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Use of AST Platelet Ratio Index Score (APRI Score) for Predicting Histologic Liver Fibrosis in Chronic Hepatitis C Patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital

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ABSTRACT

Objectives: Liver biopsy remains the gold standard to assess histologic liver fibrosis for patients with chronic hepatitis C before therapy indication. The aim of this study was to evaluate correlate of APRI score with the degree of histologic liver fibrosis in chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital.

Methods: Fifty nine patients who tested positive for hepatitis C antibody (anti HCV) and had been performed liver biopsy from March 2001 to January 2011 were included in the study. Complete blood count, blood urea nitrogen, creatinine, liver function test, coagulogram and HCV genotype were tested for all patients. APRI score was calculated by using the formula, [(AST/ULN)/platelet counts (10^9/L)] × 100 for every patients. Liver tissues were reviewed by one pathologist for evaluating histologic liver fibrosis by Metavir classification. Patient characteristics and APRI score were compared between those with fibrosis score F ≤2 and those with score F ≥3.

Results: We divided the patients into two groups with non-significant and significant histologic liver fibrosis (F0, F1, F2 vs. F3, F4). When using APRI score = 0.7515 as the cutoff point, it showed 90.48% sensitivity, 63.16% specificity, 72.88% accuracy, 57.58% positive predictive value and 92.31% negative predictive value.

Conclusions: APRI score cannot be used for predicting histologic liver fibrosis in chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital because of low accuracy (72.88%). Because of high sensitivity and negative predictive value, we can use APRI score as a screening test for evaluating histologic liver fibrosis. In chronic hepatitis C patient who has low APRI score (<0.7515) and no sign of chronic liver disease, we can predict that the patient is less likely to have significant histologic liver fibrosis and have no need to perform liver biopsy.

Key words : APRI score, liver fibrosis, chronic hepatitis C

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INTRODUCTION

Chronic hepatitis C (CHC) is an important health problem and its impact on the development of cirrhosis and hepatocellular carcinoma warrant a therapeutic decision-making based on histopathological results for all patents with viremia.

Liver biopsy is currently the gold standard for assessing structural changes in chronic hepatitis C (CHC). However, certain clinical conditions such as thrombocytopenia, coagulopathy, and patient's refusal, often prevent liver biopsy being performed[1,2]. Furthermore, the procedure is costly and invasive, and sampling error can also occur[3-5]. The search for a practical, noninvasive method that could be used as an alternative to liver biopsy for predicting histologic liver fibrosis has been developed.

In 2003, Wai *et al*[6] published a study in which they validated the index known as AST platelet ratio index score (APRI score) that establishes the relationship between this score and liver fibrosis. The index is simple, inexpensive, and available.

In 2009, Viana *et al*[7] published a study in which they used APRI score as an alternative to liver biopsy for treatment indication in chronic hepatitis C. They found that, when APRI score = 1.05 was the cut off, it showed satisfactory sensitivity, specificity, and accuracy.

Aim of this study was to evaluate whether APRI score can be used as an alternative to liver biopsy for predicting histologic liver fibrosis in chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital.

PATIENTS AND METHODS

Patient Selection

59 chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital who had been performed liver biopsy from March 2001 to January 2011 were recruited. The inclusion criteria were: adult age > 15 years old, positive serologic test for HCV (anti HCV positive), proven viremia, genotype determination, and had liver tissue for reviewing and assessing histologic liver fibrosis. Diagnoses of HIV or hepatitis B infection were the exclusion criteria.

Histological Criteria

Assessment of histological staging followed the Metavir[8] classification; stage 0 is characterized by normal lobular architecture; stage 1 is defined by fibrous portal expansion; stage 2 is characterized by fibrous portal expansion with portal-portal septa; in stage 3 the lobular architecture is only partially preserved with portal-portal and portal-central septa and outlines of nodules visible; and stage 4 is characterized by cirrhosis, which is clearly identifiable at biopsy, or a predominance of nodular areas (F0, F1, F2, F3 and F4). Liver biopsies were reviewed by a single pathologist, who was blinded regarding the APRI score.

Calculation of APRI score

To calculate APRI score, serum AST activity and platelet count obtained 15 days prior to liver biopsy were used. APRI score was calculated according to the formula $[(\text{AST/ULN})/\text{platelet counts } (10^9/\text{L})] \times 100$ proposed by Wai *et al*. in 2003[6].

Statistical Analysis

Data was represented in mean ± SD. The ROC (Receiver Operating Characteristic) curve was used to determine the best cut off points for predicting significant fibrosis (F3 and F4).

RESULTS

Demographic data of the patients were shown in Table 1. The ROC curve which represents the accuracy of this method for patients is presented in Figure 1.

The concordance and discordance between APRI score and liver biopsy for a cut off value of 0.75 are shown in Table 2. There were concordance (accuracy) (43/59) 72.88% and discordance (16/59) 27.12%. There were sensitivity 90.47%, specificity 63.16%, positive predictive value 57.58%, and negative predictive value 92.31%, respectively.

DISCUSSION

Liver biopsy staging is one of the main factors that influence the decision to indicate therapy for chronic hepatitis C patients. According to current guidelines for treating hepatitis C virus, liver disease evolves more slowly in chronic hepatitis C patients who do not have fibrosis or who have minimal fibrosis on liver biopsy, so treatment does not necessarily need to be started to these patients. In contrast, treatment

Table 1. Patient's demographic data

Data	F0-F2 group		F3-F4 group		Total	
	Mean	SD	Mean	SD	Mean	SD
Age (yrs)	44.95	11.33	52.62	10.89	47.68	11.68
Hb (mg/dL)	13.77	1.4	13.91	1.76	13.82	1.53
Hct (%)	40.95	4.49	40.93	5.32	40.94	4.76
Plt (10^3/dL)	210.74	47.14	152.52	40.71	190.02	52.72
WBC (cells/dL)	6835.79	1733.09	6513.81	1727.33	6721.19	1723.11
PMN (%)	49.49	10.38	46.18	12.08	48.31	11.03
Lymphocyte (%)	36.67	9.49	39.88	9.64	37.82	9.58
AST (U/L)	49.37	26.95	112.95	93.85	72	66.66
ALT (U/L)	71.61	51.98	148.67	119.47	99.03	89.61
AP (sec)	68.94	20.07	100.15	55.98	80.09	39.58
Gen (%)						
1	12	50	7	63.6	19	54.3
3	6	25	3	27.3	9	25.7
6	6	25	1	9.1	7	20
PT (sec)	11.53	0.83	12.42	1.33	11.85	1.12
INR	0.98	0.07	1.06	0.09	1.01	0.09
APRI score	0.7	0.5	2.35	2.39	1.29	1.66
BUN (mg/dL)	12.03	2.91	10.99	3.16	11.66	3.01
Cr (mg/dL)	0.87	0.16	0.87	0.14	0.87	0.15
Alb (mg/dL)	4.18	0.47	4.07	0.49	4.14	0.48
Glob (mg/dL)	3.3	0.52	3.77	0.57	3.47	0.58
PTT(sec)	27.54	3.54	27.75	2.42	27.63	3.12
TB (mg/dL)	0.83	0.71	0.89	0.5	0.85	0.64
DB (mg/dL)	0.29	0.42	0.26	0.2	0.28	0.35
Fibrosis score (%)						
0	4	10.5	0	0	4	6.8
1	18	47.4	0	0	18	30.5
2	16	42.1	0	0	16	27.1
3	0	0	18	85.7	18	30.5
4	0	0	3	14.3	3	5.1

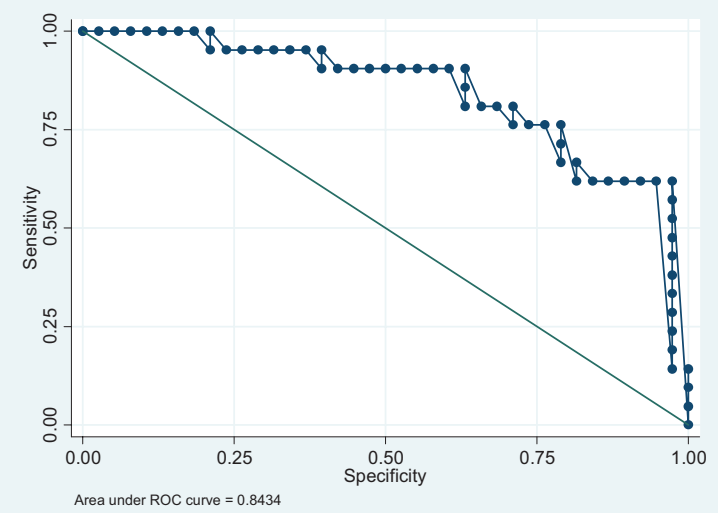

Figure 1. The ROC curve
The area under the curve was 0.84, CI 95% [0.73; 0.95], standard error was 0.056.

Table 2. Concordance and discordance between APRI score and liver biopsy when a cut off of 0.7515 was used for the APRI score.

	Fibrosis		Total
	F0-F2	F3-F4	
APRI < 0.7515	24	2	26
APRI ≥ 0.7515	14	19	33
Total	**38**	**21**	**59**

should be indicated for chronic hepatitis C patients with significant fibrosis (F2-F4) because of the risk of evolution to cirrhosis and its associated complications[9-12]. However, liver biopsy is an invasive method, can be subject to error[3-5] and has serious complications such as bleeding, perforation, and even death[13-16].

Alternative methods for assessing liver fibrosis have a number of advantages over histology including low cost, noninvasive and the absence of contraindications such as thrombocytopenia or coagulopathy. APRI score is considered to be one of the simplest and least expensive alternatives.

The results obtained from our study show that, when using 0.75 as the cutoff point level, APRI score had a quite low accuracy for predicting histologic liver fibrosis in chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital (accuracy = 72.88%). The quite low accuracy in our study came from the high false positive (14/38 = 36.84%). Because AST level could elevate from many factors and most of patient's data was reviewed retrospectively, so we could not find the definite cause of elevated AST level in our study.

APRI score can be used as a screening test because of high sensitivity (90.48%) and high negative predictive value (92.31%). If chronic hepatitis C patient without sign of chronic liver disease refuse to perform liver biopsy, we can use APRI score instead of biopsy. If APRI score lower than 0.75, we can predict that the patient is less likely to have significant histologic liver fibrosis (chance < 10%), then the procedure can be delayed.

From the results of our study, we conclude that APRI score cannot be used for predicting histologic liver fibrosis in chronic hepatitis C patients at Phramongkutklao Hospital and Bhumibol Adulyadej Hospital because of low accuracy (72.88%), but we can use it as screening test for evaluating histologic liver fibrosis because of its high sensitivity and negative predictive value.

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