

Alcohol And Anesthesia

Liver Disease and Anesthesia

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B.M.TCH ANAESTHESIA

2024- 2023

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Alcohol And Anesthesia

Alcohol use is common and causes problems as a result of both acute intoxication and chronic consumption. Ask all adults about alcohol consumption. Surgery should be avoided, if possible, in the acutely intoxicated as consent is difficult.

Acute intoxication may cause vomiting, dehydration, hypoglycaemia and delayed gastric emptying.

Careful rehydration, with attention to electrolytes and glucose, and RSI are advised.

- Rapid sequence induction is indicated for the reasons highlighted above. Chronic alcohol use increases dose requirements for general anaesthetic agents. This is thought to be because of enzyme induction.
- Volatile agents compete with ethanol for binding on neuronal gamma-amino butyric acid (GABA) and glycinereceptors.
- The effective doses of propofol, thiopental, and opioids such as alfentanil are increased. These increased anaesthetic requirements can exacerbate the risk of cardiovascular instability in patients who may be suffering from cardiomyopathy, heart failure, or dehydration.
- The distribution and metabolism of anaesthetic drugs are altered by hypoalbuminaemia and hepatic impairment.

- Neuromuscular blocking agents that undergo hepatic metabolism may have a prolonged duration of action.
- Chronic heavy alcohol use is associated with a 2–5-fold increase in post-operative complications, with higher rates of admission to high-dependency or intensive care units and increased length of hospital stay.
- Depletion of coagulation factors and thrombocytopenia increase the incidence of post-operative bleeding.
- Underlying cardiac disease limits the ability to meet the increased metabolic requirement after major surgery, and arrhythmias and acute coronary syndrome are more common after operation. Electrolyte disturbances or periods of relative hypotension exacerbate the risk.
- Alcohol use is an independent risk factor for the development of acute confusion or delirium after operation.

This can be reduced by meticulous pain control, oxygenation, and correction of metabolic disturbances. Neuroleptic drugs are preferred to benzodiazepines when alcohol withdrawal is not the primary cause of delirium. Haloperidol can be given i.v.; it is less sedating and causes less hypotension than other antipsychotic drugs.

Alcohol withdrawal syndrome

- is characterized by tremors, gastric upset, sweating, hypertension, hyperreflexia, anxiety, and agitation progressing to delirium, hallucinations, and seizures.
- The syndrome typically develops after 6–24 h without alcohol. It can be fatal if not treated appropriately.

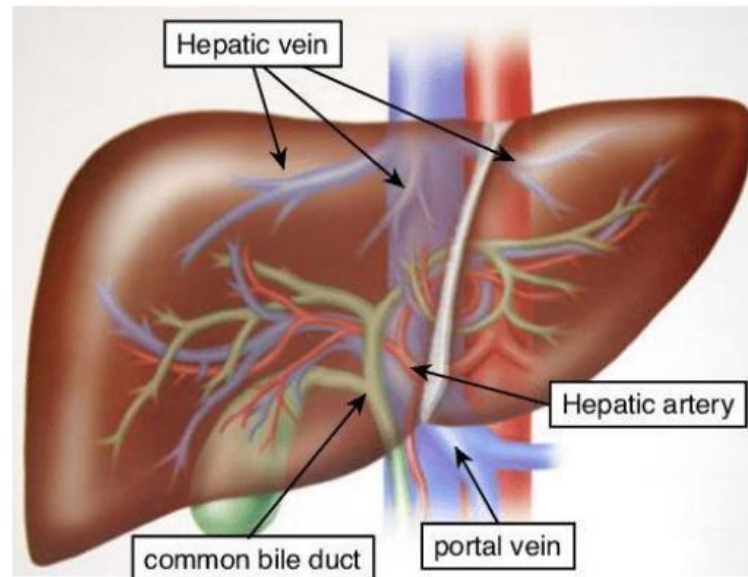
Prophylactic treatment may help prevent AWS. The most commonly used agents are benzodiazepines

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.

Anatomy

The liver is the second largest organ in the human body after the skin. It lies in the right upper abdominal quadrant, weighs around 1.4 to 1.6 kg, and receives 25% of cardiac output with a total blood flow of around 1.5 l/min. The liver has a unique dual blood supply provided by the hepatic artery and the hepatic portal vein. The liver is divided into the right and left lobes by the falciform ligament, with the right lobe being the larger.



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.

Liver Disease

Liver disease can be classified as chronic liver disease and acute liver failure.

Acute liver failure

Acute liver failure results from the rapid development of hepatocellular dysfunction, and the diagnosis is based both on clinical examination and blood test results. It is defined as the rapid development of:

1. jaundice,
2. coagulopathy, and
3. encephalopathy, in a patient without prior liver disease.

Common causes of acute liver failure are paracetamol overdose and viral hepatitis.

Chronic liver disease

The chronic liver disease involves a disease process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis. Common causes include viral hepatitis B and C, and toxins such as alcohol.

1. Renal: renal Impairment is most commonly due to dehydration, sepsis, or nephrotoxic drugs.

2. **Hepatorenal syndrome**: the reduced GFR and consequent decline in renal function caused by advanced liver disease.

3. Hepatopulmonary syndrome: This occurs when intrapulmonary vascular dilations contribute to hypoxia in liver disease.

4. Encephalopathy: toxic metabolites build up (particularly ammonia), leading to progressive encephalopathy.

5. Hematological changes: Anemia may be present secondary to blood loss, hemolysis, bone marrow depression, or nutritional deficiency. Coagulopathy is one of the primary features of advanced liver disease with the liver having a central role in the synthesis of almost all coagulation factors.

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 formatio