International Journal of Research in Medical Sciences
Beniwal RS et al. Int J Res Med Sci. 2019 Dec;7(12):4673-4676
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20195536

Original Research Article

Ultrasound of abdomen in acute viral hepatitis and its role as a prognostic marker

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Received: 26 February 2019
Revised: 30 September 2019
Accepted: 13 November 2019

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ABSTRACT

Background: To assess the extent of Ultrasound (USS) abdomen findings in acute viral hepatitis and further assess the role of USS as a prognostic marker.
Methods: From May 2013 to September 2016, a total of 220 patients of acute Enterogenic viral hepatitis were studied by routine USS within first seven days of onset of symptoms, followed by routine USS between 10 to 15 days and follow up scan after 12 weeks. Only patients with acute Enterogenic viral hepatitis (Hepatitis A and Hepatitis E) were included. All patients with chronic liver disease and other form of acute hepatitis i.e. Hepatitis B, C and D were excluded from the study.
Results: Among 220 patients of acute viral hepatitis routine USS findings including hepatomegaly, bright liver and thickened GB wall and periportal adenopathy were in isolation or in combination up to varying degrees. The commonest routine USS finding in acute phase was thickened GB wall (80%). 14 patients exhibited triad of enlarged Portal Vein (PV), Splenomegaly and Ascites. These 14 patients had prolonged stay in hospital and 11 patients had deranged liver function tests at 12 wks. interval and three patients developed hepatic encephalopathy including one patient who went into fulminant hepatic failure. Out of the patients who did not exhibit this triad 72 patients still had deranged LFT at 12 weeks and maximum of these patients had a combination of USS markers at presentation.
Conclusions: USS has very little if any role in the diagnosis of acute viral hepatitis. It can however play an important role as a prognostic marker during the acute phase where it can detect enlarged portal vein, splenomegaly and ascites. This triad of USS findings is suggestive of transient portal hypertension likely due to hepatic congestion. Also, other USS markers if seen in combination at presentation can reliably predict a poorer prognosis

Keywords: Acute viral hepatitis, Prognostic marker, Ultrasound abdomen

INTRODUCTION

Acute hepatitis occurs when liver suffers an injury with resulting inflammatory reaction, injury can occur in, various different ways, most commonly due to viral infections.

HAV and HEV infections are widely prevalent in many tropical and subtropical countries.[1] USS abdomen helps in excluding other causes of jaundice like obstructive causes and chronic liver disease. Many studies have revealed morphological changes secondary to acute viral hepatitis and its complications up to varying degrees that include hepatomegaly, "starry sky pattern" (hypo echoic liver with prominent periportal echo) and non-distended GB with abnormally thickened heteroechoic GB wall, splenomegaly, ascites and abnormal PV flow on CDFI.[2] Author studied 220 cases of enterically transmitted

hepatitis and attempted to determine USS findings in acute viral hepatitis and their role as prognostic markers.

METHODS

Study population

A series of 220 consecutive patients with acute viral hepatitis who fitted into the inclusion criteria were studied. Age of patients ranged from 6 years to 57 years, while the mean age was 21 years. The ratio of Male to female patients was 1.6: 1.

Study period

The duration of the study was from the period between April 2016 to March 2018.

Inclusion criteria

- Author included patients who had presented to us with clinical features of recent onset Jaundice and raised serum bilirubin more than 1.2 with no other known cause of jaundice.

Exclusion criteria

- Patients with other known causes of jaundice like cirrhosis were excluded from the study.
- Patients who presented beyond one week of clinical presentation.
- Patients who didn't undergo follow up USS abdomen investigations.

Methodology followed

Initial USS abdomen was done in within one week of clinical presentation. Follow up USS abdomen was done between 10 to 15 days and thereafter at 12 weeks from the time of clinical presentation.

Hepatomegaly was considered with liver size was more than 14cms for males and 13 cm for female patients. Measurements were obtained of longitudinal diameter in midclavicular line. -To determine certain subjective USS findings like the "starry sky pattern", second opinion from another Radiologist was taken into consideration.

GB changes were observed that included collapsed GB lumen with increased wall thickness. Wall thickness of more than 3mm in fasting state was considered abnormal.

Portal vein more than 15mm, 2cms proximal to porta in quiet respiration was considered abnormal.

Spleen size more than 12 cm in long axis was considered abnormal.

Opinion on clinical course, hepatic encephalopathy and fulminant hepatic failure was obtained from a Gastroenterologist.

Statistical evaluation of the variable USS parameters with clinical course and progression was carried out.

RESULTS

A total 220 patients of acute Enterogenic viral hepatitis were studied.

Total of 154(70%) patients had hepatomegaly, 99(45%) patients revealed bright liver and 170(80) patients showed evidence of GB changes, 46(21%) had periportal lymphadenopathy (Table 1). A representative Venn diagram of the overlap was generated which depicts the overlap of these signs and symptoms (Figure 1).

Table 1: Ultrasound findings in hepatitis.

Hepatomegaly	Bright Liver	GB changes	Enlarged PV	Splenomegaly	Ascites
154	99	170	14	25	18

Based on the Venn diagram the patients were classified into those having only three signs, two signs or only one ultrasound sign on presentation.

All three Signs: 26(12%) patients had all three signs (Hepatomegaly, GB Changes and Bright Liver).

Any two signs:

- 18(8 %) patients had Hepatomegaly and GB Changes.
- 08(4%) patients had Bright Liver and GB Changes.
- 05(2%) patients had Hepatomegaly and Bright Liver.

Fourteen patients apart from other routine USS findings had enlarged PV, Splenomegaly and mild Ascites. Since these were discrete findings they were not included in statistical evaluation and were taken into account as incidental findings. However, on follow up 14 patients who had triad of enlarged PV, Splenomegaly and ascites and other 206 patients without the triad of enlarged PV, Splenomegaly and Ascites showed following characteristics (Table 2).

Out of 14 patients 3 patients developed hepatic encephalopathy and one among these went into fulminant hepatic failure.

Out of 14 patients 11 patients had deranged LFT even at 12 wks. up to varying degrees, i.e. serum bilirubin varying from 2.0 mg/dl to 5.5mg/dl.

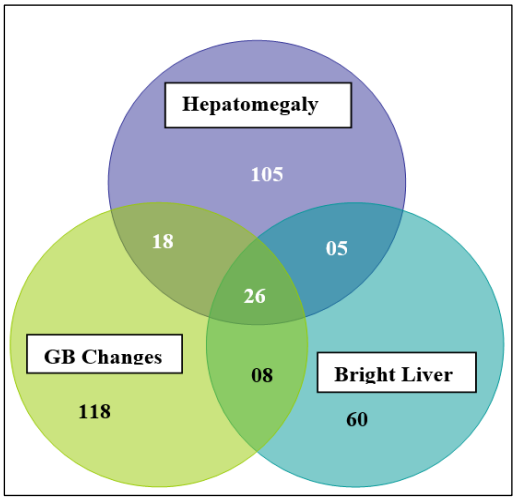

Figure 1: Venn diagram representing overlap of various ultrasound findings.

All 72 patients from rest of the study group of 206 patients showed deranged LFT at 12 weeks.

Thus, the patients in acute phase apart from showing routine USS features also showed a triad of enlarged PV, Splenomegaly and Ascites which were attributed to transient portal hypertension likely due to hepatic congestion and these patients also had prolonged period of illness and higher rate of complications.

Table 2: Follow up ultrasound findings.

	Hepatic encephalopathy or Fulminant hepatic failure	Deranged LFT at 12 weeks
14 patients with triad of enlarged PV, splenomegaly and ascites.	03	11
206 patients without the triad of enlarged PV, splenomegaly and ascites.	-	72

Out of the 72 patients who had deranged LFT at 12 weeks post presentation, author observed that 85.2 percent of these patients had a combination of two or more signs out of hepatomegaly, GB wall changes, starry sky pattern and periportal lymphadenopathy, only the remainder of 14.8 percent cases had isolated findings like only pure hepatomegaly on presentation.

DISCUSSION

Ultrasound has a very low specificity and sensitivity in the diagnosis of hepatitis; biochemical and serological parameters are required for diagnosis Common USS findings in acute stages of hepatitis include Hepatomegaly, starry sky pattern and GB changes. Hepatomegaly is common occurrence seen in various percentages varying from 45% to 80 %.[3] In this study author found hepatomegaly in 70% patients of acute stage of viral hepatitis. GB changes of collapsed thick walled GB are more common than hepatomegaly and are seen in up to 80 to 98% of patients; GB changes are most common in first week and usually resolve by 12wks in 97% of patients.[4,5] In this study GB changes were seen in 80% patients in acute stage. The GB wall changes in hepatitis are proposed due to direct injury to GB wall mucosa by virus present in the bile .Starry sky pattern (Increased brightness and clear visualization of portal vein radicles) in acute hepatitis is seen in approximately 32.2% patients and it is due to edematous swelling of hepatocytes, however in this study it was seen in 45% patients. Regional lymphadenopathy, periportal and hepatoduodenal due to response to perihepatitis, was seen in 21% of this patient.[6,7]

Gall bladder wall thickening has already been shown to have prognostic significance with presence of GB wall thickening having a strong correlation with prolonged hospital stay.[8]·In this study author noted that patients with a combination of the above findings on ultrasound had prolonged elevation of biochemical parameters and a prolonged hospital stay.

In acute hepatitis especially the complicated variety there was found to be coexistent, enlarged portal vein, splenomegaly and ascites, and all three patients in this study who went into hepatic encephalopathy (inclusive of fulminant hepatic failure) had this triad of findings. There is evidence of increased blood flow to the liver in acute hepatitis and could be a cause of transient portal hypertension.[9] Another theory is the Portal hypertension in acute hepatitis is mainly determined by intrahepatic vascular space being reduced by the collapse of sinusoids.[10] Acute viral hepatitis is known to cause transient increase in liver stiffness values measured by elastography even in the face of minimal or no fibrosis.[11]

CONCLUSION

Patients with triad of enlarged PV, Splenomegaly and Ascites had features of transient portal hypertension. These patients had poorer outcome and prolonged period of illness as compared with patients with routine USS findings who had better outcome and prognosis.

A patient with a combination of USS markers of hepatitis was much more at risk for a prolonged hospital stay and stormier course than a patient with solitary USS marker at presentation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Beniwal R, Rao A, Pimpalwar Y, Teli P. Ultrasound of abdomen in acute viral hepatitis and its role as a prognostic marker. Int J Res Med Sci 2019;7:4673-6.