Alaa hussein hajwal (practical anesthesia) forth stage

Diabetes mellitus and Anesthesia

Disorder of glucose metabolism characterized by relative or total lack of insulin or insulin resistance.

TYPES of diabetes:

divided into

1. type 1 (insulin-dependent; IDDM), presenting in children or young adults.

2. type 2 (non-insulin-dependent; NIDDM), presenting in adults (and occasionally children) who are usually obese.

CAUSES of diabetes:

1. Primary:

a) Genetic factors.

b) Infective.

c) Immunological factors.

2. Secondary:

a) Pancreatic disease, e.g., pancreatitis, malignancy.

b) Insulin antagonism, e.g., corticosteroids, Cushing's syndrome, phaeochromocytoma.

c) Drugs, e.g., thiazide diuretics.

Complications of diabetes

1) Renal impairment is caused by glomerulosclerosis, vascular insufficiency, and infection.

2) Arteriosclerosis causes ischemic heart disease, hypertension, CVA, and cardiac failure.

3) Autonomic and peripheral neuropathy.

4) Retinopathy and cataract formation.

5) Skin: collagen thickening and blisters formation.

6) Increased susceptibility to infection and delayed wound healing.

7) Diabetic coma; either hypoglycemia or diabetic ketoacidosis (DKA).

8) Syndrome of stiff joints may occur: as suggested by the 'prayer sign' (inability to press the palmar surfaces of the index fingers fully flat against one another when pressing the palms together). Has been associated with difficult tracheal intubation and reduced compliance with the epidural space.

Preoperative Evaluation

Evaluation includes assessing possible cardiac and renal disease, controlling hypertension, managing insulin and glucose control, and examination for limited joint mobility (especially neck) that may affect endotracheal intubation.

A patient with well-controlled diabetes may not require special treatment before and during surgery, although reducing the morning dose of insulin by 30% to 50% prevents hypoglycemia due to fasting. Oral hypoglycemics should be discontinued 24 to 48 hours preoperatively.

Intraoperative Management

a) Diabetic patients should be placed first on the operating list to shorten the preoperative fast and potentially allow normal oral intake later that same day.

b) Avoid hypoglycemia (under 72 mg/dl) as this can cause irreversible cerebral damage.

c) Avoid severe hyperglycemia (over 250 mg/dl) to minimize dehydration and metabolic upset.

d) Type 1 diabetics need insulin to prevent ketogenesis.

e) Aim for blood glucose between 108 and 180 mg/dl.

Postoperative Glycemic Management

Due to postoperative complications, anesthetic side effects, or a number of other reasons, glycemic control during the postoperative stage may be difficult. The foundation of good postoperative care is based on diligent blood glucose measurement. The Society of Thoracic Surgeons as well as the AACE/ADA consensus recommended a postoperative glycemic range between 140 and 180 mg/dL. However, if patients are monitored in the acute care setting after surgery due to surgical complications or various underlying comorbidities, physicians should be cognizant of the stress hyperglycemic response (averaging roughly 180–220 mg/dL) and as such develop a more tolerant glucose management strategy. If blood glucose levels remain low after surgery, a dextrose infusion rate of 5–10 g of glucose per hour should prevent hypoglycemia and concomitant ketosis

Hypoglycemia

Defined as blood glucose less than (72 mg/dl), hypoglycemia is one of the main dangers to patients in the perioperative period. In the awake patient, the usual warning symptoms and signs include profuse sweating, pallor, light-headedness, tachycardia, confusion and incomprehensible speech progressing to convulsions and coma. Irreversible brain damage can occur. Alcohol consumption, liver disease, fasting, and sepsis exacerbate hypoglycemia. The best warning sign, that of the conscious patient detecting a forthcoming “Hypo”, is lost under general anesthesia together with most of the other signs. Frequent monitoring of blood glucose and appropriate adjustments to therapy are the key to prevention Once detected, give 25ml of 50% dextrose intravenously and repeat if blood sugar measurement doesn’t increase. Glucagon 1mg IM or IV is an alternative but a slower strategy. If the patient is awake, try any sugary food/solution to hand.