

DIABETIC KETOACIDOSIS

Prof. Muhammad Afif Qureshi

MBBS, FCPS, FRCP (London), FRCP (Edinburgh), CMEd.

HOD Medicine & Allied

Azra Naheed Medical College Lahore

1111111111
1111111111

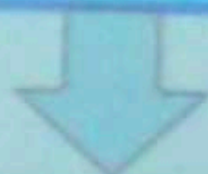
ACUTE COMPLICATIONS

- **DIABETIC KETOACIDOSIS:**
 - Dreadfull
 - Especially occurs in Type 1 DM
- **HYPEROSMOLAR NON-KETOTIC COMA:**
 - More common in Type 2 DM
 - Complication of old aged patients



DKA Definition

DKA = 3 letters = triad of D K A



Diabetic

glucose >250 mg/dL (usually 500-800)

Keto

ketones produced

- ketones – both in urine and in serum
- acetoacetate, acetone, beta-hydroxybutyrate
- fruity smell, not often encountered in real life)
- consider that if these criteria aren't met, it may not be DKA

DIAGNOSIS

- *Dreadful/ Life-threatening complication* of DM especially Type 1
- Resulting from *severe insulin deficiency*
- *Lab* (3 cardinal features):
 - *Hyperglycemia*
 - *Ketosis*
 - *Acidosis*



ALARMING FEATURES

- **EVIDENCE OF DEHYDRATION:**
 - Tachycardia, hypotension, dry mucous membranes, sunken eyeballs, poor skin turgor
- **CLOUDING** of mental status
- **TACHYPNEA** with air hunger (Kussmaul's respiration)

- **FRUITY BREATH ODOUR:**
 - Caused by Acetones
- **SIGNS OF POSSIBLE INFECTION:**
 - Infected wound, abscess, pneumonia
- **ABDOMINAL TENDERNESS** in some patients

Suspect DKA in any unconscious or hyperventilating patient

THE HALLMARKS

- **Glucose level** reveals severe hyperglycemia (serum glucose generally **> 250 mg/dl**);
- **Urine/serum ketones positive**
- **ABGs** reveal acidosis:
 - arterial **pH usually < 7.30** with **pCO₂ < 40 mm Hg**

ABG Analysis

HCO₃: NV = 22 – 26 mEq/Liter
pCO₂: NV = 35 – 45 mm Hg

pH
(NV: 7.35 – 7.45)



LOW (< 7.35)

(ACIDOSIS)

[Look for pCO₂ & HCO₃]

HCO₃ = LOW

pCO₂ =
Normal/ Low

METABOLIC
ACIDOSIS

pCO₂ = High

HCO₃ =
Normal/ High

RESPIRATORY
ACIDOSIS

HIGH (> 7.45)

(ALKALOSIS)

[Look for pCO₂ & HCO₃]

HCO₃ = High

pCO₂ =
Normal/ High

METABOLIC
ALAKALOSIS

pCO₂ = LOW

HCO₃ =
Normal/ Low

RESPIRATORY
ALAKALOSIS

CATEGORIES/ STAGES OF DKA

ACCORDING TO AMERICAN DIABETIC ASSOCIATION

- **MILD:**
 - Blood *pH* between **7.25 and 7.30**
- **MODERATE:** (Mild drowsiness may be present)
 - Blood *pH* between **7.00 and 7.25**
- **SEVERE:** (Stupor or Coma may occur)
 - Blood *pH* **< 7.00**

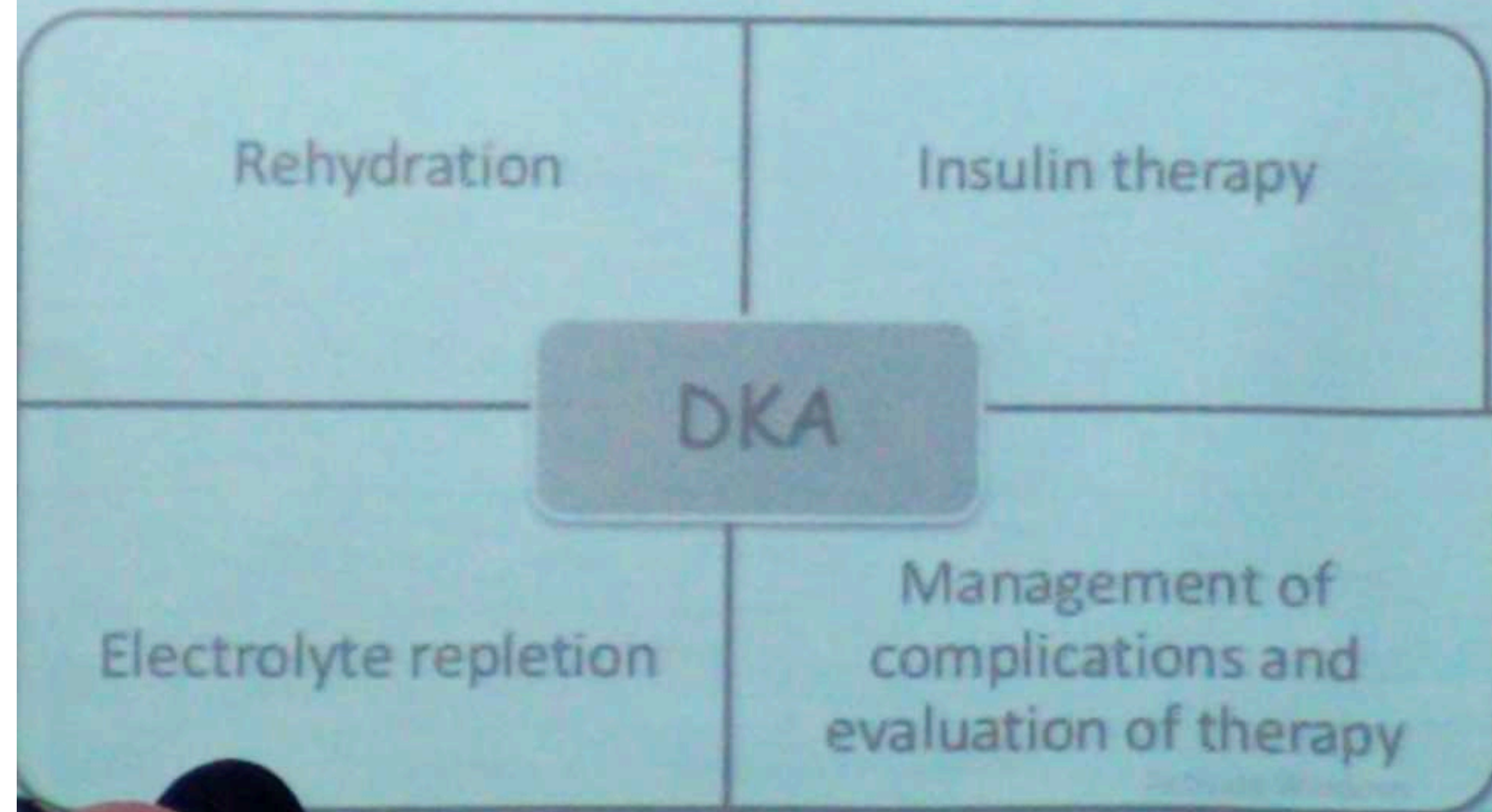
Precipitating factors

6 I's

1. Infection
2. Ignorance
3. Infarction
4. Ischemia
5. Implantation
6. Intoxication

MANAGEMENT

Management



MANAGEMENT



- Immediate management (within 1st hr)
- Ongoing management (b/w 2 – 4 hrs)
- Subsequent management (beyond 4 hrs)
- Continuing care

Classification of DKA

	Mild DKA	Moderate DKA	Severe DKA
Plasma glucose (mg/dL)	>250	>250	>250
pH	7.25-7.3	7.0-7.24	<7.0
Serum bicarbonate (mEq/L)	15-18	10-15	<10
Ketones (urine or serum)	Positive	Positive	Positive
Anion gap	>10	>12	>12
Osmolality (mOsm/kg)	Variable	Variable	Variable
Mental status	Alert	Alert/drowsy	Stupor/coma

IMMEDIATE MANAGEMENT:
WITHIN THE 1st HOUR

IMMEDIATE MANAGEMENT:
WITHIN THE 1st HOUR

Initial assessment and workup

DKA

- Airway and breathing – correct hypoxemia.
- **IV access** & consider **central line** if clinically indicated.
- **Monitor** respiratory rate, ECG, O₂ saturations, pulse rate, BP, respiratory rate, conscious level and fluid balance.
- **Perform laboratory** blood glucose, bedside BM, urea and electrolytes, s/ bicarbonate, urinalysis, Blood CSABGs, **ECG**
- **NG tube** if impaired consciousness or protracted vomiting.
- **Urinary catheter** if oliguric.
- **IV Antibiotics for infections**