By The Name of Allah

University of Jordan

Advanced Nursing

Master of Clinical Nursing

Case Presentation about:
Diabetic Ketoacidosis (DKA)

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Outline:

1- Overview of the Case
2- case history.
3- General health assessment.
4- Medical treatment and management in the critical care unit.
5- Nursing care plan.
6- Evaluation of the care based on the outcome criteria and patient response to treatment.
7- References.
Overview of the case:

M.K, 52-year-old Jordanian woman was admitted to the Emergency intensive care unit of Albashier hospital on Thursday, March 9th at 4pm, transferred from medical emergency department as a case of Diabetic Ketoacidosis with loss of consciousness.
**physical assessment**

Patient was unconscious, disoriented with strong fruity smell of breath. Patient was connected to the cardiac monitor, temperature was 36.2°C axillary, blood pressure was 85/55 mmHg, pulse 136B/m, respiratory rate was 36 B/m and O2 saturation was 91%. Patient not responsive except to very loud or painful stimuli (GCS = 7/15). The skin was dry with impaired skin turgor.
Physical assessment

Respiratory pattern was that of rapid and deep breathing (“Kussmaul” breathing) with use of accessory muscles, Clear Lung sounds with no wheezes or rhonchi, good bilateral air entry. Normal heart sounds (S1 & S2). The abdominal exam revealed mild epigastric tenderness to deep palpation but no rebound tenderness or guarding. Extremities were symmetrically well perfused with Decreased reflexes. No other pathological findings on PE.
**Diagnostic tests**

Diagnostic tests were remarkable for a room air arterial blood gas, Chemistry panel and Full blood count.

- **ABGs**

<table>
<thead>
<tr>
<th>Lab test</th>
<th>result</th>
<th>Normal value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH</td>
<td>6.85</td>
<td>7.35 -7.45</td>
<td>Sever acidosis</td>
</tr>
<tr>
<td>PCO2</td>
<td>21 mmHg</td>
<td>35 -45 mmHg</td>
<td>hypocapnia</td>
</tr>
<tr>
<td>HCO3</td>
<td>10 mEq/l</td>
<td>20 -26 mEq/l</td>
<td>Low carbonate</td>
</tr>
</tbody>
</table>
# Urine analysis

<table>
<thead>
<tr>
<th>Lab test</th>
<th>Result</th>
<th>Normal value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>+ 4</td>
<td>zero</td>
<td>hyperglycemia</td>
</tr>
<tr>
<td>Ketones</td>
<td>+ 3</td>
<td>zero</td>
<td>Ketone urea</td>
</tr>
<tr>
<td>S.G</td>
<td>1.037</td>
<td>1.01 -1.025</td>
<td>Dehydration</td>
</tr>
</tbody>
</table>
# Blood test

<table>
<thead>
<tr>
<th>Lab test</th>
<th>result</th>
<th>Normal value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>550 mg/dl</td>
<td>70 -110 mg/dl</td>
<td>Hyperglycemia</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.7 mg/dl</td>
<td>0.7 -1.4 mg/dl</td>
<td>dehydration</td>
</tr>
<tr>
<td>Sodium</td>
<td>131 mEq/l</td>
<td>135 -145 mEq/l</td>
<td>Hyponatremia</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.4 mEq/l</td>
<td>3.5 -5.3 mEq/l</td>
<td>Hypokalemia</td>
</tr>
<tr>
<td>Hb</td>
<td>15.2 g/dl</td>
<td>12 -15 g/dl</td>
<td>Hemo-concentrated</td>
</tr>
</tbody>
</table>

-Serum phosphorus, chloride, magnesium, BUN and LFT are not doable on B and C shifts.

Normal Chest X-ray with no infiltrate, ECG shows tachycardia.
Patient history

patient had general weakness, tactile fever, productive cough, nausea and vomiting 5-days ago.

Past medical and surgical history: long history of diabetes and dyslipidemia (10 years ago).

- Drug history: metformin (Glucophage) two years ago for glycemic control.

- Family history: +ve (her mother has DM and HTN).

- Patient was obese (approximately 100 Kg), Not smoker, not alcoholic.
Treatment and management that done in ICU

Although most typical features of DKA - such as dehydration, polyuria, polydipsia, nausea, vomiting, acidotic ("Kussmaul") respiration, and impaired level of consciousness - were present, there was a delay in diagnosis and management of that patient. The assessment and referee of the emergency room took a long time.
In the ICU, initial management started using "ABC" of secured airway, sustaining ventilation and maintenance a stable circulation. Cardiac monitoring initiated immediately, a secured airway established with ETT and patient connected to mechanical ventilation on SIMV mode (RR=12B/M, TV=0.7L, FiO2=40%). FC and NGT inserted, then Fluids resuscitation and hydration started by a ready order of normal saline 0.9% 1 L during the first hour then over 2 hours then over 4 hours to reverse the vascular deficit, hypotension, and extra cellular fluid losses.
Serum blood sugar ( glucocheck) done hourly to start on DW 5% instead of NS 0.9% when BS decreased to 250 mg/dl , to replenish glucose stores because muscles and liver glucagons reserves may have been depleted during gluconeogenesis . In addition glucose may prevent cerebral edema, which may result when water is drown across the blood-brain barriers into the brain tissues.

One time bolus insulin of 0.2 -0.3 IU/kg (20 IU PI) were given IV to saturate the insulin cell receptor sites and compete with the insulin resistance, then replacement with low dose short-acting insulin 0.1 IU/kg/hr (10 IU PI) were given intravascular to decrease blood glucose level .
Serum potassium was 3.4 mEq/L, so 30 mmol potassium chloride was added to each litter of hydration solution to replace potassium depletion, serum potassium level was checked hourly.

Sodium bicarbonate infusion was also given to neutralize the severe acidotic status with continuous monitoring of ABGs, and when PH reached 7 replacement stopped.

No replacement was done for magnesium, and phosphorus. Patient neurological status and level of consciousness was checked from time to time.
Nursing Care Plane

Nursing Diagnosis, goals, interventions and evaluation.

1 - Fluids volume deficit related to excess excretion of urine, nausea and vomiting as manifested by physical assessment, lab tests and V/S.

Goal: to maintain fluids and electrolytes balance.

Outcomes: by the end of the shift, patient will demonstrate stable V/S, acid base balance, warm, moist skin and stable mental status.

Interventions:-
- Intravenous fluids and electrolytes administration as ordered.
- check V/s frequently Q 15 minutes specially BP and pulse.
- check the peripheral pulse, note equality and presence.
- Strict intake and output monitoring, for balance and loss.
- Urine analysis for the color, Ketones, and specific gravity.
- Monitor mental status, and note any deterioration.
- Monitor lab tests, such as sodium, potassium, hematocrit and creatinine.
- check skin turgor, color, warmth and mouth dryness.

**Evaluation:** goal was met as evidenced by:
- patient V/S (blood pressure and heart rate) improved.
- Patient skin turgor improved (warm and moist skin).
- Patient extubated and mental status improved, patient became conscious and less drowsy (GCS = 14/15).
- Patient electrolytes disturbance subsided (Na, K & HCO3).
Nursing Diagnosis: -

2 - Ineffective Therapeutic Regimen related lack of understanding of preventive measures, insufficient self-monitoring of blood glucose and medications.

Goal: to improve the efficiency of the therapeutic regimen.

Outcomes: by the end of the clinical day, the patient or significant relatives will be able to list the preventive measures of DKA and factors that affect therapeutic regimen.

Interventions:
- Provide quite environment to explain information.
- Teach the signs and symptoms of hyperglycemia that may lead to DKA:
  a. BG > 250 mg/dL  b. Polyuria  c. Polydipsia  d. Polyphasia  
  e. Fatigue  f. Blurred vision.
Teach the possible causes of hyperglycemia:

- increased food intake
- Decreased oral hypoglycemic agent
- Decreased exercise
- Infection
- Dehydration.

- Monitor for the effectiveness of the oral hypoglycemic agents and the need for insulin therapy (medical consultation).
- Explain the need of regular exercise program that may help to control BS.
- Teach the client to monitor blood sugar and urine for Ketones every 12 hours.
- Strongly advise the client to have an individualized meal plan developed by a specialized dietitian to enhance nutritional balance that helps for normal blood glucose level.

**Evaluation:**
- goal was met, as evidenced by:
- Patient listed the signs and symptoms of hyperglycemia and the preventive measures of DKA.
Other Nursing Diagnosis:

- Knowledge deficit.
- Anxiety.
- Powerlessness.

My advice for better management regimen is to make all lab tests doable 24 hours a day at least for urgent cases that helps in a faster diagnosis and management and decreases post-treatment complications.
References


Thanks