Case Study Presentation Diabetic Ketoacidosis in Type 1 Diabetes Mellitus

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Objectives

- • Discuss clinical presentation, assessment, management, and complications of DKA.
- • Enhance understanding of pathophysiology and nursing care.
- • Promote safe and evidence-based management of DKA.
- • Encourage feedback and discussion for clinical improvement.

Introduction

- Diabetic Ketoacidosis (DKA) is a serious, life-threatening acute complication of Type 1 Diabetes Mellitus.
- It occurs due to severe insulin deficiency causing hyperglycemia, fat breakdown, and ketone accumulation.
- Early recognition and management prevent complications and mortality.
- Nurses play a key role in monitoring, fluid balance, and patient education.

Definition

- According to the American Diabetes Association (ADA, 2024):
- 'Diabetic Ketoacidosis (DKA) is characterized by the triad of hyperglycemia (blood glucose >250 mg/dL), ketonemia, and metabolic acidosis (pH <7.3, bicarbonate <18 mEq/L).'
- It results from insulin deficiency and elevated counter-regulatory hormones.

Patient Profile

- Name: Ms. X
- Age: 42 years
- Gender: Female
- Date of Admission: 01/10/2025
- Date of Discharge: 07/10/2025

Chief Complaints:

- Nausea, vomiting, abdominal pain, excessive thirst, rapid breathing (2 days).

Present Medical History

- Type 1 Diabetes Mellitus for 15 years, on insulin therapy.
- Missed insulin doses due to gastrointestinal symptoms.
- Developed weakness, abdominal pain, Dehydration[vomiting Diarrhoea], polyuria, and polydipsia.
- No previous episodes of DKA.

Past Medical History

- Known case of Type 1 Diabetes Mellitus for 15 years, on insulin therapy.
- History of Hypothyroidism – on Levothyroxine.
- No history of hypertension, cardiovascular, or renal disease.
- No known allergies.
- No previous DKA episodes.

Past Surgical and Family History

Past Surgical History:

- No major surgeries in the past.
- No hospitalization related to diabetes complications.
- No post-operative complications noted.

Family History:

- Mother – Type 2 Diabetes Mellitus
- Father – Hypertension
- No family history of thyroid or renal disease.

Personal History

- Non-smoker, non-alcoholic.
- Mixed diet, normal bowel and bladder habits.
- Normal sleep pattern.
- Moderate physical activity.
- Adequate hygiene and medication adherence.

Physical Examination

General appearance: Drowsy or lethargic, dehydrated, fruity (acetone) breath odor.

Vital signs:

- **Temp** – normal/mildly elevated
- **Pulse** – rapid, weak
- **Respiration** – deep, labored (Kussmaul)
- **BP** – low due to dehydration/shock.

General Examination

- Conscious but lethargic.-not coherent
- Pallor, icterus, cyanosis – absent.
- Dehydration – present.
- Skin – dry, poor turgor.
- Edema – absent.
- Odor of acetone noted.

Head-to-Toe Physical Examination (Part 1)

Head and Neck:

- **Head** – Normocephalic, no injury.
- **Eyes** – Sunken, blurred vision.
- **Ears** – No discharge.
- **Nose** – No bleeding.
- **Mouth** – Dry tongue, missing teeth.
- **Neck** – No lymphadenopathy.

Head-to-Toe Physical Examination (Part 2)

Chest and Extremities:

- **Chest** – Kussmaul breathing noted.
- **Heart** – Rapid heart rate and irregular rhythm.
- **Abdomen** – Soft, tenderness due to acidosis.
- **Extremities** – Warm, mild edema.
- **Skin** – Dry, flushed.
- **Neurological** – GCS 11/15.

Systemic Examination

- **Respiratory** – Breathing may become rapid,deep and lobored[Kussmaul breathing] clear air entry.
- **Cardiovascular** –Irregular heart sounds, no murmur.
- **Abdomen** – Soft, epigastric tenderness.
- **Musculoskeletal** – No deformity.
- **Neurological** – Weakness, tingling sensation,Agitition.

CNS Examination

- **GCS**: 11/15 (E3 V4 M4)
- **Motor** – limbs move symmetrically.
- **Sensory** – patient withdrawl with painful stimulus.
- **Reflexes** – sluggish.[decreased reflexes,which is assign that the body is becoming severly dehydrated.
- **Mental status** –Difficulty concentrating,confusion

Laboratory Investigations

- **RBS**: 420 mg/dL
- **ABG**: pH 7.10, HCO_3^- 12 mEq/L
- **Na^+**: 130 mEq/L, K^+: 5.8 mEq/L
- **BUN**: 44 mg/dL, Creatinine: 1.4 mg/dL
- **HbA1c**: 9.8%

Urine Analysis

- **Color** – Light yellow
- **Reaction** – Acidic
- **Albumin** – Traces
- **Sugar** – 3+
- **Transparency** – Clear
- **Pus cells** – 5–6/HPF
- **Epithelial cells** – 4–5/HPF

Complications Observed

- Mild acute kidney injury (resolved)
- Hypokalemia during insulin therapy (corrected)
- No cerebral edema or secondary infection.

Treatment and Management of DKA

Fluid Replacement:

- Start with 0.9% Normal Saline (15–20 ml/kg in 1st hour)
- Switch to 0.45% saline if Na^+ normal/high
- Add 5% Dextrose when glucose < 250 mg/dL

Insulin Therapy:

- IV Regular Insulin 0.1 U/kg/hr
- Reduce glucose 50–75 mg/dL/hr

Potassium Replacement:

- Start when urine output adequate, K^+ < 5.5 mEq/L
- Add 20–30 mEq KCl/L

Acidosis Correction:

- Corrects with fluids + insulin
- Bicarbonate only if pH < 6.9

Monitor:

- Hourly glucose, ECG, electrolytes every 2–4 hrs

Treat Underlying Cause:

- Gastroenteritis or missed insulin dose.

Nursing Interventions

- Monitor vital signs, level of consciousness, and fluid balance hourly.
- Administer IV fluids and insulin as prescribed; monitor for hypoglycemia and electrolyte imbalance.
- Monitor serum glucose, ketones, and ABG values periodically.
- Assess for signs of dehydration and improvement in mental status.
- Monitor urinary output and Monitor for signs of fluid overload

- Provide oral fluids when patient is conscious and nausea subsides.
- Monitor potassium and glucose levels ,for signs of increased ICP
- Educate patient on insulin adherence, diet, and sick-day management.
- Provide psychological support to reduce anxiety and fear.
- Collaborate with healthcare team for ongoing assessment and management.

Recommendations

- Follow diabetic diet plan and hydration.
- Maintain insulin adherence even during illness.
- Foot care: inspect daily and wear MCR footwear.
- Regular glucose monitoring.
- Seek medical help for vomiting/confusion.
- Psychological support and education.


Thank
You