

Q: What is type 2 diabetes mellitus (T2DM)?

A: Type 2 diabetes develops with beta-cell insufficiency and insulin resistance.

Q: What are the three categories of causes of insulin resistance?

A: The causes of insulin resistance

- 1) Abnormal B-cell secretory product.
- 2) Circulating insulin antagonists.
- 3) Target tissue defects.

Q: What is glucose intolerance?

A: Glucose intolerance is increased glucose concentrations in the face of increased insulin concentrations.

Q: What is the normal range for a fasting blood sugar?

A: After a 12 hour fast the blood sugar will normally range from 70 to 110mg/dl.

Q: What does the American College of Endocrinology (ACE) recommend the blood glucose level in an intensive care unit be maintained at?

A: The American

College of Endocrinology recommends blood glucose be kept at or below 110mg/dl.

Q: At what value does the American College of Endocrinology (ACE) recommend more frequent blood glucose monitoring?

A: ACE recommends that blood glucose values above 180mg/dl be monitored more frequently.

Q: What does the blood glucose level need to exceed in order to cause glucosuria?

A: Glucosuria develops when the amount of glucose presented to the proximal tubule exceeds its threshold. This threshold is reached when the blood glucose exceeds 180mg/dl at a normal glomerular filtration rate of 125ml/min.

Q: What is a glycosylated hemoglobin test? HgA1c

A: A glycosylated hemoglobin test measures the percentage of hemoglobin molecules undergoing nonenzymatic glycosylation in the presence of glucose. This reaction is proportional to the average glucose concentration during the preceding 60 to 90 days.

Q: What is the purpose of a glycosylated hemoglobin test?

A: The purpose of a glycosylated hemoglobin test is to assess long term diabetic control.

Q: What is the normal range for a glycosylated hemoglobin test?

A: The normal range for a glycosylated hemoglobin test is 4% to 6%.

Q: What are the signs and symptoms of diabetes?

A: Signs and symptoms of diabetes are weight loss, fatigue, polyuria, polydipsia, blurring of vision, nausea, vomiting, and evidence of volume contraction.

Q: What is diabetic ketoacidosis (DKA)?

A: Diabetic ketoacidosis develops as a consequence of a deficiency of insulin and an excess of the glucose counterregulatory hormones.

Q: What are the insulin antagonists?

A: The insulin antagonists (or glucose counterregulatory hormones) are cortisol, growth hormone, glucagon, and catecholamines.

Q: What is hyperglycemic hyperosmolar syndrome (HHS)?

A: HHS is a hyperglycemia crisis in the absence of significant ketoacidosis.

Q: What signs are seen in DKA but not HHS?

A: Kussmal's respirations and acetone or fruity breath are the signs seen in DKA but not HHS.

Q: What prevents ketoacidosis from developing in HHS?

A: Enough insulin is available to prevent the breakdown of protein and fat thereby preventing the development of ketoacidosis.

Q: How do you measure ketoacidosis?

A: Ketoacidosis can be measured by calculating the anion gap.

Q: How do you calculate the anion gap?

A: Calculation of the anion gap

$Na - (Cl + HCO_3) = \text{anion gap}$

Q: What is the normal range of the anion gap?

A: The normal range of the anion gap is 10 to 12 mEq/L.
Greater than 14 indicates metabolic acidosis.

Q: What type of metabolic acidosis develops in patients recovering from DKA?

A: Patients recovering from DKA commonly demonstrate hyperchloremia and develop a non-anion-gap metabolic acidosis.

Q: What is the treatment for DKA and HHS?

A: Treatment for DKA and HHS:

Rehydrate with IV fluids.

Administer regular insulin by IV infusion.

Replace potassium, phosphate and magnesium.

Q: At what dose is the insulin drip started at?

A: The insulin drip is usually started at 0.1 units/kg/hour.

Q: Is a bolus of regular insulin recommended prior to the start of the IV infusion?

A: A bolus of 0.3 units/kg of regular insulin IVP is recommended to prime the tissue receptors.

Q: When is the insulin drip stopped?

A: The insulin drip is stopped when the anion gap has normalized, the serum bicarbonate level has normalized, the patient is able to eat, and the patient has received subcutaneous insulin for 2 hours.

Q: When is dextrose included in the intravenous (IV) fluid administered to a patient with DKA or HHS?

A: The IV fluid is changed to include dextrose when the blood glucose is 250mg/dl.

Q: Is the average serum glucose higher in DKA or HHS?

A: The average serum glucose is higher in HHS.

HHS 1100 mg/dl

DKA 600 mg/dl

Q: Which condition causes a greater fluid loss DKA or HHS?

A: Greater fluid losses occur in HHS.

HHS 8 to 15 L

DKA 4 to 8 L

Q: What electrolytes are depleted in HHS and DKA?

A: Sodium, potassium, phosphorus, and magnesium are depleted in HHS and DKA.

Q: Why are potassium losses greater in HHS than DKA?

A: HHS develops over a longer time and therefore more potassium is lost.

Q: What vitamin can become depleted in DKA and HHS?

A: The catabolic state associated with uncontrolled diabetes predisposes the patient to B vitamin and in particular thiamine deficiency.

Q: What is the most important complication of HHS?

A: Vascular occlusions are the most important complication of HHS.

Q: What is considered to be the cause of coma in a diabetic?

A: Coma is the result of hyperglycemia and hyperosmolarity.