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# Ultrasound Findings among Hepatitis C Patients and Its Association with Liver Enzymes

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***Abstract***
***BACKGROUND:*** *Chronic liver disease (CLD) is a disease of the liver resulting from an inflammatory, infiltrative, immunologic, mechanical or metabolic injury to the liver, which has persisted for six or more months without complete resolution. The leading causes include hepatitis B and hepatitis C. Among the radiological imaging Ultrasonography is most acceptable method of assessment of liver being least expensive and highly safe.*
***AIMS AND OBJECTIVE:*** *To see the ultrasonological findings in hepatitis C positive patients and to see its association with liver enzymes*
***MATERIAL AND METHODS: -*** *This Cross sectional study was conducted at LLRM Medical College from September 2016 to Aug 2017. All the hepatitis C patients who were admitted in different wards and visited OPD were taken. After selecting the study subjects full history taking, clinical examination and investigations were done. Collected data was entered in Microsoft Office Excel and analyzed statistically by using chi square test.*
***RESULTS:*** *Out of total 110 patients, 52.7% were above 40 years of age, 65.5 % were male and about 34.5% were female. Ultrasound finding of patient shows 77.3% had Normal USG, nearly 58.2 % patients were found to have elevated liver enzymes. 21.9% of those with elevated liver enzymes have abnormal ultrasound findings. Nearly 24% of hepatitis C positive patients found to have hypoalbuminemia. 30.7 % these had abnormal ultrasound.*
***CONCLUSION:*** *liver sonography and biochemical markers (AST/ALT) are important non-invasive procedure in assessing chronicity of hepatitis C. Though some better radiological investigation like ultrasonic elastography i.e. fibroscan should be encouraged.*
***KEY WORDS:*** *Hepatitis C, Chronic Liver Disease, Ultrasound, Liver Enzymes*

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## I Introduction

Chronic liver disease (CLD) is a disease of the liver resulting from an inflammatory, infiltrative, immunologic, mechanical or metabolic injury to the liver, which has persisted for six or more months without complete resolution. As liver is one of the vital organs of the body, any disease effecting liver can have large morbidity and mortality rate. The leading causes include hepatitis B and hepatitis C.

Hepatitis C with its six genotypes and nearly 50 subtypes effects approximately 3% of the world population i.e. about 170 million people are chronically infected by HCV.The cell mediated immunity and elaboration of antiviral cytokines by Tcell1 for the containment of infection results in inflammation which damages the hepatic cells membrane responsible for liver injury.[1]

For the assessment of liver and biliary system status there are a number of laboratory tests, liver biopsy and radiological imaging. Laboratory investigations are helpful in evaluating liver function, assessing severity of liver injury, refining diagnosis concerning any identified abnormality of liver. [2]

Among the radiological imaging Ultrasonography is most acceptable method of assessment of liver along with least expensive and highly safe. [3]

Blood tests are the most widely available noninvasive method for assessing fibrosis. They are quick, painless, and relatively inexpensive. A variety of different blood tests (sometimes called panels) are available for assessing liver fibrosis. These tests measure levels of various chemicals and substances (also called serologic markers) that are present in blood when there is chronic inflammation and fibrosis of the liver. Examples of some of the serologic markers used in fibrosis test panels include liver enzymes aspartate aminotransferase (AST) and alanine aminotransferase (ALT), bilirubin, several different blood proteins (globulins), and various

types of collagen and cytokines. Elevations of these serologic markers can be used to predict the extent and degree of fibrosis.[4]

## II Aims And Objective

1. To see the ultrasonological findings in hepatitis C positive patients
2. To see the association between liver enzymes with ultrasonological finding of Hepatitis C positive patients.

## III. Material And Methods:-

This Cross sectional study was conducted at LLRM Medical College from September 2016 to Aug 2017. All the patients who were admitted in wards of Medicine, Surgery, Gynecology & Orthopedics of LLRM Medical College during study period and found to be Hepatitis C positive on serological examination and those OPD patients who were incidentally found +ve for hepatitis C on serological examination were included in the study.

After selecting the study subjects full history taking, clinical examination and investigations were done according to predesigned and pretested study schedule.

After completing data collection all data was entered in Microsoft Office Excel and analyzed statistically by using chi square test.

**Inclusion criteria**

- Patient above 15 years of age.
- Hepatitis C +ve patients
- Patient who have given written consent.

**Exclusion criteria**

- Hepatitis C patients who had co-infection of Hepatitis B.
- Hepatitis C patients who were chronic alcoholic.
- Patients taking hepatotoxic drugs
- Patients who are diabetic
- Patients who are at CHF.
- Patients who refused to give consent
- Patients <15 years of age

## IV. Observation And Results

In the study duration total 110 patients were diagnosed with hepatitis C. out of total hepatitis C positive patients ,1.8% were in between 16 to 18 years of age, 45.5% of infected patients were between 18-40 years, while 52.7% of infected patients were above 40 years of age .

Out of total HCV positive patients about 65.5 % were male and about 34.5% were female. 20.8% of these hepatitis C positive male have abnormal ultrasound findings where as 29% of the infected female have abnormal ultrasound findings.

In all the hepatitis C positive patients ultrasound, was done and five different types of results were observed. 77.3% had Normal size and normal echotexture, which is normal USG, while 22.7% had abnormal USG findings. Four patterns of abnormal findings were observed and these were normal size and altered echotexture (8.2%), Hepatomegaly and normal echotexture (7.3%), Hepatomegaly with altered echotexture (5.4%) and Small size liver with altered echotexture (1.8%).

All the hepatitis C positive patients were also investigated for liver enzymes level. Among these patients, nearly 58.2 % patients were found to have elevated liver enzymes. 21.9% of the hepatitis C positive patients with elevated liver enzymes have abnormal ultrasound findings in liver, whereas 23.90% of patients with normal liver enzymes level have abnormal Ultrasonography finding in liver. The p value of association is >0.05 which is not significant.

These 78.1% hepatitis C positive patients with elevated liver enzymes have normal size normal echotexture. Presence of Abnormal pattern like normal size with altered echotexture(7.8%), hepatomegaly with normal echotexture, (4.6%), hepatomegaly with altered echotexture (7.8%)and small size with altered echotexture (1.5%) were observed among patients with elevated liver enzymes. While 76.1% of patients with normal liver enzyme have normal USG, 8.6% have normal size with altered echotexture, 10.8%have hepatomegaly with normal echotexture, 2.2% have hepatomegaly with altered echotexture and another 2.2% have small size with altered echotexture

Nearly 24% of hepatitis C positive patients found to have hypoalbuminemia. 30.7 % of hepatitis c positive patients having hypoalbuminemia found to have abnormal ultrasound finding, while only 20.3% of

patients with normal serum albumin level have abnormal ultrasound finding of liver. The p value of association is >0.05 which is not significant

Nearly 27.3 % of patient have deranged renal function in form of elevated s. urea and 19% of patients have elevated s.creatinine.38.1 % of hepatitis C positive with elevated S. creatinine level have abnormal ultrasound findings of liver and 19.1% of hepatitis C positive patients with normal S. creatinine level have abnormal ultrasound findings of liver . The p value of association is >0.05 which is not significant

26.7 % of hepatitis C positive with raised S. urea level has abnormal ultrasound finding in liver. Whereas 21.3% of hepatitis C positive patients with normal S. urea have abnormal ultrasound finding in liver. The p value of association is >0.05 which is not significant

## V. Discussion

Ultrasound can be a good predictor for the ongoing inflammatory and deteroratory changes including fibrosis (by indentifying alteration in size and echotexture of liver) that keeps on going in liver of the patients infected with hepatitis C virus. Although it has been pointed out that liver biopsy is the gold standard for assessment of severity of liver damage in hepatitis C infection but there is still requirement of some non invasive procedure to assess the liver status in hepatitis C infection[5].

Matos CA also emphasized on development of steatosis in the progression of disease in hepatitis C and the role of ultrasound in the identification of steatosis was advocated[6] .

H Tchelepi et al stated sonography as first imaging procedure to be performed in the individuals of suspected of liver disease[7] .

In our study, Out of total HCV positive patients about 65.5 % were male and about 34.5% were female. 20.8% of these hepatitis C positive male have abnormal ultrasound findings where as 29% of the infected female have abnormal ultrasound findings, whereas in the study of Prof. Marcia w. et al the proportion of male and female were 47.4% and 52.65% respectively[8]

On observing age distribuyion, 1.8% were in between 16 to 18 years of age, 45.5% of infected patients were between 18-40 years, while 52.7% of infected patients were above 40 years of age .In the similar study done by Prof. Marcia wang et al, the most of hepatitis C positive patients were between 30 years to 56 years of age[8].

Among all the patients, five different types of USG findings were observed. 77.3% had Normal size and normal echotexture, which is normal USG, while 22.7% had abnormal USG findings. Four patterns of abnormal findings were observed and these were normal size and altered echotexture (8.2%), Hepatomegaly and normal echotexture (7.3%), Hepatomegaly with altered echotexture-(5.4%) and Small size liver with altered echotexture (1.8%). Similarly in a study conducted by Mohd Najfizadeh et al over 54 serologically confirmed hepatitis C positive patients and 31 healthy controls it was found 61.5% of patients and 30.4% of control have increased echogenicity of liver (i.e. altered pattern of liver echotexture).[9] Marcia Wang et al observed normal sonographic patterns in 69.3 % of patients and 30.7 % patients were with altered sonographic findings of liver. [8]

The patients who found to be hepatitis C positive were investigated for liver enzymes level. Among these patients, nearly 58.2 % patients were found to have elevated liver enzymes. 21.9% of the hepatitis C positive patients with elevated liver enzymes have abnormal ultrasound findings in liver, whereas 23.90% of patients with normal liver enzymes level have abnormal ultrasonographic finding in liver, while Mohd Najafizide et al observed that serum AST level in "increased liver echogenicity group i.e altered sonographic pattern of liver" (41.47%-+8.11) was higher than in normal group(36.82%+-4.49) with p value of association <.05 i.e significant[9]. This discrepancy in relation to our study may be due to exclusion of alcoholic hepatitis C positive patients from our study where SGOT is major parameter to assess liver derangement.

Nearly 24% of hepatitis C positive patients found to have hypoalbuminemia. 30.7 % of hepatitis c positive patients having hypoalbuminemia found to have abnormal ultrasound finding, while only 20.3% of patients with normal serum albumin level have abnormal ultrasound finding of liver.

The study also depicts the pattern of renal function in hepatitis C positive patients.

Nearly 27.3 % of patients have deranged renal function in term of elevated s. urea and 19% of patients have elevated S.creatinine.

38.1 % of hepatitis C positive with elevated S. creatinine level have abnormal ultrasound findings of liver and 19.1% of hepatitis C positive patients with normal S. creatinine level have abnormal ultrasound findings of liver.

26.7 % of hepatitis C positive with raised S. urea level have abnormal ultrasound finding in liver. Whereas 21.3% of hepatitis C positive patients with normal S. urea have abnormal ultrasound finding in liver. Fabrizi et al in their study depicted the chances of development of mebranofroliferative glomerulonephritis in hepatitis C positive patients are 10 times higher than hepatitis C negative patients[10].

## VI. Conclusion

Hepatitis C virus is a RNA virus which predominately affects the liver. Since the disease shows chronicity in large proportion of infected individuals and the patients are quite reluctant to minor ailments which may have developed due to virus infection, so in this study association between ultrasound findings and s biochemical parameter like liver enzymes level, serum albumin level, S.urea and S. creatinine levels was studied.

Taking in account our study and in light of advancement in field of radiological imaging, there is need of some better radiological investigation like ultrasonic elastography i.e. fibroscan may overcome the limitations and discrepancies found in our study.

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**Table – 1 Association of elevated liver enzymes level with ultrasound findings in hepatitis C positive patients**

| Ultrasound findings | Normal liver enzymes | Elevated liver enzymes | total |
|---|---|---|---|
| Normal ultra sound findings | 35(76.1%) | 50(78.1%) | 85(77.3%) |
| Abnormal ultra sound findings | 11(23.9%) | 14(21.9%) | 25(22.7%) |
| total | 46(41.8%) | 64(58.2%) | 110(100%) |
| $X^2$=.0633, P>0.05 | | | |

**Table -2 Different types of ultrasound findings of liver in hepatitis C positive patients with elevated liver enzymes (SGOT, SGPT) level**

| . | Normal size and normal echotexture NO. (%) | Normal size with altered echotexture NO. (%) | Hepatomegaly with normal echotexture NO. (%) | Hepatomegaly with altered echotexture NO. (%) | Smaller liver with nodular echotexture NO. (%) | Total NO. (%) |
|---|---|---|---|---|---|---|
| Normal liver enzymes(<40 iu/l SGOT;<40 iu/l SGPT) | 35(76.1%) | 04(8.6%) | 05(10.8%) | 01(2.2%) | 01(2.2%) | 46(41.8%) |
| Elevated liver enzyme(>40 iu/l SGOT:>40 iu/lSGPTt:) | 50(78.1%) | 05(7.8%) | 03(4.6%) | 05(7.8%) | 01(1.5%) | 64(58.2%) |
| Total | 85(77.3%) | 09(8.2%) | 08(7.3%) | 06(5.4%) | 02(1.8%) | 110(100%) |

**Table -3 Association of hypoalbuminemia with ultrasound findings in hepatitis C positive patients**

| | Hypoalbuminemia present NO. (%) | Hypoalbuminemia absent NO. (%) | Total NO. (%) |
|---|---|---|---|
| Normal ultrasound findings | 18(69.2%) | 67(79.7%) | 85(77.3%) |
| Abnormal ultrasound findings | 08(30.7%) | 17(20.3%) | 25(22.7%) |
| Total | 26 (23.6%) | 84 (76.4%) | 110(100%) |
| $X^2$=1.2538, P>0.05 | | | |

**Table -4 Association of elevated S.urea and S.creatinine level with ultrasound findings in hepatitis C positive patients**

| | S.creatinine level elevated(>1.5 mg/dl) NO. (%) | S.creatinine level normal(<1.5 mg/dl) NO.(%) | TOTAL |
|---|---|---|---|
| Normal ultrasound findings | 13 (61.9%) | 72(80.9%) | 85(77.3%) |
| Abnormal ultrasound findings | 08(38.1%) | 17(19.1 %) | 25(22.7%) |
| Total | 21 (19%) | 89(81%) | 110(100%) |
| $X^2$=3.4904, P>0.05 | | | |

**Table-5 Association of elevated S.urea with ultrasound findings in hepatitis C positive patients**

| | Serum Urea elevated | Serum Urea WNL | TOTAL |
|---|---|---|---|
| Normal ultrasound findings | 22(73.3%) | 63(78.7%) | 85(77.3%) |
| Abnormal ultrasound finding | 08(26.7%) | 17(21.3 %) | 25(22.7%) |
| Total | 30 (27.3%) | 80 (72.7%) | 110(100%) |
| $X^2$=0.3645, P>0.05 | | | |

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