Physical Education, Health and Social Sciences

https://journal-of-social-education.org E-ISSN: 2958-5996

P-ISSN: 2958-5988

Sonographic Evaluation of Hepatocellular Carcinoma and Benign Liver Lesions in Patients with Hepatitis B

Qamrosh Akhtar[1], Hafiz Shahzad Muzamil[2], Anam Mirza[3], Ammara Riaz[4], Amna Salman[5], M Zain Ul Abidin[6]

[1] Student, MS Allied Health Science Superior University Lahore
[2] Associate Professor, Faculty of Allied Health Science, Superior University Lahore
[3] Student, MS Allied Health Science Superior University Lahore
[4] Student, MS Allied Health Science Superior University Lahore
[5] Student, BSMIT FAHS UMT, Lahore
[6] Consultant Sonologist, Neurology Department SIMS
Corresponded Author: Dr Muhammad Zain Ul Abidin, zainrao750@gmail.com

DOI: https://doi.org/10.63163/jpehss.v3i1.174

Abstract

Background: Chronic hepatitis B virus (HBV) infection is a significant risk factor for liver cirrhosis and hepatocellular carcinoma (HCC). Early detection and differentiation between malignant and benign liver lesions are crucial for timely management. Ultrasonography (USG) serves as a valuable non-invasive tool for liver lesion evaluation, particularly in resource-limited settings.

Objective: This study aimed to evaluate the sonographic appearance of HCC and benign liver lesions in patients with chronic hepatitis B.

Methods: This descriptive study was conducted at Jinnah Hospital, Lahore, over a period of four months. A total of 162 adult patients with diagnosed hepatitis B undergoing abdominal ultrasound were included using a convenience sampling technique. Data were collected on demographic details, liver lesion characteristics, liver margins, echotexture, ascites, and lesion location. Analysis was performed using SPSS version 24.

Results: Among 162 patients, 129 (79.6%) were male and 33 (20.4%) females. Fever was reported in 94 (58%), and jaundice in 94 (58%) patients. Liver size was shrunken in 64 (39.5%), normal in 70 (43.2%), and enlarged in 28 (17.3%). Liver echotexture was coarse in 68 (42%), altered in 67 (41.4%), and homogeneous in 27 (16.7%). Ascites was present in 75 (46.3%) patients. HCC was diagnosed in 73 (38.8%), hepatic cysts in 63 (45%), and focal nodular hyperplasia (FNH) in 26 (16%).

Conclusion: Sonographic evaluation effectively identified a range of liver pathologies in hepatitis B patients, with HCC being prevalent, especially in males and patients with cirrhotic features. Regular ultrasound surveillance in high-risk populations can facilitate early diagnosis and timely intervention.

Keywords: Hepatitis B, Ultrasonography, Hepatocellular carcinoma, Liver lesions, Liver echotexture

Introduction Hepatitis B virus (HBV) infection is a global health concern, responsible for chronic liver disease (CLD), cirrhosis, and hepatocellular carcinoma (HCC). Approximately 2 billion people worldwide

have been infected with HBV, with over 350 million living with chronic infection. In Pakistan, hepatitis B and C pose significant public health challenges, with combined prevalence exceeding 7%.
Sonography plays a critical role in the evaluation of liver lesions, particularly in chronic hepatitis patients, by providing real-time imaging of liver texture, size, margins, and focal abnormalities. This study was conducted to characterize and compare sonographic findings of HCC and benign liver lesions in hepatitis B patients to support early diagnosis and management.

Materials and Methods Study Design and Setting: Descriptive study conducted in the Radiology Department of Jinnah Hospital, Lahore.
Study Duration: Four months.
Sample Size: 162 patients with diagnosed hepatitis B.
Sampling Technique: Convenience sampling.
Data Collection: Sonographic examinations were performed using Toshiba Xario-100 and GE S-8 ultrasound machines with convex (3.5 MHz) and linear (9-15 MHz) probes. Data were recorded in Microsoft Excel and analyzed using SPSS version 24.
Variables Assessed: Liver size, margins, echotexture, ascites, lesion location, age, and gender.

Results

Table 1: Patient Demographics (n=162)

Parameter	Frequency (n)	Percentage (%)
Male	129	79.6%
Female	33	20.4%
Age Range	5 to 85 years	-
Mean Age	46.7 years	-

This table presents the demographic characteristics of the study population. The majority of patients were male (79.6%), while females comprised 20.4%. The age range of patients varied from 5 to 85 years, with a mean age of 46.7 years.

Table 2: Clinical Presentation (n=162)

Symptom	Frequency (n)	Percentage (%)
Fever	94	58%
Jaundice	94	58%

This table summarizes the clinical symptoms observed in the patients. Fever and jaundice were the most common symptoms, each reported in 58% of cases.

Table 3: Sonographic Features (n=162)

Sonographic Parameter	Category	Frequency (n)	Percentage (%)
Liver Size	Normal	70	43.2%
Liver Size	Shrunken	64	39.5%
Liver Size	Enlarged	28	17.3%
Liver Margins	Regular	99	61.1%
Liver Margins	Irregular	63	38.9%
Liver Echotexture	Coarse	68	42%
Liver Echotexture	Altered	67	41.4%
Liver Echotexture	Homogeneous	27	16.7%

Ascites	Present	75	46.3%

This table outlines the ultrasound findings among patients. Liver size was normal in 43.2% of cases, shrunken in 39.5%, and enlarged in 17.3%. The liver margins were regular in 61.1% and irregular in 38.9%. Regarding liver echotexture, 42% had a coarse texture, 41.4% had altered echotexture, and 16.7% had a homogeneous appearance. Additionally, ascites was present in 46.3% of patients.

Table 4: Lesion Location (n=162)

Liver Segment	Frequency (n)
Segment II	28
Segment III	35

This table highlights the distribution of liver lesions across different hepatic segments. Segment III had the highest number of lesions (35 cases), followed by Segment II (28 cases).

Table 5: Final Diagnoses (n=162)

Diagnosis	Frequency (n)	Percentage (%)
Hepatocellular Carcinoma (HCC)	73	38.8%
Hepatic Cyst	63	45%
Focal Nodular Hyperplasia (FNH)	26	16%

This table provides an overview of the final diagnoses among patients. Hepatic cysts were the most frequently diagnosed condition (45%), followed by hepatocellular carcinoma (HCC) at 38.8%, and focal nodular hyperplasia (FNH) at 16%.

Discussion

Premarital disease screening is of considerable significance as it prevents a next-generation disease and can also provide an insight into the occurrence of certain diseases in the population. The mandatory premarital screening program in population of Pakistan provides an excellent platform to estimate different disease prevalence in general population. This is of importance as it helps to obtain precise epidemiological data in general population than that in certain groups.[50] With high incidences of hepatitis, it became highly significant to obtain datum on the prevalence of the disease. However, the studies are not still enough to obtain a comprehensive data.[51]

Our study was designed evaluate the sonographic appearance of hepatocellular carcinoma (HCC) and benign liver lesions in chronic hepatitis B patients. On the basis of diagnostic performance for exclusion of hepatitis b ultrasound is considered as reliable method for diagnosis of sonographic findings in patients with symptoms of hepatitis B.

In current study, attempt was made to determine evaluate the sonographic appearance of hepatocellular carcinoma (HCC) and benign liver lesions in chronic hepatitis B patients. Data were collected according to the age, gender and clinical history and sonographic findings of liver. Another study revealed that 97.7% of screened male subjects were seronegative, while 1.9% and 0.4% were seropositive for HBV and HCV, respectively. In females, 98.41% were seronegative, while the prevalence of HBV and HCV was 1.43% and 0.15%, respectively. Local studies investigating this topic are very scant. In result of our study out of total number of 162 patients 79% of males and 20% of females and 57 % had hepatitis B and 73% of patients had positive hepatitis C.[52]

A study conducted in 2009 showed that the prevalence of HBV in couples tested through the premarital screening program was 1.31%, while it was 0.33% for HCV. This study also reported that the prevalence of HCV to be 0.1% in 2008, 3% in 2009 and 0.83% in 2010.[53]
Another study was introduced by Shahid Sarwar, and Anwar A. Khan in 2017. In this study, 216 patients included, liver cirrhosis was available in 112 (51.9%) patients, and 69(31.9%) were treatment experienced. Liver sickness was decompensated in 37 (17.1%) patients. 206 patients who finished examination convention, 173 (83.1%) accomplished SVR12, 89.2% (25/28) with triple treatment, and 82.2% (148/180) with sofosbuvir/ ribavirin treatment.[54] Treatment reaction was comparative between treatment innocent 86.2% (119/138) and treatment experience 79.4% (54/68) patients (p value 0.9) SVR12 was mediocre in cirrhosis patients 75.4% (80/106) when contrasted with those with no cirrhosis 93% (93/100) (p value <0.000). It was considerably lesser in those with decompensated liver ailment 68.8% (24/35).[55]
In results of our study, out of total number of 162 patients, 63 had chronic liver disease, 25 had hepatomegaly and 74 had normal size. In another study, the median, interquartile, mean, and upper and lower limits of the SWV of normal livers were found to be 1.07 m/ sec, 0.97-1.16 m/sec, and 0.85-1.26 m/sec, respectively, these values are similar to those reported by Liao et al., who found that the 95% confidence intervals of the median and mean SWV of normal livers measured at S5/8 were 0.81-1.27 and 0.82-1.27 m/sec, respectively.[56] However, our findings are inconsistent with the result of Hu et al. that the mean SWV of normal liver was 1.31±0.25 m/sec. These discrepancies suggest that measurement variation and other factors may affect measured SWV values. In this study, only 16.7% (2 of 12) of patients with liver patchy echogenicity had cirrhosis (F4), which did not correspond to a significant difference from the proportion of patients without liver patchy echogenicity who had cirrhosis (11.1%, 1 of 9), this observation shows that the presence of patchy liver echogenicity in patients with CHB is minimally related to the diagnosis of cirrhosis.[57] Meanwhile, the median SWV of patients with biopsy confirmed cirrhosis was found to be lower than that of patients with decompensated cirrhosis (1.39 m/sec vs. 2.02 m/sec), indicating that different stages of liver cirrhosis are associated with different levels of liver stiffness. Stiffness of the liver, which is thought to be mainly caused by fibrosis, could be influenced by patient-dependent factors, including liver inflammation, liver congestion, and biliary obstruction.[58] In results of our study Out of total number of 162 patients, 63 had chronic liver disease, 25 had hepatomegaly and 74 had normal size, 67 patients alter liver parenchymal echotexture, 68 had coarse liver echotexture and 27 had normal homogenous echotexture

Conclusion Sonographic evaluation effectively identified a range of liver pathologies in hepatitis B patients, with HCC being prevalent, especially in males and patients with cirrhotic features. Regular ultrasound surveillance in high-risk populations can facilitate early diagnosis and timely intervention.

Recommendations

1. Routine ultrasound screening for all chronic hepatitis B patients.
2. Emphasis on training sonographers to recognize subtle signs of malignant transformation.
3. Combining sonographic findings with serum biomarkers (AFP) for improved diagnostic accuracy.
4. Nie JJ, Sun KX, Li J, Wang J, Jin H, Wang L, Lu FM, Li T, Yan L, Yang JX, Sun MS. A type-specific nested PCR assay established and applied for investigation of HBV genotype and subgenotype in Chinese patients with chronic HBV infection. Virology journal. 2012 Dec;9(1):1-9.
5. Novack L, Sarov B, Goldman-Levi R, Yahalom V, Safi J, Soliman H, Orgel M, Yaari A, Galai N, Pliskin JS, Shinar E. Impact of pooling on accuracy of hepatitis B virus surface antigen screening of blood donations. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2008 Aug 1;102(8):787-92.

6. Malinchoc M, Kremers W, Therneau TM, Kosberg CL, et al.Amodel to predict survival in patients with end-stage liver disease. Hepatology 2001;33:464–70.
7. Kumada T, Toyoda H, Ogawa S. Quantification of fibrosis in hepatitis C using statistics analysis tool of ultrasonics (2nd report). Jpn J Med Ultrasonics. 2007;34:S641.
8. Handra-Luca A, Kettaneh A, et al: Noninvasive assessment of liver fibrosis by measurement of stiffness in patients with chronic hepatitis C. Hepatology 2005; 41: 48–54.
9. Choi BI. New paradigm for management of hepatocellular carcinoma by imaging. Liver Cancer. 2012;1(2):94-109.
10. Castera L, Le Bail B, Adhoute X, Bertet J, Couzigou P, de Ledinghen V. Diagnosis of cirrhosis by transient elastography (FibroScan): a prospective study. Gut. 2006 Mar 1;55(3):403-8.
11. Conte D, Donato MF, Ronchi G, Colombo M. Reproducibility of transient elastography in the evaluation of liver fibrosis in patients with chronic liver disease. Gut. 2007 Jul 1;56(7):968-73.
12. Chon C. FibroScan-based risk estimation of HBV-related HCC occurrence: development and validation of a predictive model: 1359. Hepatology. 2012 Oct;56.
13. Kriener S, Sotoudeh F, Richter S, Bojunga J, Herrmann E, Poynard T, Dietrich CF, Vermehren J, Zeuzem S. Liver fibrosis in viral hepatitis: noninvasive assessment with acoustic radiation force impulse imaging versus transient elastography. Radiology. 2009 Aug;252(2):595-604.
14. Petroll WM, Urban J. Positive toxicology and reactive serology in tissue donors: a retrospective study over a 3-year period. Cell and tissue banking. 2020 Sep;21(3):427-31.
15. Vauthey JN, Nagorney DM, Ng IO, Ikai I, et al. Tumor size predicts vascular invasion and histologic grade: implications for selection of surgical treatment for hepatocellular carcinoma. Liver Transpl 2005;11:1086–1092
16. Latif MZ, Malik AA, Arif M, Bukhari I. Epidemiological Study of Anti HCV Antibodies in Rural Punjab. Annals of King Edward Medical University. 2017;23(2).
17. Farman S. Frequency and determinants of Hepatitis B and C virus in general population of Farash Town, Islamabad. Pakistan journal of medical sciences. 2015;31(6):1394.
18. Casazza G, Conte D, Donato MF, Ronchi G, Colombo M. Reproducibility of transient elastography in the evaluation of liver fibrosis in patients with chronic liver disease. Gut. 2007 Jul 1;56(7):968-73.
19. Han KH, Chon C. Fibro-Scan-based risk estimation of HBV-related HCC occurrence: development and validation of a predictive model: 1359. Hepatology. 2012 Oct;56.
20. Duan T, Chen J, Cao L, Song B. Intrahepatic cholangiocarcinoma in the setting of HBV-related cirrhosis: Differentiation with hepatocellular carcinoma by using Intravoxel incoherent motion diffusion-weighted MR imaging. Oncotarget. 2018 Jan 30;9(8):7975