

Original Research Article

A study of alanine aminotransferase - aspartate aminotransferase as a marker of advanced alcoholic liver disease

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ABSTRACT

Background: Alcohol is one of the most common etiology for chronic liver disease. There are several enzymes which remain elevated in both excessive Alcohol consumption and Alcohol induced liver cirrhosis¹. But none is sensitive or specific. The ratio of Aspartate transaminase (AST) with Alanine transaminase (ALT) is one of the best marker for alcohol liver disease. Current study mainly compares the ratio of AST/ALT with both Alcoholic liver disease and excessive Alcohol consumption patients.

Methods: Observational, cross sectional study conducted on 50 patients diagnosed with alcoholic liver disease and 50 patients of alcohol withdrawal syndrome. Either admitted or seen on outpatient basis at Bangalore medical college and research institute and data was compared among the groups and appropriate statistical methods are applied.

Results: The mean ratio of AST/ALT ratio in 50 patients of alcoholic liver disease group was 3.45, whereas the mean ratio in 50 patient of alcohol withdrawal was about 99. When compared statistically this ratio was significant in chronic liver disease group.

Conclusions: Most of the patients with heavy alcohol drinking had high AST and alt levels. But ratio of AST/ALT levels was significant high and suggest chronic liver disease secondary to alcohol.

Keywords: Alcohol withdrawal syndrome, Chronic liver disease of Aspartate transaminase with Alanine transaminase

INTRODUCTION

Chronic liver disease remains a major cause of liver related mortality and morbidity in India and worldwide. Alcohol is one of the most common etiology. There are several enzymes which remain elevated in both excessive alcohol consumption and alcohol induced liver cirrhosis.¹ It would be valuable to get an accurate test to determine alcohol as etiology.

Serum markers like gamma glutamyl transferase, aspartate transferase, mean corpuscular volume and carbohydrate deficient transferrin elevated in alcoholic are not sensitive and specific marker.² The ratio of

Aspartate transaminase (AST) with Alanine transaminase (ALT) is one of the best marker for Alcohol liver disease. However, many patients with excessive alcohol consumption with frequent admission for alcohol intoxication and withdrawal related features will show both AST and ALT elevated. There are many additional factors which indicate AST/ALT elevated like severity of the disease and deficiency of pyridoxal 5 phosphate which act as cofactor for ALT.³

This study mainly compares the ratio of AST/ALT with both alcoholic liver disease and excessive alcohol consumption patients.

METHODS

A prospective cross-sectional study was conducted on 50 patients of diagnosed alcoholic chronic liver disease and 50 patients of alcoholic withdrawal diagnosed based on DSM 4 criteria for alcohol dependence. patients were taken from both admitted and outpatient basis the study was approved by ethics committee and individual participating in the study were given informed consent. Irrespective of the sex of the patient, all those aged more than 18 years were included in the study, subjects who didn't give valid informed consent were excluded. All patients underwent relevant investigation like liver function test, complete blood count, renal function test, serum electrolytes, prothrombin time and ultrasound abdomen was done.

Inclusion criteria

Age >18 years, patients with diagnosed alcohol cirrhotic liver disease, patient undergoing treatment for alcohol intoxication and alcohol withdrawal diagnosed by DSM 5.

Exclusion criteria

Age <18 years, Uncooperative not willing for valid consent.

Statistical analysis

Data was analysed using simple, appropriate statistical methods and represented categorically in tables and figures. SPSS VERSION 20 was used.

RESULTS

As is evident from Table 1, the chronic liver disease had higher AST, but not ALT, than the alcohol dependent group patients. The mean AST/ALT was 3.45 in chronic liver disease with maximum value of 13.6 and the minimum value was 0.94. Similarly, the mean value of AST/ALT was 0.99 with maximum value of 3.10 and minimum value was 0.57. when the ratio was compared with independent sample t test with p value was 0.00 which is statically significant indicating ratio of AST/ALT was significant ally high in chronic liver disease group than alcohol dependent group.

As is evident from Table 2, the chronic liver disease had lower total protein level, with a mean value of 5.87, With maximum value of 7.8 and the minimum value was 3.9. Similarly, the mean value of total protein in alcohol dependent group was 6.35 with maximum value of 7.5 and minimum value was 4.5. When the ratio was compared with independent sample t test, which was statistically significant with (p <0.005) indicating mean total protein was significant ally high in chronic liver disease group than alcohol dependent group.

Table 1: Comparison of the mean AST/ALT ratio using independent sample t test.

	Minimum	Maximum	Mean	Std. Deviation	Mean difference	p value
Alcohol dependent	0.57	3.10	0.99	0.36	-2.46	0.00*
Chronic liver disease	0.94	13.60	3.45	2.18		

Table 2: Comparison of the mean total protein levels using independent sample t test.

	Minimum	Maximum	Mean	Std. Deviation	Mean difference	p value
Alcohol dependent	4.50	7.90	6.35	0.75	0.47	0.005*
Chronic liver disease	3.90	7.80	5.87	0.88		

Table 3: Comparison of the mean INR using independent sample t test.

	Minimum	Maximum	Mean	Std. Deviation	Mean difference	p value
Alcohol dependent	0.50	1.70	1.12	0.22	-0.593	0.00*
Chronic liver disease	0.80	3.56	1.71	0.58		

Similarly, Table 3 when the two groups were compared with INR, chronic liver disease patient had a higher value when compared with alcohol dependent group this was statistically significant with a (p <0.001). With a maximum and minimum value of 1.70 and 0.50 in alcohol dependent group. Similarly, INR maximum value of 3.56 and minimum of 0.80 was seen in chronic liver disease group.

DISCUSSION

Data collected from the patients suggest high AST/ALT ratio was well-recognized in alcoholic liver disease patients, in fact, predominantly in patients with advanced alcoholic liver disease had high serum AST/ALT.

The practical guidelines for alcoholic liver disease published by the American College of Gastroenterology in 1998 (McCullough and O'Connor, 1998). Has highlighted about the high AST/ALT ratio for alcoholic liver and also mentioned about the diagnostic significance of the same in advanced alcoholic liver disease. The possibility of the high AST/ALT ratio in alcoholic liver disease have been reported by many authors, depletion of pyridoxal 5-phosphate in livers of chronic alcoholic alcoholics, reduced activity of liver ALT in alcoholic, other mechanism proposed is mitochondrial damage leading to an increase in serum activity of mitochondrial aspartate in patients with high alcohol consumption.^{4,6}

Similar studies conducted by H. Nyblom et al, conducted in the department of internal medicine, Sahlgrenska university hospital, Sweden. Retrospective study comprising of 3 groups with 313 patients with alcohol dependence, 78 patients with alcohol abuse and 48 alcohol liver cirrhosis. Comparison was made with respect to AST/ALT ratio between groups. High AST/ALT ratio suggests advanced alcoholic liver disease.⁷

An increased AST/ALT ratio in patients with increased serum aminotransferase activity has also been associated with the development of cirrhosis in Nonalcoholic Steatohepatitis, even though a still higher AST/ALT ratio was observed in a group of non-biopsied patients with alcoholic liver disease.⁸

One study of AST/ALT conducted by Singh DK et al, at Pant hospital New Delhi, 60 patients histologically diagnosed with Alcoholic steatohepatitis (ASH) and non-alcoholic steatohepatitis (NASH) they found high serum bilirubin, AST/ALT >1 and many others are predictors of higher stage of fibrosis and favors a diagnosis of ASH.⁹

Furthermore, a high AST/ALT ratio in patients with increased serum aminotransferases has been reported in chronic viral hepatitis Sheth et al, concluded in their study.¹⁰

CONCLUSION

To conclude, most patients with high alcohol consumption do not have an AST/ALT ratio above 1. A high AST/ALT ratio is suggestive of advanced alcoholic liver disease.

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