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Original Research Paper

Fibro scan based score to predict liver fibrosis in patients with liver disease and its correlation with anthropometric measurements

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ABSTRACT:

Introduction: Progressive hepatic fibrosis with the improvement of cirrhosis is a function of nearly all persistent liver diseases. Transient elastography (TE) using Fibro Scan now permits for a speedy size of liver stiffness. **Material and methods:** Between Dec 2020 and Dec 2021, all consecutive sufferers with continual liver ailments considered at the branch of generic medicinal drug AIIMS, Bhatinda, had been prospectively included. Patients have been enrolled after written knowledgeable consent was once obtained. For all patients, the following clinical, organic and morphological parameters have been decided at the time of the liver stiffness measurement. **Results:** Correlation is giant at the 0.01 degree (2-tailed) in SBP, DBP, BMI, and HbA1C. Correlation is full-size at the 0.05 degree (2-tailed) in creatinine, and VLDL. **Conclusion:** TE using fibroscan gives a convincible choice as compared to the use of liver biopsy in diagnostic evaluation of fibrosis, cirrhosis, and persistent liver diseases.

Keywords: Liver fibrosis, Fibro Scan, Transient Elastography, Anthropometric measurements.

INTRODUCTION:

Progressive hepatic fibrosis with the development of cirrhosis is a feature of almost all chronic liver diseases. Approximately 10–20% of patients with chronic hepatitis C virus infection have cirrhosis at first clinical presentation Cirrhosis and complications of cirrhosis like liver failure, ascites, portal hypertension, variceal bleeding, hepatic encephalopathy, and hepatocellular carcinoma, eventually develop in hepatitis C infection within decades in 20-30% of patients Hepatic Fibrosis can be assessed by liver biopsy [1,2,3]. However, it is an invasive and painful procedure, with rare but potential life threatening complications, limiting its acceptance and repetition in usually asymptomatic patients.[4,5] In addition, the accuracy of liver biopsy in assessing fibrosis may be questioned because of sampling error and interobserver variability, which may lead to under staging of cirrhosis.[6-9] Thus there is a need to develop and validate non-invasive tests that can accurately reflect the full spectrum of hepatic fibrosis, cirrhosis, and its severity in liver diseases. NAFLD is significantly correlated with metabolic risk factors such as diabetes, inflammation and insulin resistance.[10] Some studies showed that NAFLD like metabolic syndrome have a significant relationship with visceral fat disposition.[11] In a study performed by Eskandari et al, the authors suggested that waist circumference can predict visceral fat independent of waist-hip ratio for predict of liver steatosis in adult.[12] Transient elastography (TE) is very simple, safe, rapid technique takes 5-10min and can be done in outpatient setting or speciality clinic TE utilising fibro Scan allows for a rapid measurement of liver stiffness and severity due to altered mechanical properties of fibrotic liver (13,14,15) It is a cost effective, rapid technique to evaluate for the presence of fibrosis (16). It cannot be used in individuals with ascites, and is associated with higher failure rates or unreliable results in obese patients using the standard M probe, as the shear wave does not propagate through fluid, and fat also attenuates ultrasound and elastic waves.[17] Children and lean patients with narrow intercostal spaces also have higher failure rates. In acute inflammation and/or moderate alanine amino transferase (ALT) elevation values of T may be 1.3-3

times higher; values return to baseline along with normalisation of laboratory abnormalities (18) it is better to avoid TE in transaminitis. Sinusoidal congestion, extrahepatic cholestasis, age, and steatosis (controversial) are other limitation for acute stiffness. TE value also depends upon the accuracy of operator and is operator dependent. After adjusting for sex and body mass index liver stiffness values were also higher in subjects with metabolic syndrome (19). Procedure of TE is rather easy affected person is requested to speedy for 2-3 hours prior to the manner to keep away from make bigger in liver stiffness from publish prandial blood glide (20). Vibrations of slight amplitude and low frequency (50 Hz) are transmitted via the liver tissue. The probe then makes use of pulse-echo ultrasound to comply with the propagation of the shear wave and to measure its velocity. The pace of the wave is immediately associated to tissue stiffness which correlates with fibrosis. [21,22]. Various parameter like pace of wave propagation, speed of vibration, and elastic modulus is evaluated. TE lets in for the identification of ailment severity due to altered mechanical residences of the fibrotic liver. [14,15]. The affected person is positioned in a dorsal decubitus role with the proper arm in maximal abduction. The examination begins with placement of the probe alongside the intercostal house to reap a view of the proper lobe of the liver.[23] Area of at least 6 cm thick and free of giant vascular constructions or gallbladder has been identified, ten measurements are got the use of the Fibro Scan probe. The proper location measured by way of the probe has a quantity that is at least a hundred instances greater than the common liver biopsy sample.[23] A dependable examination ought to end result in ten measurements with a 70% success rate, and the interquartile vary have to be much less than 30% of the cost of the median. Newer XL probes have been developed that reduce failure rates in obese patients. Fibrosis thresholds are lower than the standard M probe, and further cohorts of chronic liver disease patients is required.[24] Roulot et al showed that men and patients with a body mass index >30 kg/m2 had higher liver stiffness scores on average. Studies on the measurement of liver stiffness in normal subject has been done to establish pattern among general population. Prospective study was done to predict Liver Fibrosis in patient with chronic liver disease based on Fibro scan score and its correlation with anthropometric measurements.

MATERIAL AND METHODS:

Patient with persistent liver sickness had been evaluated in Department of General Medicine AIIMS, Bathinda between Dec 2020 and Dec 2021, the find out about protocol conformed to the moral recommendations of the 1975 Declaration of Helsinki. Written knowledgeable consent used to be taken from all patients. Etiology of continual liver disorder used to be made the use of wellknown diagnostic criteria. Hepatitis C virus (HCV) or hepatitis B virus (HBV) was once recognized by way of serological detection of hepatitis C antibodies (with nice serum HCV-RNA via polymerase chain reaction) and hepatitis B floor antigen, respectively. Liver Cirrhosis secondary to alcohol was once recognized in these with consumption off at least 40gm of alcohol every day for 10 12 months and more. All different illnesses have been recognized as usual. Details of the technical historical past and examination technique have been in the past described. (11,12) Measurements had been carried out on the proper lobe of the liver via intercostal areas on sufferers mendacity in the dorsal decubitus role with the proper arm in maximal abduction. The tip of the probe transducer was once protected with coupling gel and positioned on the skin, between the rib bones at the degree of the proper lobe of the liver. The operator, assisted by way of an ultrasonic time-motion image, placed a liver component of at least 6 cm thick free of massive vascular structures. Once the dimension place had been located, the operator pressed the probe button to begin an acquisition. Measurement depth used to be between 25 mm and sixty five mm under the pores and skin surface. Measurements which did now not had a right vibration structure or a right comply with up of the vibration propagation had been routinely rejected through the software. Up to 10 profitable measurements had been carried out on every patient. Success fee was once calculated as the ratio of the variety of profitable measurements over the complete quantity of acquisitions. The outcomes are expressed in kilopascal (kPa). Median price of the profitable measurements was once saved as representative of liver stiffness. The complete examination length used to be much less than 5 minutes. Only liver stiffness measurements acquired with at least 5 profitable measurements and a success fee of at least 30% had been viewed reliable. The following parameters had been decided at the time of the liver stiffness measurement. Clinical parameters protected weight, height, previous records of ascites, bleeding varices, and hepatocellular carcinoma. Laboratory parameters blanketed aspartate aminotransferase (AST), alanine aminotransferase (ALT), γ-glutamyl-transpeptidase, whole bilirubin, platelet count, prothrombin time, and albumin. Morphological parameters covered oesophageal varices (after top gastrointestinal endoscopy) and ultrasonographic splenomegaly. As ascites is a bodily problem affected person with equal

had been excluded. Statistical testing has been conducted with the statistical package for the social science software (SPSS version 20.0). Continuous variables were presented as mean±SD. Categorical variables were expressed as frequencies and percentages.

RESULTS:

In our study out of total 109 patients, majority of the patients i.e. 35(32.1%) were in age group 20-30 years, followed by 26(23.9%) from age group 31-40 years, 24(22%) from age group 41-50, 12(11%) each in age group 51-60 and >60. 76(69.7%) were male and 33(30.3%) were female. 7(6.3%) had history of HTN, and 4(3.6%) of DM. 67% of the patients never had alcohol, while 17(15.2%) had history and 7 (6.3%) were taking alcohol currently. 12(10.75) patients had fatty liver. In our study mean±SD of SBP(n=101) and DBP(n=101) was 130.28±16.79(100-186) and 81.21±9.34(50-126) respectively. Mean±SD of weight(n=98) was 70.98±14.31(38-126), height (n=94) was 169.68±11.53(131.1±207.3), BMI(n=92) was 169.68±11.53(131.1-207.30), waist Cir.(n=62) was 76.31±25.46(30-108), hip Cir. (n=60) was 80.30±25.08 (30-112), and waist to hip ratio (n=60) was 0.97±0.4(.88-1.13). Mean±SD of Hb(n=5) was 11.50±1.47(9-12.50), WBC(n=56) was 6.89±1.90(3.07-14.05), RBC(n=43) was 14.03±61.05(3.9-405), HB (n=56) 12.40±1.39(9.80-16.60) and PLT(n=51) was 2657.61±17374.27 (70-124300). In present study Mean±SD of RBS (n=65) was 134.93±32.59(96-275), FBS(n=16) was 108.86±24.91(83.70-199), and HbA1C (n=14) was 5.42±1.52(4.50-10.30). Mean±SD of creatinine (n=62) was 0.77±0.18(0.20-1.30), and urea (n=58) was 32.04±7.40(14.60-45.00). Mean ± SD of SGOT(n=63) and SGPT(n=63) was 43.47±14.54(14-95) and 49.25±15.37(18-94) respectively. Mean ± SD of S. Cholesterol (n=54) was 186.11±36.23, triglyceride(n=55) was 148.56±46.5(33-390), HDL(n=54) was 62.11±21.92(30-98), LDL(n=53) was 122.87±45.23(32-218), VLDL(n=46) was 32.12±12.84(10-109) and hepatitis(n=1) was 2.98. Fibro scan(n=105) was 8.33±12.35(1.60-75). Correlation is significant at the 0.01 level (2-tailed) in SBP, DBP, BMI, and HbA1C. Correlation is significant at the 0.05 level (2-tailed) in creatinine, and VLDL.

DISCUSSION:

Fibro Scan is a non-invasive test to estimate liver fibrosis and cirrhosis in patients with chronic hepatitis B, however the diagnostic performance is affected by several factors including ALT flares, BMI, and hepatic steatosis. A study of 170 patients with chronic hepatitis B demonstrated that hepatic steatosis was independently related to the severity of liver histological fibrosis.[25] Petta et al [26] found that patients with liver steatosis had higher LSM values measured by Fibro Scan, which led to overestimations of the severity of liver fibrosis. In our study out of total 109 patients, majority of the patients ie. 35(32.1%) were in age group 20-30 years, followed by 26(23.9%) from age group 31-40 years, 24(22%) from age group 41-50, 12(11%) each in age group 51-60 and >60. In the study by Qiang Li, et al [27]., the mean age of the patients was 36±10, while in the study by J Foucher et al [28]., in 2006, mean age of 52 (13) years. Wei-Yu Kao et al [29]., in 2020, Of the 123 patients, mean age was 35.5 years. In present study 76(69.7%) were male and 33(30.3%) were female. In contrast to our study in the study by Wei-Yu Kao et al [29]., in 2020, 87 (70.7%) were female, while similar to our study in the study by Qiang Li, et al [27].,77(66.4%) male. In this study 7(6.3%) had history of HTN, and 4(3.6%) of DM. in the study by Qiang Li, et al [27].,15(12.9%) had diabetes. According to the study by Wei-Yu Kao et al [29]., in 2020, 25 (20.7%) had diabetes mellitus. In our study Mean±SD of Hb(n=5) was 11.50±1.47(9-12.50), and PLT(n=51) was 2657.61±17374.27 (70-124300). According to Sumit Rungta et al [30]., in 2021, Haemoglobin (gm/dl) was 12.58±2.25, Platelets (/mm3) was 156946.73±65526.20. In our study BMI(n=92) was 169.68±11.53(131.1-207.30). In the study by Li, Qiang et al [27]., in 2020, body mass index (BMI) 25.5 kg/m2 (IQR 22.4–28.4), according to Sumit Rungta et al [30]., in 2021, BMI was 21.16±3.78. In our study Mean±SD of RBS (n=65) was 134.93±32.59(96-275), FBS(n=16) was 108.86±24.91(83.70-199), and HbA1C (n=14) was 5.42±1.52(4.50-10.30). Mean±SD of creatinine (n=62) was 0.77±0.18(0.20-1.30), and urea (n=58) 32.04±7.40(14.60-45.00) Mean ± SD of SGOT(n=63) and SGPT(n=63) was 43.47±14.54(14-95) and 49.25±15.37(18-94) respectively.

In the study by Li, Qiang et al [27]., in 2020, The median HBV DNA, ALT, AST, GGT, body mass index (BMI), and LSM values were 7.5 log10 copies/mL (IQR 6.9–7.7), 51 IU/L (IQR 34–78), 29 IU/L (IQR 23–40), 25 IU/L (IQR 15–72), 25.5 kg/m2 (IQR 22.4–28.4), and 8.7 kPa (IQR 5.4–12.8), respectively. In the study by Sumit Rungta et al [30]., in 2021 AST (IU/L) was 59.22±45.71, ALT (IU/L) was 63.96±53.89, and ALP (IU/L) was 256.07±119.02 According to the clinical guidelines on the treatment of CHB, patients with HBV DNA >20,000 IU/mL and ALT >2 ULN can start treatment even without a liver biopsy. In present study Mean ± SD of S. Cholesterol(n=54) was 186.11±36.23, triglyceride(n=55) was 148.56±46.5(33-390) ,

HDL(n=54) was 62.11±21.92(30-98), LDL(n=53) was 122.87±45.23(32-218), VLDL(n=46) was 32.12±12.84(10-109) and hepatitis(n=1) was 2.98. Fibro scan(n=105) was 8.33±12.35(1.60-75). Gaia et al [31] confirmed that Fibro Scan can be considered a valid support to detect fibrosis in chronic liver disease related to HCV but it should be interpreted cautiously in chronic hepatitis B and NAFLD patients, where host or disease-related factors may modify its accuracy. Boursier et al. who evaluated the diagnostic accuracy of LSM by TE in a cross-sectional study including 452 NAFLD patients; found that its accuracy was 83.1% [32]. Aykut et al. who compared the diagnostic performances of three different non-invasive methods including TE for the detection of liver fibrosis in a total of 88 patients with biopsy-proven NAFLD and found the diagnostic accuracy 90.2% [33]. In our study Mean ± SD of S. Cholesterol(n=54) was 186.11±36.23, triglyceride(n=55) was 148.56±46.5(33-390), HDL(n=54) was 62.11±21.92(30-98), LDL(n=53) was 122.87±45.23(32-218), VLDL(n=46) was 32.12±12.84(10-109) In the study by Kao, W.-Y et al [34]., in 2020, in all the included patients i.e. N= 73, LDL, (mg/dl) was 129.1 ± 32.1, and TG (mg/dl) was 161.9 ± 112.5. According to Parikh Pathik et al [35]., in 2015, In high-risk patients (liver biopsy advised) cholesterol level was 223±7.28 and triglyceride level was 220±11.8. In low-risk patients (no liver biopsy) cholesterol level was 126±8.47 and triglyceride level was 109±4.1. In the study by Andrew Yang et al [36]., in 2021, n=190, Cholesterol was ≥5.5 mmol/L in 64 (34%), and Triglycerides ≥2.0 mmol/L in 43 (23%). Subaranian et al confirmed that the diagnostic energy of waist circumference in adults with NAFLD used to be 0.72.[37] Also Vernon G et al. in a find out about carried out on 2011 suggested the electricity of anthropometric parameters in diagnosing NAFLD in paediatric populace and the AUC of waist circumference, complete physique fats mass (TFM) and visceral fats (IAAF) used to be 0.720, 0.661 and 0.741 respectively. In a find out about by means of Rui-Dan Zheng et al. on grownup subjects, the BMI used to be proven to be correlated with visceral fats deposition and liver fibrosis.[39]

CONCLUSION:

TE using fibroscan gives a convincible choice as compared to the use of liver biopsy in diagnostic evaluation of fibrosis, cirrhosis, and persistent liver diseases. This modality provides complementary information to other serologic non-invasive measures of significant fibrosis in chronic liver disease, and has certainly reduced the requirement for liver biopsies for routine staging of CHC patients.

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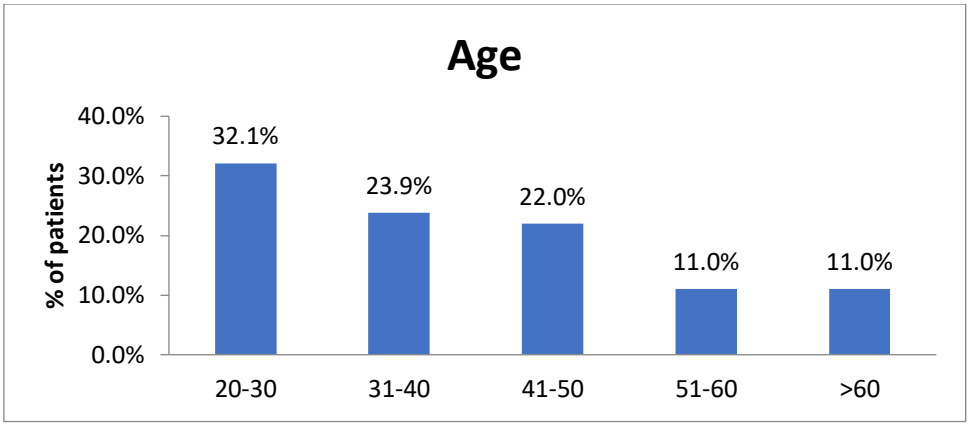
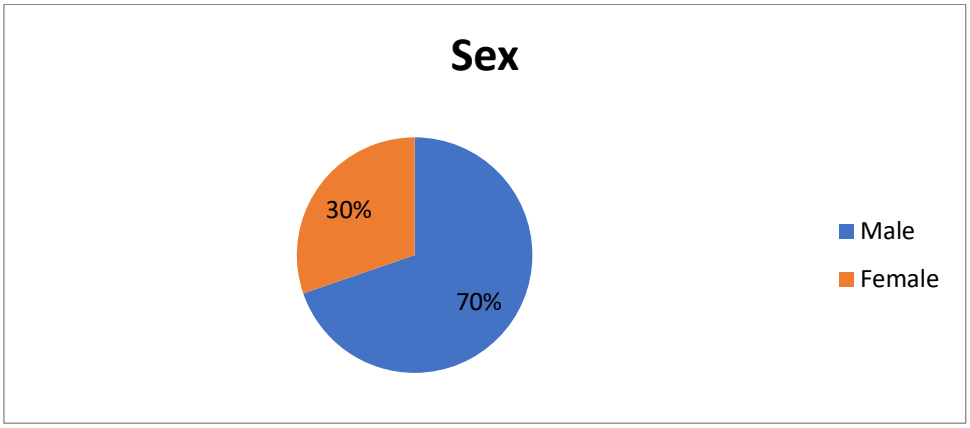
Tables and figures:


Age
40.0%
30.0%
20.0%
10.0%
0.0%
% of patients
32.1%
23.9%
22.0%
11.0%
11.0%
20-30
31-40
41-50
51-60
>60


Sex
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70%
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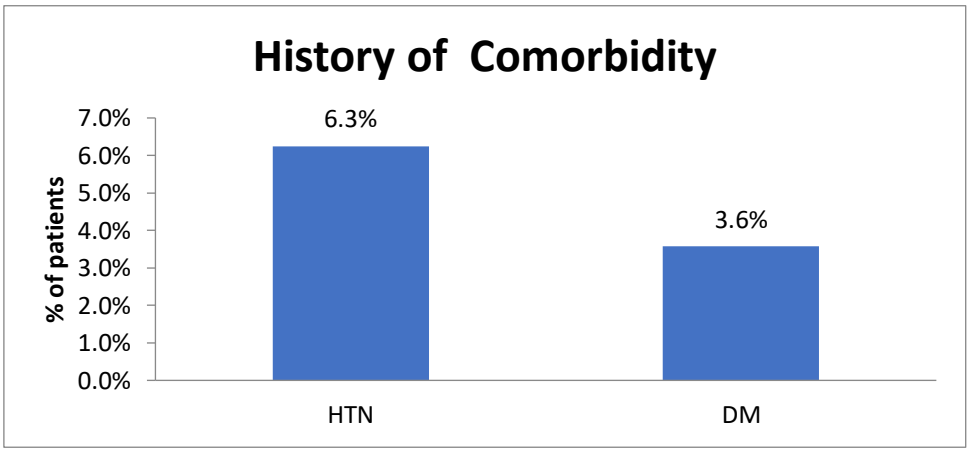
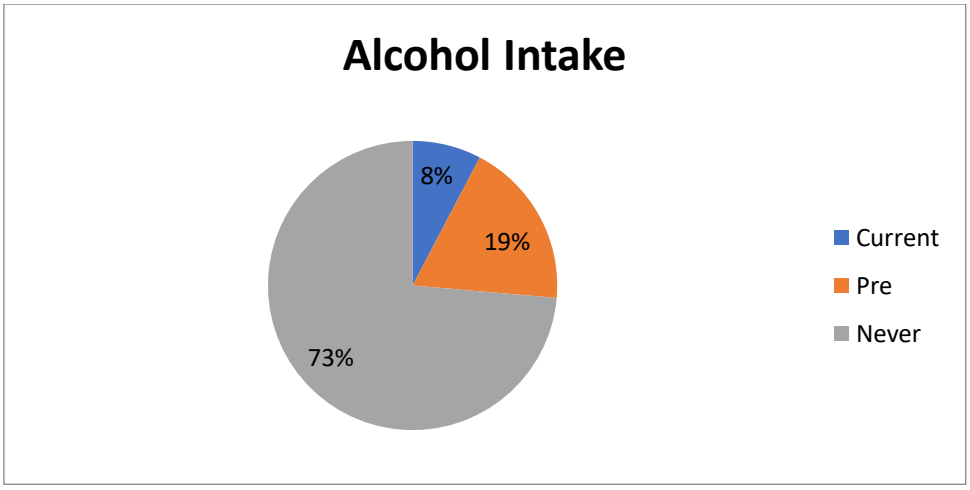
Female


History of Comorbidity
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
% of patients
6.3%
3.6%
HTN
DM


Alcohol Intake
8%
19%
73%
Current
Pre
Never

	Fibro scan

	N	Correlation Co-efficient	p-value
SBP	95	.366**	.000
DBP	95	.264**	.010
BMI	86	.360**	.001
Waist Cir.	59	-.166	.208
Hip Cir.	57	-.141	.295
Waist to Hip Ratio	57	.022	.873
Hb	5	.667	.219
WBC	54	.011	.939
RBC	43	-.065	.678
HB	53	.047	.736
PLT	48	-.216	.140
RBS	62	.192	.136
FBS	15	.365	.181
HbA1C	14	.677**	.008
Creatinine	59	-.267*	.041
Urea	56	-.140	.303
SGOT	60	.094	.474
SGPT	60	.225	.084
S. Cholesterol	53	.041	.770
Triglyceride	54	-.090	.516
HDL	53	-.013	.924
LDL	52	.058	.682
VLDL	45	-.304*	.042
**. Correlation is significant at the 0.01 level (2-tailed).			
*. Correlation is significant at the 0.05 level (2-tailed).			