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Nayab Mustansar *

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Research Article

Unlocking Insights into Chronic Liver Disease: The Power of Ultrasound

Nayab Mustansar *, Maj Rizwan Rafi, Col Yasser Khan, Nazakat Ullah Khan, Aniqa Shahzad, Asad Rehman

Resident Radiology, CMH PESHAWAR, Pakistan

***Corresponding Author:** Nayab Mustansar, Resident Radiology, CMH PESHAWAR, Pakistan.

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Abstract

Chronic liver disease (CLD) encompasses a spectrum of liver disorders leading to liver dysfunction and complications. Ultrasound (US) is a pivotal non-invasive imaging modality for the assessment of liver conditions. This study aims to evaluate the effectiveness of ultrasound in diagnosing and monitoring CLD in 100 patients, examining its role in detecting liver abnormalities, complications, and guiding management decisions.

Keywords: motor and emotional tests; ethanol intoxication

Introduction

Chronic liver disease is a significant global health issue, resulting from various etiologies such as viral hepatitis, alcoholic liver disease, and non-alcoholic fatty liver disease. Early detection and monitoring are crucial to managing these patients and preventing complications like cirrhosis and hepatocellular carcinoma. Ultrasound imaging provides a safe, cost-effective method to evaluate liver morphology and function. This study investigates the utility of ultrasound in assessing liver abnormalities and its correlation with clinical and laboratory findings in patients diagnosed with CLD.

Materials and Methods

Study Design: A cross-sectional study was conducted over six months in a tertiary care hospital.

Inclusion and exclusion Criterion: 100 patients with diagnosed chronic liver disease were enrolled. Inclusion criteria comprised adults (≥18 years) with clinical and biochemical evidence of CLD. Patients with acute liver failure or contraindications for ultrasound were excluded.

Methods: All participants underwent a comprehensive ultrasound examination. The ultrasound parameters assessed included liver size, echogenicity, presence of nodules, portal vein diameter, and signs of complications (e.g., ascites, splenomegaly). Data were compared with liver function tests (LFTs), including serum bilirubin, ALT, AST, and INR.

Statistical Analysis: Data were analyzed using descriptive statistics. Correlation between ultrasound findings and laboratory results was assessed using Pearson's correlation coefficient.

Results

Demographics: The study comprised 60 males (60%) and 40 females (40%) with a mean age of 55 years. The most common etiologies of CLD were viral hepatitis (45%), alcoholic liver disease (30%), and non-alcoholic fatty liver disease (25%).

Ultrasound Findings

- Liver Size: 70% of patients showed hepatomegaly.
- Echogenicity: 65% exhibited increased echogenicity, indicating steatosis or fibrosis.
- Nodules: Liver nodules were detected in 25% of patients.
- Ascites: 40% had varying degrees of ascites.
- Splenomegaly: Noted in 30% of cases.
- Portal Hypertension: Increased portal vein diameter was observed in 50% of patients. As shown in figure below:

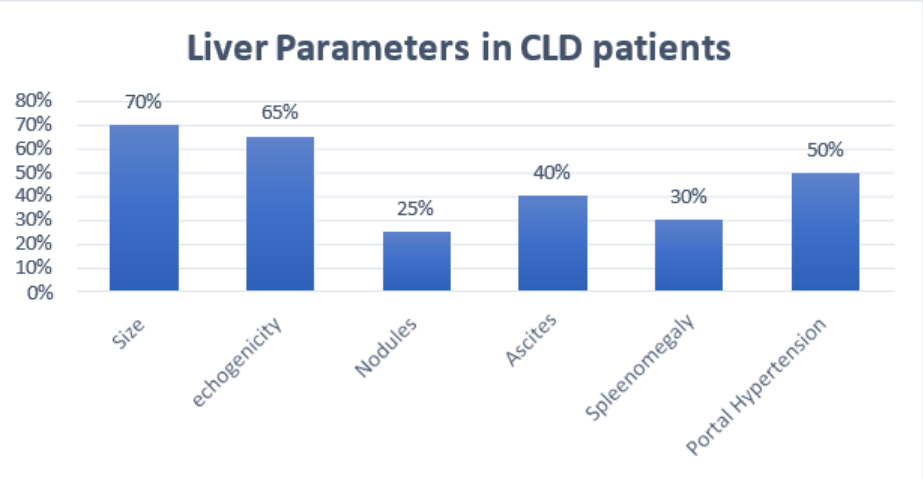

Figure 1: Liver Parameters in CLD patients Correlation with Laboratory Results

- Ultrasound findings of hepatomegaly correlated significantly with elevated serum ALT ($r = 0.65$, $p < 0.01$) and AST levels ($r = 0.60$, $p < 0.01$).
- The presence of ascites correlated with higher bilirubin levels ($r = 0.70$, $p < 0.01$).
- Splenomegaly was associated with prolonged INR ($r = 0.55$, $p < 0.01$).

Discussion

The study highlights the significant role of ultrasound in the assessment of chronic liver disease. Ultrasound is effective in detecting liver enlargement, echogenicity changes, and complications such as ascites and splenomegaly. The strong correlation between ultrasound findings and laboratory parameters emphasizes its utility in monitoring disease progression and guiding management. Ultrasound serves as a first-line imaging modality due to its non-invasive nature, availability, and ability to provide real-time assessment. However, it has limitations, including operator dependency and inability to provide histological information. Future studies could explore the integration of ultrasound with elastography and other imaging modalities for a more comprehensive evaluation. This study underscores the critical role of ultrasound in the assessment of chronic liver disease (CLD) in a cohort of 100 patients. The findings demonstrate that ultrasound is not only effective in diagnosing liver abnormalities but also serves as a valuable tool for monitoring disease progression and guiding management decisions. The high prevalence of hepatomegaly (70%) and increased echogenicity (65%) in our cohort aligns with existing literature, which indicates these are common ultrasonographic findings in patients with CLD. The association between echogenicity changes and serum liver enzymes (ALT and AST) suggests that ultrasound can reflect underlying liver pathology and hepatic inflammation.

The detection of liver nodules in 25% of patients is noteworthy, as it raises the potential concern for hepatocellular carcinoma, particularly in individuals with chronic viral hepatitis and cirrhosis. This highlights the importance of regular surveillance using ultrasound for high-risk

populations, as recommended by various clinical guidelines (e.g., AASLD). The identification of ascites in 40% of patients and its correlation with elevated bilirubin levels emphasizes the role of ultrasound in evaluating complications associated with advanced liver disease, such as portal hypertension. Additionally, the finding of splenomegaly in 30% of patients further indicates portal hypertension, reinforcing the utility of ultrasound in diagnosing and monitoring these complications. The significant correlations between ultrasound findings and laboratory parameters support the use of ultrasound as a complementary tool in the clinical management of CLD. While ultrasound provides important morphological information, it should be integrated with laboratory assessments and clinical evaluations for a comprehensive understanding of the patient's condition. However, it is essential to acknowledge the limitations of ultrasound, including operator dependency and potential variability in interpretation. Future studies could explore the combination of ultrasound with elastography and other imaging modalities, such as MRI or CT scans, to enhance diagnostic accuracy and provide a more comprehensive evaluation of liver disease.

Conclusion

Ultrasound is a valuable tool in the assessment of chronic liver disease, aiding in diagnosis, monitoring, and management. Its non-invasive nature and correlation with clinical findings make it indispensable in clinical practice. Further research is warranted to optimize its use and integrate new technologies in the management of CLD. In conclusion, ultrasound is a valuable, non-invasive imaging modality in the assessment of chronic liver disease. Its ability to detect liver abnormalities, evaluate complications, and correlate with clinical and laboratory findings makes it an indispensable tool in managing CLD. Regular use of ultrasound can aid in early detection of complications and guide therapeutic interventions, ultimately improving patient outcomes. As technology advances, integrating ultrasound with emerging techniques will likely enhance its utility in the clinical settings

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