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Research Article

SHARE WAVE ELSATROGRAPHY HELPFUL TOOL IN PATIENTS OF CHRONIC LIVER DISEASE CO INFECTED WITH HEPATITIS B&C.

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Abstract:

***Objective:** The objective of this study was to determine the frequency of degree of liver fibrosis in a patient of chronic liver disease co infected with Hepatitis B and C.*

***Study Design:** Descriptive cross-sectional study.*

***Settings:** This study was conducted at all medical units of Liaquat university Hospital Jamshoro/Hyderabad.*

***Duration of Study:** 01 year July 2016 to July 2017.*

***Methodology:** This study included patients (182 patients) recruited from all medicine units of Liaquat university Hospital Jamshoro/Hyderabad. All the patients who fulfilled the inclusion criteria were included in the study. Taking detailed history after obtaining informed consent, demographic data (name, age, sex, duration of CLD etc.) were collected. Surface antigen (HbSAg) and anti-HCV antibody tests was performed by using ELIZA METHOD for diagnosing Hepatitis B and C. Shear wave elastography was performed by consultant and scoring was F0 No fibrosis, F1 Portal fibrosis without septa, F2 Portal fibrosis with few septa, F3 numerous septa without cirrhosis and F4 Cirrhosis. SPSS 16 was used , chai square as applied and p value considered 0.05 significant.*

***Results:** In current study, 182 patients were selected out of which 121 (66.5%) patients were male and 61 (33.5 %) were female. Liver fibrosis stages in selected patients were confirmed as; 12 (6.6%) patients of F1 (portal fibrosis without septa: minimal fibrosis), 76 (41.8%) patients of F2 (portal fibrosis with a few septa: moderate fibrosis or clinically significant fibrosis), 64 (35.2%) patients of F3 (septal fibrosis with many septa but no cirrhosis: severe fibrosis) and 30 (16.5%) patients of F4 (cirrhosis).*

***Conclusion:** Shear wave elastography of the liver is an effective predictor for determining liver fibrosis stages in patients having chronic liver diseases co- infected with Hepatitis B and C, which will help in early screening, monitoring and management of chronic liver diseases co-infected with Hepatitis B and C.*

Key Words: Liver fibrosis, cirrhosis, morbidity, mortality, hepatitis C

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INTRODUCTION:

Chronic liver diseases are quite frequent in daily practice, either secondary to chronic infection with hepatitis viruses' C or B, or with other etiologies, such as ethanol abuse (alcoholic steatohepatitis - ASH) or nonalcoholic steatohepatitis –NASH [1]. Prevalence of chronic liver disease (CLD) in the United States between 2005 and 2003 was estimated to be as high as 14.8% [2], with as many as 150 000 new cases diagnosed each year 20% of which had cirrhosis at presentation [3 ,4]. Viral hepatitis due to HBV & HCV is unfortunately highly endemic in Pakistan. In Pakistan, seropositive hepatitis B and C co infection is 1.3% [5]. Liver fibrosis is a common pathway for several liver injuries. Viral (hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) HCV co-infection), autoimmune, hereditary, metabolic and toxin mediated liver disease can result in hepatocellular dysfunction, expansion of extracellular matrix with distortion of hepatic architecture, portal hypertension and finally liver cirrhosis. Approximately 20 to 30% of patients with chronic liver disease develop cirrhosis. The incidence of CLD is increasing due to the development of chronic hepatitis C, non-alcoholic fatty liver disease (NAFLD) and more specifically non-alcoholic steatohepatitis (NASH); the latter one affecting almost 3% of the population in western countries. Liver fibrosis is therefore a major public health problem [6]. Ultrasonographic elastography and MR elastography have both shown promising results in several clinical studies [7,8] with Ultrasound based elastography providing the additional advantage of real-time imaging and lower cost. Transient elastography, a vibro acoustic non-imaging technology, and acoustic radiation force imaging, which is an imaging-based technology, have both been shown to be highly accurate for the diagnosis of cirrhosis and of intermediate accuracy for the differentiation of mild to moderate hepatic fibrosis [9,10]. Shear-wave elastography (SWE) uses measurement of acoustically generated tissue shear wave propagation speeds to derive estimates of liver stiffness, with the advantage of simultaneous anatomic B-mode US imaging [11]. This allows selection of a liver parenchymal region of interest devoid of blood vessels or focal lesions for analysis.

Different levels of fibrosis exist which in practice are assessed using a histological score. The most widely used is the METAVIR score, which incorporates five stages of fibrosis: F0 (no fibrosis), F1 (portal fibrosis without septa: minimal fibrosis), F2 (portal fibrosis with a few septa: moderate fibrosis or clinically

significant fibrosis), F3 (septal fibrosis with many septa but no cirrhosis: severe fibrosis) and F4 (cirrhosis) [6]. Study of Anthony E. Samir on Shear-Wave Elastography for the estimation of liver fibrosis in chronic liver disease and reported fibrosis on Samir on Shear-Wave Elastography were F0 in 19 (14%) cases, F1 in 82 (60.3%) cases, F2 in 18 (13.2%) cases, F3 in 10 (7.4%) cases and F4 in 7 (5.1%) cases [12].

The rationale of this study is to determine the frequency of different stages of liver fibrosis in patients of CLD co-infected with hepatitis B and C during literature search it has been observed that local studies on this topic is limited, results of my study will be help in early detection and better management of CLD patients co-infected with hepatitis B and C and to reduce associated mortality and morbidity.

MATERIAL AND METHODS:

This study was conducted at all medical units of Liaquat university Hospital Jamshoro/Hyderabad. The duration of study was 1 year and was cross sectional study. The sampling was Non-Probability consecutive.

The sample calculation was done using the raosoft software for "Sample size calculation" by using the prevalence of 5.1% with 95 % confidential interval and 3.2% of margin of error (as only compensated CLD patients with co infection of Hepatitis B and C will be included), the sample size stands to be n=182.

Sample selection:

Inclusion Criteria:

Both sex age 18 to 70 years co-infected with hepatitis B and C assessed on Eliza method

Exclusion Criteria:

- Patients with CLD due to other etiology like alcoholic, nonalcoholic fatty liver disease, autoimmune, or cryptogenic diagnosed on history of alcohol, blood tests like ANA antibodies and serum lipid profile.
- Patients with decompensated cirrhosis assessed clinically on signs of ascites i.e. shifting dullness and fluid thrill and on ultrasound which shows presence of fluid in peritoneal cavity.

DATA COLLECTION PROCEDURE:

This study was conducted after taking approval from the Research Evaluation Unit (REU), College of Physicians and Surgeon Pakistan. All CLD patients who fulfilled the inclusion criteria and admitted at Medical units Liaquat medical hospital during the study period was included in the study. Informed consent was taken from all the participants at the time

of inclusion in the study. Participants information regarding age gender, duration of CLD was collected through pre-designed proforma . Those participants included who are co-infected with hepatitis B and C. Surface antigen (HbSAg) and anti-HCV antibody tests was done by ELIZA method and scoring are

F0 No fibrosis,

F1 Portal fibrosis without septa,

F2 Portal fibrosis with few septa,

F3 numerous septa without cirrhosis and

F4 Cirrhosis. Shear wave elastography will be done by consultant radiologist at liaquat university hospital Hyderabad/jamshoro.

DATA ANALYSIS PROCEDURE:

All data was entered and analyzed by using Statistical Package for Social Sciences (SPSS) version 16. Descriptive statistics was calculated. Mean and standard deviation was calculated for continuous variables like age, duration of CLD. Frequencies and percentages was calculated for the categorical variables like gender, shear wave elastography scoring as per mentioned above.

Effect modifiers are age, gender, duration of CLD was addressed through stratification and chi square was applied. A p-value equal to 0.05 or < 0.05 was considered statistically significant.

RESULTS:

In current study 182 patients were included who fulfill the inclusion criteria. In table 1 descriptive statistics of continuous variables of the study was presented like age (in years), sex, duration of CLD (in months) and Shear wave score, where mean and standard deviation of age was 40.59 ± 10.423 (18-61), duration of CLD 36.87 ± 18.213 months (8-75 months) and Shear wave score 11.168 ± 4.996 (6.35-37.45).

In table 2 distribution of Shear wave grading was shown, 12 (6.6%) patients of F1 (portal fibrosis without septa: minimal fibrosis), 76 (41.8%) patients of F2 (portal fibrosis with a few septa: moderate fibrosis or clinically significant fibrosis), 64 (35.2%) patients of F3 (septal fibrosis with many septa but no cirrhosis: severe fibrosis) and 30 (16.5%) patients of F4 (cirrhosis).

In Table 3 & 4 stratification of Shear wave grading with respect to gender, age and duration of CLD was done. Stratification of Shear wave grading with respect to gender shows non-significance result, whereas stratification of Shear wave grading with respect to age and duration of CLD shows significance result with p-value < 0.05.

TABLE 1 ; DESCRIPTIVE STATISTICS OF CONTINUOUS VARIABLES

Variables	Number	Minimum	Maximum	Mean	Std deviation \pm
Gender					
Male	121(66.5%)				
Female	61(33.5%)				
Age	182	18	61	40.59	10.423
Duration of CLD (months)		8	75	36.87	18.213
Share wave score		6.35	37.45	11.168	4.996

TABLE 2: DISTRIBUTION OF SHEAR WAVE GRADING

Share wave grading	Frequency	Percentage
F1	12	6.6
F2	76	41.8
F3	64	35.2
F4	30	16.5
TOTAL	182	100

TABLE 3: STRATIFICATION OF SHEAR WAVE GRADING WITH RESPECT TO GENDER

SEX	SHARE WAVE GRADING				TOTAL
	F1	F2	F3	F4	
MALE	9	51	36	25	121
FEMALE	3	25	28	5	61
TOTAL	12	76	64	30	182

Chi- square value = 7.234

P-value = 0.065 (Non-significant)

TABLE 4: STRATIFICATION OF SHEAR WAVE GRADING WITH RESPECT TO AGE

AGE	SHARE WAVE GRADING				TOTAL
	F1	F2	F3	F4	
18-30	2	15	16	6	39
31-40	5	18	21	14	58
41-50	2	32	14	5	53
51-60	3	11	13	2	29
61-70	0	0	0	3	3
TOTAL	12	76	64	30	182

P-value =0.002 (Significant)

DISCUSSION:

Liver fibrosis management play a key role in controlling the morbidity and mortality. Without proper and timely interference, progressive liver fibrosis will gradually lead to cirrhosis, hepatocellular carcinoma, that causes liver failure [13] which increases the mortality rates [14]. Therefore, in patients with chronic liver disease co infected with Hepatitis B and C, accurate, timely diagnosis and management of liver fibrosis is essential for the prevention, prognosis and optimization of treatment plan [15]. Different types of elastographic methods are used for diagnosing liver fibrosis stages, out of which Shear wave elastography (SWE) is more recent method which help in early and appropriate diagnosis of liver fibrosis stages. [16]

In current research male patients were more affected with liver fibrosis as compare to female patients, male to female ratio was 1.98:1. In current study male patients were 121 (66.5%) whereas female patients were 61 (33.5 %). Another study by Mohamed RE et al. also shows higher male ratio with liver fibrosis, 63.3% males and 36.7% females, with a male to female ratio of 1.72:1. [17]

In current research patients detail demographic and clinical data was collected by interviewing patients and checking patient's hospital record, in order to

observe each factor that was affecting the patients. Duration of chronic liver diseases (CLD) is also a key factor that was observed. Most of the patients i.e. 52 (28.6%) were having CLD from 13-24 months, 34 (18.7%) patients were having CLD from 37-48 months, 30 (16.5%) patients CLD from 49-60 months, 27 (14.8%) patients were having CLD from 25-36 months, 22 (12.1%) patients were having CLD from > 60 months and 17 (9.3%) patients were having CLD from 6-12 months. Cross tabulation of Shear wave grading with duration of CLD clearly shows that as the duration of CLD in patients increases liver fibrosis stage increases whereas patients having shorter duration of CLD were reported with initial stages of liver fibrosis.

A study by Chen S et al. shows similar results for fibrosis stages where, 3 (12.5%) patients for F0, 2 (8.3%) for F1, 4 (16.7%) for F2, 7 (29.2%) for F3, 8 (33.3%) for F4 [18].

CONCLUSION:

Shear wave elastography of the liver is an effective predictor for determining liver fibrosis stages in patients having chronic liver diseases co infected with Hepatitis B and C, which will help in early screening, monitoring and management of chronic liver diseases co infected with Hepatitis B and C.

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