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Cirrhosis of the Liver

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Introduction

- Liver cirrhosis is a chronic condition where a liver becomes fibrotic and loses its normal function and architecture (Hirth et al., 2018).
- Liver cirrhosis can be classified as either compensated liver cirrhosis, if signs and symptoms are not yet experienced by the patients or uncompensated liver cirrhosis, if signs and symptoms experienced by the patients (Bider et al., 2019). Several factors, such as alcoholism, Hepatitis B, Hepatitis C, hemochromatosis, Wilson disease, and fructose intolerance can predispose a person to this condition (Vatansever & Pakoz, 2019).
- It is a commonly encountered condition throughout the world. Annually, about 30,000 people in the United States die due to a complication of liver cirrhosis, making it the 12th leading cause of the death in this country (Yoon & Chen, 2017).
- Liver cirrhosis has been selected as a topic due to its high prevalence and poor prognosis. Information on this should be helpful to future nurses to appreciate the role of liver in metabolizing and detoxifying various medicines. Thus, understanding the disease process in detail is necessary to prevent any adverse reactions related to drug-overdose or drug-drug interactions (Kockerling et al., 2019). Future, advance nurse practitioner needs in-depth information about the current knowledge of this condition and ways of addressing its complications.



Figure 1: (American Liver foundation, 2017)

Case Study

A 50 years old woman came to the Emergency room with a complain of recent onset non-painful hematemesis. She reports that her abdomen is increasing distended for the last 15 days, shocks are getting tighter to wear, and is breathing faster than usual. On examination, she appears malnourished and confused; she has scleral icterus, shifting dullness in abdomen, and bilateral pitting edema. Patient reports drinking at least 2-3 glass of wine every evening for the past 10 years. The blood test revealed elevated ammonia, alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, but low albumin and thrombocyte count. Total two units of PRBC was transfused and a liter of 0.9% NS was provided. Emergency endoscopy revealed esophageal varices. Pt was diagnosed with liver cirrhosis and transferred to the intensive care unit for further management.

Signs and Symptoms:

- Ascites
- Jaundice
- Peripheral edema
- Brusing
- Flapping tremor
- Enlarged spleen
- Esophageal varices
- Dull abdominal pain
- Spider angioma
- Asterixis
- Electrolyte abnormalities
- Gynecomastia
- (Yoon & Chen 2017)

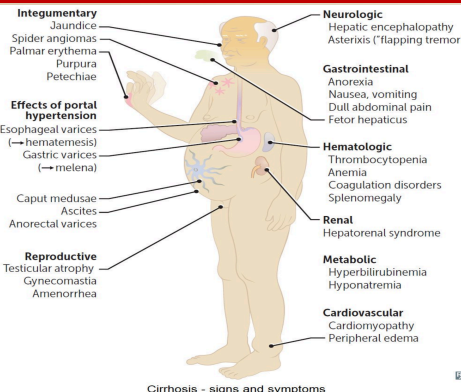


Figure 2: (Hussain, 2017)

Signs and symptoms of liver cirrhosis arises due to the presence of fewer functional hepatocytes:

- Lower clearance of bilirubin results in an increase in the quantity of total, direct, and indirect bilirubin, resulting in pruritus, scleral icterus, kernicterus, pale stool, and dark urine.
- Lower clearance of ammonia presents as hepatic encephalopathy and asterixis.
- Fibrosis of liver leads to portal hypertension, which presents as splenomegaly, caput medusae, esophageal varices, and anorectal varices.
- Lower production of albumin and transthyretin presents as edema, ascites, peritonitis, and hepatic hydrothorax, secondary to low oncotic pressure.
- Lower production of sex-hormone binding globulin leads to estrogen amplification, which presents as gynecomastia and telangiectasia
- Lower production of coagulation factors and thrombopoietin presents as prolonged bleeding time, prothrombin time, and partial thromboplastin time
- Liver cirrhosis can eventually lead to hepatocellular carcinoma. (Pinderup & Bager, 2019)

Underlying pathophysiology

Hepatocytes are stable cells, which remains in G₀ phase of cell cycle, but go into G₁ phase and mitosis after an insult to regenerate more hepatocytes. In minor circumstances, hepatocyte will fully resolve the insult without the formation of scar tissue (Gonzalez, Gilger, Huh, & Washington, 2017). However, following a prolonged damage, hepatocytes cannot effectively regenerate to resolve the situation. It has to undergo the process of repair. There is a gap between fenestrated hepatic sinusoids and hepatocyte which is called the space of disse (Pinderup & Bager, 2019). Hepatic stellate cells are found in the space. When it is inactive, hepatic stellate cells store vitamin A. However, in its active form, this cells synthesizes collagen to repair damages. Activation of many Ito cells leads to fibrotic scar formation in the liver. This will hamper the normal function of liver parenchyma, leading to the condition of liver cirrhosis. Nodules made by hepatocyte with bridging fibrosis is a pathognomonic histological finding in liver cirrhosis (Gonzalez, Gilger, Huh, & Washington, 2017).

Liver Cirrhosis Cascade

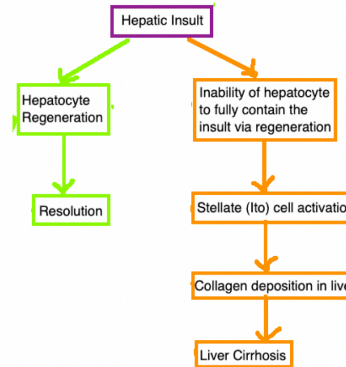


Figure 3: (Rehaim & Mohamed, 2017)

Significance of Pathophysiology

- Understanding the pathophysiology of liver cirrhosis helps to adequately diagnose the condition at an earlier stage of the condition. For example, being able to detect nodules in a CT scan helps to detect the disease at an earlier stage.
- Understanding the pathophysiology also helps to decide on treatment. For example, a person showing the signs of ascites and painless vomiting needs furosemide or octreotide; a person showing the signs of coagulopathy needs plasma transfusion or thrombopoietin injection; a person showing the signs of hepatic encephalopathy needs lactulose (Kodali, Kalif, Tariq, & Singal, 2018).
- Due to its chronic nature, patients will benefit if health care providers can detect this condition at an earlier stage. There is no definitive test to detect liver cirrhosis, so providers should investigate the presence of signs and symptoms of liver damage in patients with positive risk factors as potential cases of liver cirrhosis.
- Scleral icterus is one of the earliest signs of liver cirrhosis; however, this is a non-specific finding. Esophageal varices is one of the later findings, which leads to painless emesis, the most common cause of death in people with liver cirrhosis. Deposition of collagen by Ito (hepatic stellate) cells is the pathophysiological reason behind this condition (Vatansever & Pakoz, 2019).
- Stopping to cells activation is a noble approach in delaying hepatic fibrosis, hence, slowing down the progression to liver cirrhosis. This approach is derived based upon the understanding of pathophysiology (Rehaim & Mohamed, 2017).

Implication for Nursing care

- Cirrhosis is an irreversible condition, so liver transplant is the most definitive treatment (Vatansever & Pakoz, 2019). However, symptom management can be a strategy to address the need of a patient with liver cirrhosis. Thus, educating the patient about the disease process and healthy habits to delay symptom progression is important. Education can be implemented as an interventional strategy in nursing care. Education on alcohol abstinence can be the single-most important topic to address the issue of liver cirrhosis. However, education should also be focused on motivating patients with risk factors to undergo screening tests so that the condition can be detected early. For example, newborn should be screened for hepatitis; children should be screened for metabolic conditions, like glycogen storage disorders or lysosomal storage disorders; adults should be screened for alpha-1 antitrypsin deficiency, Wilson disease, and hemochromatosis.
- Advance nursing care should be based on the knowledge that liver cirrhosis affects cytochrome P450 and other drug-metabolizing enzymes in liver. This will significantly affect the first-pass metabolism. Therefore, doses of the drugs that depend on those enzymes for activation or eventual excretion should be adjusted to avoid patients suffering symptoms of drug overdose or under-dose (Bider et al., 2019).
- Nurse anesthetics should use Lorazepam, Oxazepam, and Temazepam and avoid all other benzodiazepines, if one is indicated for the patient with liver cirrhosis. It is because those three benzodiazepines have liver-independent processing (Kockerling et al., 2019)



Figure 4: (American Liver Foundation, 2017)

Conclusion

- In conclusion, liver cirrhosis is a common condition in the world, claiming lives of several thousands of individuals every year. Even though the most common etiologies of this condition are hepatitis viruses and alcohol, several metabolic syndromes are responsible for causing this condition in younger people.
- Understanding this condition by nurses help to educate patients about the risk factors and healthy habits to delay the progression, and motivate patients to undergo screening tests for viruses or metabolic syndromes. Nurses should be mindful about the need of medication adjustment to patients with liver cirrhosis to avoid adverse events due to impaired liver metabolism.

References



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