Alaa hussein ALgobouri (practical anesthesia) forth stage

Liver Disease and Anesthesia

The liver is a large, complex organ with multiple functions. Patients with liver failure present a significant challenge to the anesthetist. A good understanding of normal liver physiology, causes of liver dysfunction, and its multi-system impact on patient function are very important in managing these patients.

THE FUNCTION OF **THE** LIVER

The liver has five main functions:

1. Metabolic: metabolism of carbohydrate, lipid, amino acid, ammonia formation, interconversion of sugars.

2. Synthesis: synthesis of albumin, alpha and gamma globulins, and clotting factors.

3. Secretory: secretion of bile in the intestine, and conjugation of bilirubin.

4. Detoxification: detoxification of drugs, steroids, thyroid hormones, and endogenous metabolites.

5. Storage: storage of glycogen, B12, iron, and vitamin A.

ANAESTHESIA IN PATIENTS WITH LIVER FAILURE

The risks of anesthesia in this group are related to where the patient lies on the liver disease spectrum, from subclinical to end-stage liver disease. Optimal preparation may decrease both peri-operative death and postoperative complications.

Pre-operative assessment Common preoperative investigations to assess liver disease include:

1) Full blood count: to establish anemia, thrombocytopenia, or evidence of infection.

2) Prothrombin time (PTT): as an indicator of hepatocellular function

3) Renal function and electrolyte.

4) ECG and Echocardiography.

5) Chest x-rays and pulmonary function tests.

6) Liver function tests and Hepatitis screening.

Intraoperative Management

I. Monitoring

Standard monitoring should be used, with consideration given to invasive arterial and CVP monitoring. Perioperative hemodynamic instability can worsen hepatic function; MAP should be maintained within 10–20% of preoperative levels. hepatic blood flow and O2 delivery should be maintained.

II. Drug effects

Propofol is the most commonly used induction agent in this group as it undergoes considerable extra-hepatic metabolism. It should be remembered that sensitivity to the sedative and cardiorespiratory effects of propofol are increased in liver failure and so the dose should be reduced. In terms of muscle relaxant choice, suxamethonium may have a prolonged duration of action due to reduced pseudocholinesterase concentrations slowing its metabolism, and Vecuronium and rocuronium have a prolonged elimination phase in severe disease. Atracurium and cisatracurium are better options as they are not reliant on hepatic excretion. Monitoring of neuromuscular blockade is advised whatever the choice of agent. With regards to the choice of volatile agent, isoflurane, sevoflurane, and desflurane all undergo minimal hepatic metabolism. Desflurane has the advantage of being the least metabolized and providing the quickest emergence.

Postoperative considerations

1. Patients with advanced liver disease will need postoperative intensive care.

2. To prevent encephalopathy, constipating analgesics, such as opioids, should be prescribed with concurrent lactulose.

3. Postoperative ileus may also precipitate encephalopathy in cirrhotic patients.

4. Complications include delayed wound healing, sepsis, renal impairment, and bleeding.

5. Fluid balance should be carefully monitored postoperatively, aiming for a urine output of 1mL/kg/h.

6. Coagulopathy increases the risk of postoperative bleeding and hematoma formation.