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Current Management of Acute Hyperglycemia: Diabetic Ketoacidosis and Hyperglycemic Hyperosmolar Syndrome

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Acute Hyperglycemia: High Cost, High Prevalence

- Diabetic ketoacidosis (DKA) episodes occurred for 4-8 episodes/1000 of type 1 diabetes mellitus (T1DM) in the United States
- In the last decade, hospitalization for DKA has increased by 30% in the US
- Total 500,000 days of hospital stay in 2009, and 2.4 billion dollars of direct and indirect costs each year
- UK 13.6 /1000 patients with T1DM had DKA episodes
- Sweden 14.9/1000 patients with T1DM had DKA episodes
- African continent 80/1000 T1DM patients, with a 30% mortality rate

(Lapolla, et al., 2020)

Signs and Symptoms

- Polyuria
- Polydipsia
- Nausea
- Vomiting
- Abdominal pain
- Visual disturbance
- Lethargy
- Altered sensorium
- Tachycardia
- Tachypnea
- Kussmaul respirations
- A fruity odor to the breath

(Karslioglu French, et al. 2019)

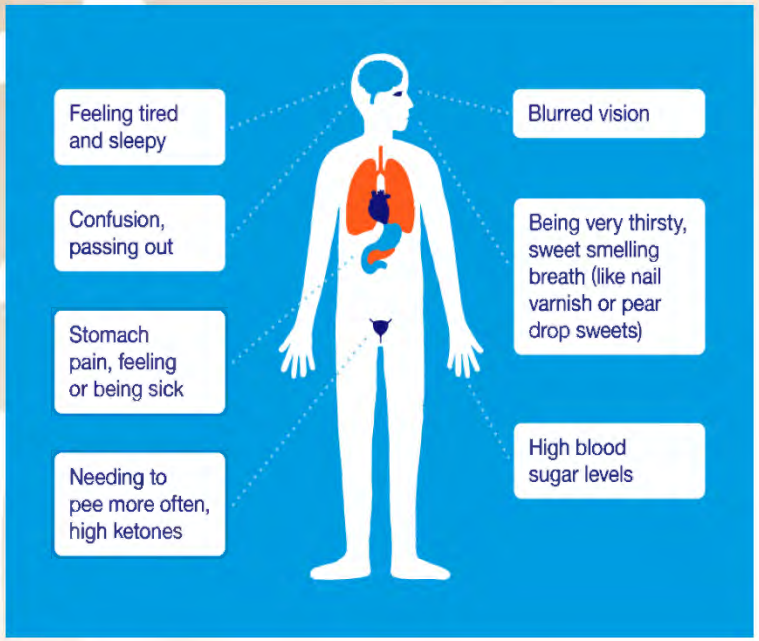
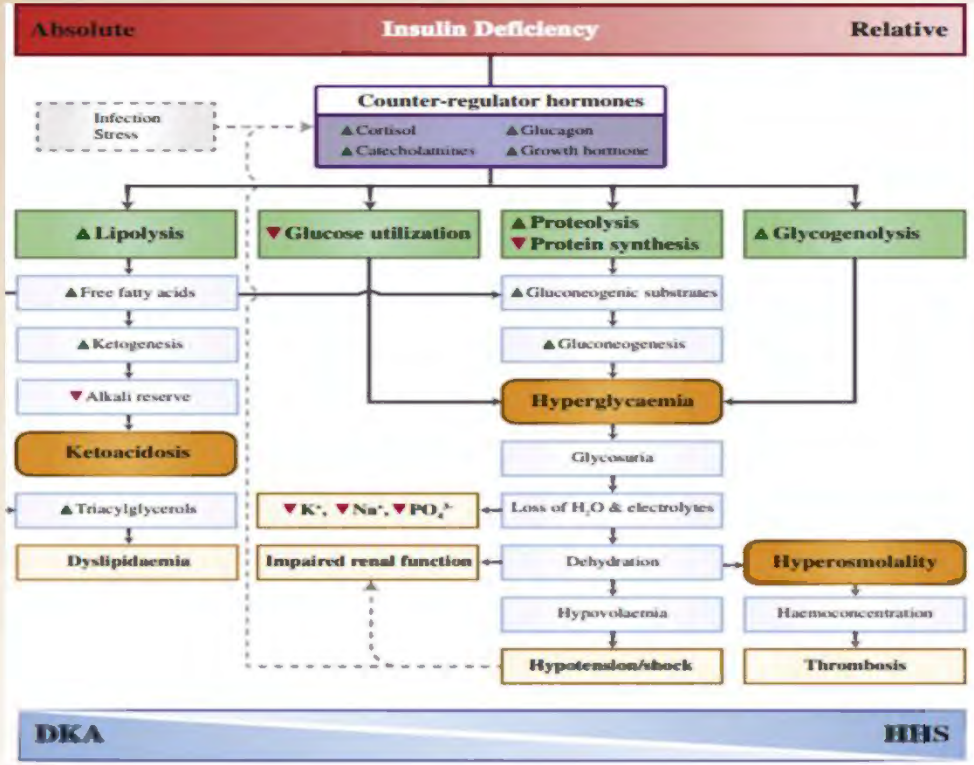


Image source: *Diabetes UK*, diabetes.org.uk

Underlying Pathophysiology



(Cardoso, et al., 2017)

Significance of Pathophysiology

- Patients lie along a spectrum during acute hyperglycemic events, DKA to hyperglycemic hyperosmolar syndrome (HHS)
- HHS, due to longer timeframe of development of pathology, has increased fluid deficit
- 10% of patients with DKA present with euglycemic DKA
- HHS occurs mostly in adults and elderly patients and has a higher mortality than DKA with death occurring in 5–16%
- HHS has low or no ketone production despite low levels of insulin

(Dhatariya, et al., 2017)

Treatment

- Fluid correction to euvolemia
- Avoidance of overcorrection, especially in pediatric populations, due to risk of cerebral edema.
- 3 Phases: Bolus, Deficit, Maintenance
- Intravenous IV Insulin administration after initial fluid resuscitation
- Avoidance of additional complications:

1. Hypokalemia
2. Hypophosphatemia
3. Acute kidney injury (AKI)
4. Acute respiratory distress syndrome (ARDS)
5. Hyperchloremic acidosis

(Jayashree, et al., 2019)

Treatment Implications for Nursing

- Intensive Care Unit patient
- Frequent assessment with emphasis on neurologic status, airway, cardiopulmonary
- Cardiac monitoring due to likely electrolyte abnormalities
- Frequent glucose monitoring to avoid hypoglycemia
- Frequent lab draws to monitor electrolyte status
- Likely arterial line placement
- Low threshold for intubation if neurologic status declines

References

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