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Nonalcoholic Fatty Liver Disease

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Introduction
Nonalcoholic fatty liver disease (NAFLD) is the most common chronic liver disease in the United States (McCance, Butterworth, & Strickland, 2014, p. 1461). Historically, NAFLD primarily affected adults; however, Berardis and Sokal (2014) identified NAFLD has also become the most common cause of liver disease among children and adolescents in Western countries (p. 131). In association with rising rates of childhood obesity and metabolic syndrome, NAFLD is on the rise. NAFLD was diagnosed in more than doubled in the last two decades with the most recent estimate for NAFLD at 0.6% of the general pediatric population (Kohli et al., 2016, p. 9). However, the disease process itself does not cause significant illness directly, children and adolescents with NAFLD are at much higher risk for serious chronic illnesses long term.

Risk Factors
The primary risk factor in the development of NAFLD is obesity, specifically increased levels of adipose tissue. Other risk factors include elevated triglyceride levels, elevated cholesterol levels, and insulin resistance either with or without type 2 diabetes mellitus.

Signs & Symptoms
NAFLD is usually asymptomatic; however, certain individuals may experience:
- Enlarged liver
- Fatigue
- Pain in the right upper abdominal quadrant (Moyo Clinic, 2018)

Changes at the Cellular Level
NAFLD develops when liver cells become infiltrated with fat. Under the microscope, these hepatocytes contain visible amounts of fat within the cell membranes. Visible signs of inflammation may be present even if NAFLD has begun to progress to nonalcoholic steatohepatitis (NASH).

Pathogenicity in the Liver
In its healthy state, the liver is able to synthesize, catalyze, store and process triglycerides and fatty acids. As a result of obesity and/or FFA store and any unused supplies until they are needed at a later time. However, if the liver is unable to process excess quantities of these molecules, the surplus will be converted to triglycerides and stored as fat. The organelles in these cells become disrupted as large vacuoles of fat form within the cell membranes (McCance et al., 2014, p. 142). Increased delivery of FFAs may be the result of increased dietary intake or the release of FFAs from adipose cells.

Phenotypic Alterations
- Nonalcoholic steatohepatitis (NASH) occurs when hepatocytes become injured by stored fat and inflammatory processes take over, leading to the recruitment of macrophages in the innate immune system including Toll-like receptors (TLRs), Kupffer cells (KC), lymphocytes and neutrophils and possibly inammable hepatocytes (Ferrue, van Bosven, van der Matten, 2012, p. 149). The effects of NAFLD are destruction of liver cells with possible progression to fibrosis which leads to decreased liver function.

Cirrhosis
If the inflammation and fibrosis continue, damage in the liver can progress to cirrhosis. Cirrhosis occurs when fibrous tissue replaces damaged hepatocytes, leading to further decrease in liver function. Cirrhosis is the twelfth leading cause of death in the United States and can lead to portal hypertension and jaundice (McCance et al., 2014, p. 1460).

Liver Cancer
Further damage to the liver can result in the formation of malignant neoplasms or hepatocellular carcinoma. Although cirrhosis is not a direct cause for all cases of liver cancer; it is a significant and preventable risk factor that leads to a potentially fatal condition. The American Cancer Society estimates ~14,000 individuals will be diagnosed with primary liver cancer in 2018 and for those individuals, ~30,000 will die from this illness (American Cancer Society, 2018).

Clinical Considerations
NAFLD and NASH are usually asymptomatic and can lead to serious complications and comorbidities. These complications may include hepatic decompensation, liver failure, cirrhosis, and primary liver cancer. NAFLD and NASH usually progress to chronic conditions if left untreated. Cirrhosis can be asymptomatic; however, certain liver functions can be impacted. Damage to the liver and its associated formation of scar tissue contribute to obstruction of the portal venous system. Further damage to the liver can result in the formation of malignant neoplasms or hepatocellular carcinoma. Although cirrhosis is not a direct cause for all cases of liver cancer; it is a significant and preventable risk factor that leads to a potentially fatal condition.

Implications for Nursing Care
NAFLD is an often silent disease with serious health risks. It is of utmost importance to not only take into account the physical processes, NAFLD may cause serious damage to the liver and other body systems. The importance of interventions related to energy intake and physical activity is essential. Children as well as adults should be educated on the importance of physical activity and should also be educated on the importance of eating a balanced diet.

Conclusion
NAFLD is an often silent disease with serious health risks. It is of utmost importance to not only take into account the physical processes, NAFLD may cause serious damage to the liver and other body systems. The importance of interventions related to energy intake and physical activity is essential. Children as well as adults should be educated on the importance of physical activity and should also be educated on the importance of eating a balanced diet. Further damage to the liver can result in the formation of malignant neoplasms or hepatocellular carcinoma. Although cirrhosis is not a direct cause for all cases of liver cancer; it is a significant and preventable risk factor that leads to a potentially fatal condition.

Additional Sources

References