STANDARD TREATMENT WORKFLOW (STW)

Diabetic Ketoacidosis

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Department of Health Research
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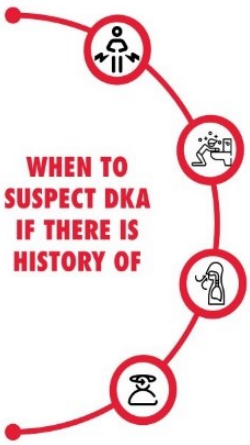
Standard Treatment Workflow (STW)

DIABETIC KETOACIDOSIS

ICD-10-E11.10



- May be the initial presentation in T1DM
- Pain abdomen
- Recurrent vomiting
- Rapid/labored breathing
- Altered sensorium

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

	Mild	Moderate	Severe
pH	7.25-7.3	7.0-7.25	<7.0
HCO_3	15-18	10-15	<10
Level of Sensorium	Alert	Mild Drowsiness	Stupor/ Coma
Sever case: ICU Admission			

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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)
- VBG (for pH, bicarbonate, anion gap)
- Na^+/K^+/BUN/Creatinine/ECG

MANAGEMENT

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, HCO_3 : 2-4 hourly
  - Blood ketones (if available)/Urine for ketones: 12 hourly
- After resolution of DKA: Blood glucose monitoring every 4 hours

TREATMENT

- 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

WHEN TO STOP INSULIN INFUSION?

- 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 <than 320 mOsm/kg H_2O
- 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 childern
- Body temperature cannot be used as a guide to presence of infection
- Hyperamylasemia: Cannot be used as a marker for diagnosis of pancreatitis
- Hypertriglycredemia: can cause pseudohyponatremia and when marked precipitates pancreatitis
- Ketosis may worsen paradoxically with successful treatment initially
- Stopping I/V insulin before S/C insulin given

ABBREVIATIONS

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

KEEP A LOW THRESHOLD FOR TIMELY DIAGNOSIS AND MANAGEMENT OF DKA