Alanine Aminotransferase/Aspartate Aminotransferase Ratio Reversal and Prolonged Prothrombin Time: As A Specific Indicator of Hepatic Cirrhosis in Chronic Hcv

Megahed Khalil MD., Mohamed Ahmad Elassal MD., Ramy Ahmad Samy MD., and Nesma Attia Fawzy Attia M.B.B.ch

Gastroenterology and Hepatology Unite Faculty of Medicine Benha University, Egypt.

Abstract: Both ALT/AST ratio reversal (AST/ALT>1) and prolonged prothrombin time are separately related to hepatic cirrhosis. Ratio reversal means that in normal individuals ALT is more than AST and thus ALT/AST> 1 but with development of cirrhosis AST becomes › ALT and so AST/ALT>1 or ALT/AST<1. This study was conducted with the idea that prolonged prothrombin time and reversed (AST/ALT >1) ratio together can prove a more specific indicator with a high positive predictive value for the detection of the advance of hepatic cirrhosis in patients of chronic cirrhotic liver due to HCV than either of the two alone. **Method:** This is a comparative cross sectional study. The data of hepatitis C patients was collected from the general medical ward and medical out patient department.. Patients who were alcoholic were excluded from the study as alcohol itself causes ALT/AST ratio reversal also we exclude patients with comorbid conditions who can have high AST values eg: hemolysis,myocardial infarction.
[Fawzy megahed Khalil, Mohamed ahmad elassal, Ramy ahmad samy, and Nesma Attia Fawzy Attia. **Alanine Aminotransferase/Aspartate Aminotransferase Ratio Reversal and Prolonged Prothrombin Time: As A Specific Indicator of Hepatic Cirrhosis in Chronic Hcv.** *N Y Sci J* 2016;9(3):15-18]. ISSN 1554-0200 (print); ISSN 2375-723X (online). http://www.sciencepub.net/newyork. 3. doi:10.7537/marsnys09031603.

Key Words: ALT/AST ratio reversal, Pro longed PT, Hepatic Cirrhosis.

1. Introduction

Liver cirrhosis is the final stage of various chronic liver diseases. The concept is essentially morphological, defined as a diffuse alteration of hepatic architecture by the presence of necrosis, fibrosis and regenerative nodules. These disorders conduct to intrahepatic vascular changes and to the reduction of functional mass. Finally, the consequences are the development of portal hypertension and the occurrence of liver failure. [(1)]

Detection of cirrhosis in patients of chronic liver disease is very important from therapeutic point of view. The gold standard for detection of hepatic cirrhosis is liver biopsy[(2)]

In normal individuals ALT value is higher than AST value and so their ratio ALT/AST is more than 1.Reverse ratio means that AST value becomes greater than ALT value and so AST/ALT greater than 1. [(3)]

The prothrombin time (PT) measures the clotting time from the activation of factor VII, through the formation of fibrin clot. This test measures the integrity of the extrinsic and common pathways of coagulation. It has normal range of 10-14 seconds in normal healthy individuals and is prolonged in patients of chronic liver disease. [(4)]

Accordingly, the present study evaluated the use of prothrombin time (PT) and the reversed (AST/ALT) ratio to emphasize their importance to detect the advance of cirrhosis in chronic HCV and compared these parameters in HCV patients with compensated liver and decompensated liver.

2. Material and Methods

Subjects: We enrolled in the study 60 patients with HCV cirrhosis, fulfilling all criteria detailed below. The 60 patients were divided into 2 groups:

Group I: Including patients with decompensated liver cirrhosis (30 patients).

Group II: Including patients with compensated liver cirrhosis (30 patients),

Apparatus: USG abdomen by a single ultrasonologist to see the hepatic features for cirrhosis. Prothrombin time was measured by one stage prothrombin time. The reagent used for this, supplies a source of tissue thromboplastin and calcium, which activates factor VII and is there sensitive to all extrinsic and common pathway factors. The data for this comparative cross sectional study was collected from the General medical ward of Benha teaching hospital.

Inclusion criteria

In this study we include cirrhotic patients due to HCV, the data will be collected from medical ward and clinical out patient department in Benha teaching hospital. Age of patients will be ranging from 40-60 years old.

Exclusion criteria:

In this study we exclude patients with co-morbid conditions who can have high AST values eg: hemolysis, myocardial infarction, we also exclude those who had been taking alcohol, as it can cause reversal of AST/ALT ratio.

Data Analysis: **Table (1): Showing distribution of *group I* and *group II* (decompensated and compensated cirrhosis) as regarding reversed ratio and PT prolongation.**

Variable	Group 1(30)		Group 2 (30)		Test	P value
	N	%	N	%		
Prolonged + reversed	22	73.3	0	0.0		0.001**
Prolonged only	3	10.0	0	0.0	FET=54.01	Significant
Reversed only	3	10.0	3	10.0		
Both negative	2	6.7	27	90.0		

Decompensated group compared to compensated group shows statistically significant prolongation of PT ratio + ratio reversal in the percentage of 73.3%, prolongation only in the percentage of 10.0%,ratio reversal in the percentage of 10.0% and both are negative in the percentage of 6.7%.

Results: According to this data the percentage sensitivity of decompensated group (the number of patients who have reversed ratio and prolonged prothrombin out of 30 patients) is approximately 73%, with a positive predictive value of 90.3%, P value of 0.001. This shows that there is a significant difference between decompensated and compensated groups as regarding reversed ratio and prolonged prothrombin, in other words in decompensated liver disease there is increased incidence of ratio reversal and prolonged prothrombin. Reversed ratio alone showing positive predictive value of 89.3% while prolonged ratio alone showing a positive predictive value of 100%.

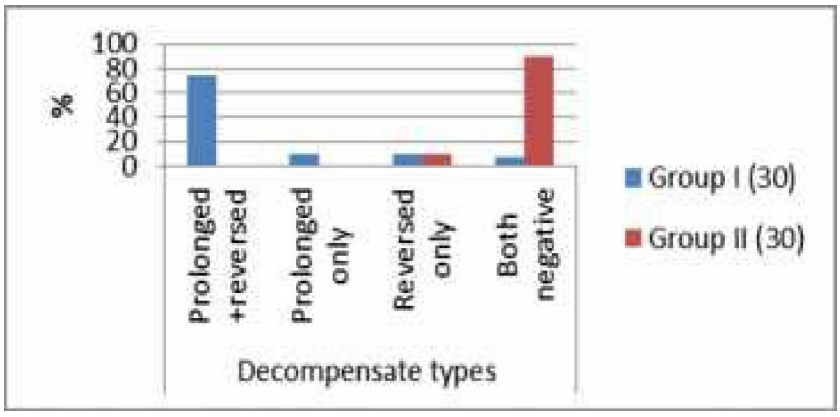

Fig. (1):Decompensated types

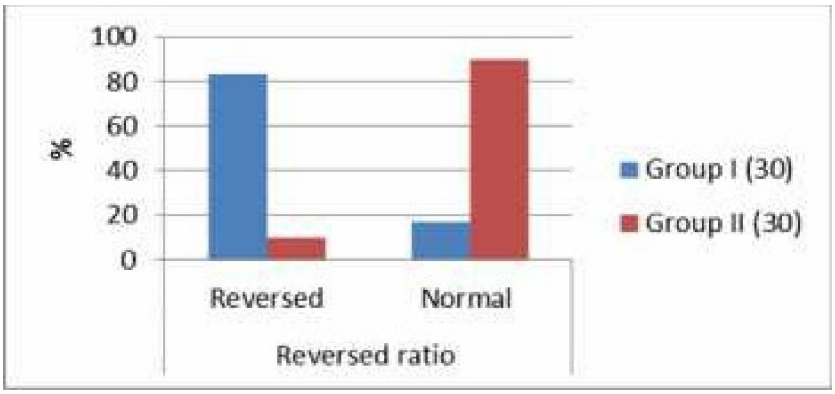

Fig.(2): Showing reversed ratio.

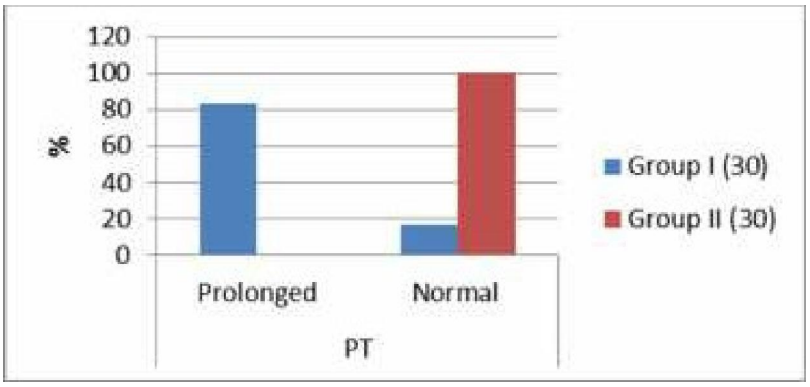

Fig. (3): Showing PT prolongation

4. Discussion:

Our study clarified that a value of > or = 1 for the ratio of aspartate aminotransferase to alanine aminotransferase (the AST/ALT ratio) has been shown to have a positive predictive value for the diagnosis of the advance of cirrhosis in patients with chronic hepatitis

We also found that the reversal of ratio is being used not only in diagnostic purposes but also for prognostic and treatment purposes as well.

This agrees with ***Botta et al.,*** as his studies showed that reversal of the AST/ALT ratio was reported in patients who progress from chronic hepatitis to liver cirrhosis and the AST/ALT ratio of more than 1 had a good predictive value for advanced fibrosis or cirrhosis. An AST/ALT ratio greater than 1.16 had 81.3% sensitivity and 55.3% specificity in identifying cirrhotic patients who died within 1 year of follow up.

Other studies disagree with ***Imperiale et al.,*** who showed that AST/ALT ratio of more than 1 doesn't discriminate well enough to be used as a surrogate for advanced liver disease.

We also found that there is low prevalence of prolonged PT in patients with compensated liver diseases and high prevelance in patients with decompensated liver disease.

This agrees with ***Minuk*** as he concluded that Serum albumin, bilirubin, and prothrombin time reflect hepatic function, but these values frequently remain normal in patients with compensated or early cirrhosis.

This not agrees with ***Malinchoc,*** his study showed that decreased levels of coagulation factors may prolong the PT, while decreased levels of anticoagulant factors may shorten the PT and both can occur in chronic liver disease, therefore PT prolongation may not be prominent in cirrhosis unlike changes in other liver function markers.

Conclusion:

Liver biopsy remains an important tool in the evaluation and management of liver disease. However it is invasive, can cause significant complications and clearly, needle liver biopsy is far from an ideal test. Even though it is an imperfect "gold standard", For this reason, the efforts to estimate the hepatic lesion stage through noninvasive methods are justified.

Noninvasive investigations, such as various biomarkers, fibrosis scoring panels and imaging techniques offer considerable promise in their ability to detect and to stage liver fibrosis.

References:

1. *Ampurade, (2002)*: Compensated liver cirrhosis gastroenterology and hepatology:643-645.
2. *Gunneson TG, Menon KV, Wiesner RH, et al. (2002):* Ultrasound-assisted percutaneous liver biopsy perfomed by a physician assistant. Am J Gastroenterol;97:1472-5.
3. *Gordon fd, (1998):* Ast/Alt ratio predicts cirrhosis in patients with chronic hepatitis c virus infection. Am j Gastroenterol,93(1):44-8.
4. *hokhar N, (2003):* Serum aminotransferase levels and platelet count as Predictive factor of fibrosis and cirrhosis in patients with chronic C infection.j pak Med Assoc,53 (3):101-4. hepatitis.
5. *Botta F, et al.(2003):* Validity and clinical utility of the aspartate aminotransferase-alanine aminotransferase ratio in assessing disease

severity and prognosis in patients with hepatitis C virus-related chronic liver disease. Arch Intern Med; 163: 218-224.

6. *Imperiale TF, Said AT, Cummings OW, Born LJ, (2000):* Need for validation of clinical decision aids: use of the AST/ALT ratio in predicting cirrhosis in chronic hepatitis C. Am J Gastroenterol; 95(9):2328 -32.
7. *Minuk GY, (2000):* Serum aspartate but not alanine aminotransferase levels help to predict the histological features of chronic hepatitis C viral infections in adults. Am J Gastroenterol; 95:1545-1550.
8. *Malinchoc, et al. (2001*): Amodel to predict survival in patients with end-stage liver disease. Hepatology, vol.33, no.2, pp.464-470.

2/24/2016