate should be given only if pH is less than 6.9 or if pH is less than 7.1 along with hypotension or if hyperkalemia is present

**Treating**
- Patient accepting orally, blood glucose consistently > 250 mg/dl, normalization of anion gap and correction of metabolic acidosis
- Administer SC dose of long/intermediate-acting & short acting insulin at least 30 mins before stopping insulin infusion. Shift to basal-bolus/pre-mixed insulin regimen

**Common Errors/Pitfalls in DKA Diagnosis and Management**
- Initiating Insulin therapy before I/V fluid therapy
- Failure to review fluid replacement therapy particularly in elderly patients
- Failure to identify underlying cause
- Search for another cause of obtundation: If the osmolality is <320 mOsm/kg H₂O
- Potassium: may be normal despite depletion of body stores due to metabolic acidosis
- Elevated total leucocyte count does not suggest presence of infection until more than >15 X 10⁹/l
- Monitor for cerebral edema especially in children
- Body temperature cannot be used as a guide to presence of infection
- Hyperamylasemia: Cannot be used as a marker for diagnosis of pancreatitis
- Hypertrophic necrosis: can cause pseudohypokalemia and when marked precipitates pancreatitis
- Ketosis may worsen paradoxically with successful treatment initially
- Stopping I/V insulin before SC insulin given

**Abbreviations**

- BUN: Blood urea nitrogen
- DKA: Diabetic ketoacidosis
- ECG: Electrocardiogram
- GCS: Glasgow coma scale
- IV: Intravenous
- ICU: Intensive care unit
- SC: Subcutaneous
- VBG: Venous blood gas

**Keep a Low Threshold for Timely Diagnosis and Management of DKA**

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