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Comparison Between Seromarkers and Transient Elastography for Assessment of Significant Liver Fibrosis in NAFLD Patients

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Abstract: Background: Transient elastography is very sensitive noninvasive tool to assess liver fibrosis in NAFLD patients. But it is costly and not widely available There are also seromarkers (APRI & FBI4) for ruling out significant liver fibrosis. This study intends to compare between seromakers & transient elastography result for assessment of significant liver fibrosis (SF) in NAFDL patients. Methods: This was an observational cross sectional study done in Sheikh Russel National Gastroliver Institute & Hospital from April 2019 to December 2019. A total 111 patients were selected by purposive sampling method. Demographic, clinical and biochemical data were collected. Liver fibrosis was assessed by transient elastography. Aspertate transaminase (ASI) to platelet ratio index (APRI) & FIB-4 score were compared among the non-significant fibrosis (F2-F4) patients. Result: The total number of study population was 111, among them 39 (35.3%) had significant liver fibrosis (Kpa>7.2; F0 to F1). There was significant difference in between SF & non SF groups in terms of mean serum ALT, AST, albumin and platelet count. APRT and FIB-4 were significantly higher in SF group. APRI had better accuracy (area under the receiver operating characteristics curve=0.925) than FIB-4) 0.885) in ruling out SF. Conclusion: Seromarkers are comparable to transient elastography in assessment of significant liver fibrosis in NAFLD patients. Among them APRI is more accurate in determining significant fibrosis.

Keywords: Transient Elastography, NAFLD, Significant Fibrosis, Non-significant Fibrosis, Seromakers

1. Introduction

Nonalcoholic fatty liver disease (NAFLD) and chronic hepatitis B (CHB) are chronic liver diseases with a high incidence worldwide. [1, 2] Nonalcoholic fatty liver disease has a spectrum comprised of fatty liver, advanced fibrosis cirrhosis and nonalcoholic steatohepatitis (NASH). CHB and NAFLD commonly cause cirrhosis and hepatocellular carcinoma [3, 4]. Increasing rate of NAFLD in CHB patients is alarming currently [5]. NASH was independently correlated with liver fibrosis in patients with CHB [6]. Moreover, fatty liver can independently increase hepatitis B virus - related

HCC development 7.3-fold [7]. So timely and accurate diagnosis of liver fibrosis in CHB patients with NAFLD is urgent. Liver biopsy has been the gold standard for assessing liver fibrosis [8]. However, it is invasive and it might be result in several complications [9]. Therefore, noninvasive and accurate tools could be clinically assess liver fibrosis in CHB patients with NAFLD are urgently needed. To assess structural changes and screen for HCC abdominal ultrasonography is performed on CHB patients. Several US signs, such as irregular Echotexture of the liver parenchyma, spleen size, uneven liver surface and changes in the diameters of vessels, have been found to be correlated with liver cirrhosis [10, 11]. Transient elastography is an ultrasound-based technology measuring liver stiffness by the difference in velocity of elastic shear wave propagation across the liver. In evaluating fibrosis and cirrhosis in different settings, TE has been repeatedly validated and has shown overall good accuracy [12]. However, including liver inflammation, liver congestion, and biliary obstruction, TE could be influenced by patient-dependent factors [12, 13]. Therefore, the results should be interpreted with accurate clinical information. To accurately evaluate the degree of fibrosis, existence of NAFLD may cause morphological changes in the liver of CHB patients, which may make it more difficult.

2. Methodology & Materials

This was an observational cross sectional study conducted in the Department of Gastroenterology, Sheikh Russel National Gastroliver Institute & Hospital Dhaka, Bangladesh from April 2019 to December 2019. A total 111 patients were included. Demographic, clinical and biochemical data were obtained. Transient elastography was done all study population. Significant fibrosis was measured about Kpa>7.2. Then comparison between seromakers & transient elastography result. The area under the receiver operating characteristic curve (AUROC) for APRI, FIB-4 was calculated. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of each of these scores using previously published cut-offs were calculated. [14, 16-18] Statistical analysis was done using SPSS version 25.0. P value.

3. Results

The distribution of gender male was 59 (53.2%) and female were 52 (46.8%) in (Figure 1). According to figure 2 significant fibrosis (F2-F4) total number of patients was 39 (35.3%) and non-significant fibrosis (F0-F1) was 72 (67.7%). Mean of age among SF group were 46±8 and NSF group were 39.32±8.18, p value 0.838 (table 1). Platelet in SF group was 181.05±50.16 and NSF group was 259.75±50.65, where P value was < 0.001. Serum ALT in SF group was 78.82±38.78 and NSF group 36.11±14.58, where p-value was < 001. Among the patient's serum alkaline phosphates were 102.13±22.17 in SF group, among NSF group were 101.94±18.67, where p-value was.0963. Then the Serum Albumin among SF group where mean was 35.85±5.31 and NSF group was 42.07±3.68, p-value was < 0.001. Serum bilirubin in SF group was 0.85±0.24 and NSF group mean was 0.72±0.39, p-value 0.082. Prothrombin time among SF group was 13.6±3.7 and NSF group was 12.8±1.6, p-value 0.115 (Table 3). Table shows the comparison of APRI and FIB-4 index between SF and NSF groups. APRI among the SF group was 0.92±0.58 and NSF group was 0.25±0.10. P-value was < 0.001. FIB4 mean in SF group was 1.64±0.92 and NSF group was 0.68±0.33, the P-value was < 0.001. Specificity was in APRI total patients 102 (91.9%) and in FIB-4 total patients was 90 (81.1%). PPV in APRI was 95 (85.6%) and FIB-4 was 99 (89.2%). AURCO among SF and NSF both group were 1 (.09%) of study patients (N=111).

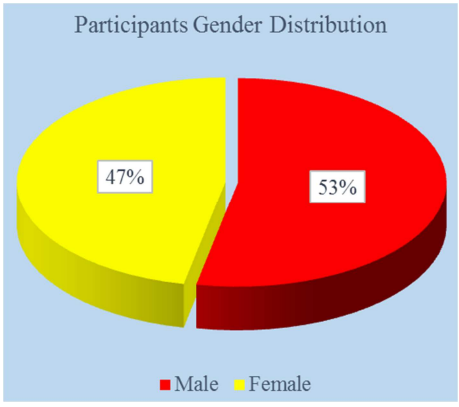

Figure 1. *Participants Gender Distribution.*

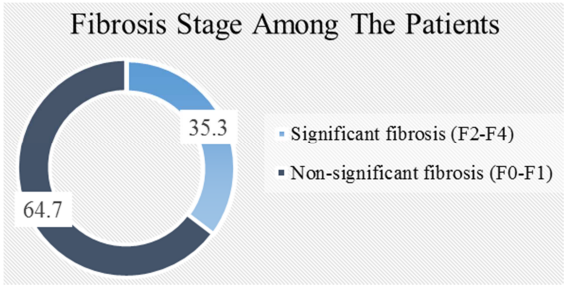

Figure 2. *Fibrosis Stage among the patients.*

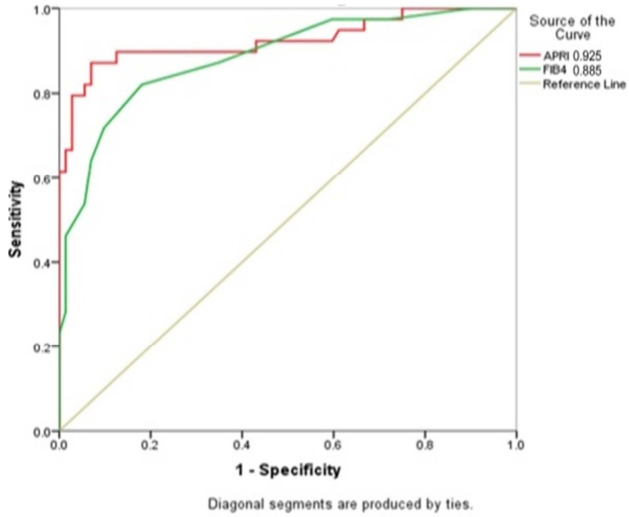

Figure 3. *ROC curve for APRI and FIB -4 in differentiating significant fibrosis.*

Table 1. *Age and laboratory parameters in SF and NSF group (N=111).*

Characteristics	SF	NSF	p-Value
Age	38.97±8.97	39.32±8.18	0.838
Platelet	181.05±50.16	259.75±50.65	< 0.001
Serum ALT	78.82±38.78	36.11±14.58	< 0.001
Serum AST	58.59±26.82	23.92±6.22	< 0.001
Serum Alkaline Phosphataes	102.13±22.17	101.94±18.67	0.963
Serum Albumin	35.85±5.31	42.07±3.68	< 0.001
Serum bilirubin	0.85±0.24	0.72±0.39	0.082
Prothrombin time	13.6±3.7	12.8±1.6	0.115

Table 2. *Comparison of APRI and FIB-4 index between SF and NSF groups (N=111).*

Characteristics	SF	NSF	p-Value
APRI	0.92±0.58	0.25±0.10	< 0.001
FIB4	1.64±0.92	0.68±0.33	< 0.001

Table 3. *Performance characteristic of APRI and FIB-4 (N=111).*

Parameters (cut-off)	APRI (0.378)		FIB-4 (0.95)	
	n	%	n	%
Sensitivity	97	87.4	91	82.0
Specificity	102	91.9	90	81.1
PPV	95	85.6	79	71.2
NPV	103	92.8	99	89.2
AURCO	1	0.9	1	0.9

4. Discussion

In this study, comparison of AUCs discovered that TE was considerably superior to U.S.A. within the diagnosing of pathology and subclinical liver disease. Combining TE with U.S.A. didn't increase the accuracy of detective work vital pathology, advanced liver disease, or liver disease compared to TE alone. kPa. [19] kPa, with NPVs of 92.4% and 98.7%, severally. HBV infection may be a major etiology of chronic disease worldwide. Consequently, the amount of CHB patients with concomitant NAFLD is rapidly growing. Many reports have discovered that metabolic syndrome will increase the chance of liver pathology progression and liver disease in CHB patients [20, 21]. Though TE could also be laid low with many factors, it performs well in CHB patients and should cut back the requirement for LB [22]. The results of internal organ steatosis on TE performance in patients with chronic HCV and NAFLD could also be additional definitive, leading to overestimations of the liver pathology stage [23, 24]. However, the role of internal organ steatosis in CHB remains arguable [25, 26]. No vital variations existed in parametric statistic of TE with pathology stage among completely different degrees of internal organ steatosis. Additionally, these findings indicate that TE can be helpful and reliable in assessing liver pathology in CHB patients, even in those patients co-occurring with NAFLD. However, the precise impact of internal organ steatosis on TE performance needs more analysis. Since U.S.A. is habitually accustomed assess structural changes caused by CHB, it's necessary to check TE with U.S.A. before introducing TE to judge pathology in CHB patients with NAFLD. TE proved to be superior to U.S.A. within the diagnostic performance of predicting vital pathology (P=0.02) [27]. For NASH clinical trials candidate eligibility functions, vital alcohol consumption was outlined as > 30 g/day in men and > 20 g/day in women [28]. Moreover, this definition has been suggested by western pointers, however with weak strength and comparatively caliber [29]. Whereas within the Asia-Pacific region, vital alcohol consumption has been outlined as > 20 g/day for men and > 10 g/day for ladies by the Asia-Pacific social unit on NAFLD and has been wide used [30].

This study was conducted only one hospital. Sample size was small and follow-up period were short in comparison to other studies. So, the result of the study may not reflect the exact scenario of the whole country.

5. Conclusion and Recommendations

In assessment of significant liver fibrosis in NAFLD patients, seromarkers are comparable to transient elastography. In determining significant fibrosis, APRI is more accurate among them. There were some limitations of this study. Moreover, our sample size was relatively small. TE is more dependable in the assessment of liver fibrosis and can avoid unnecessary liver biopsies. Multi-centre study with large sample size are required to conduct in future.

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