

*Case Study*

# Aspartate Aminotransaminase, Alanine Aminotransaminase activities and AST/ALT ratio as Markers for Liver disease among Tonsillitis Patients in Khartoum state

Afra Musa Ahmed<sup>1</sup> and Mariam Abbas Ibrahim<sup>2\*</sup>

<sup>1</sup>Department of Clinical Chemistry, Faculty of Medical Laboratory Sciences, Al- Neelain University, Khartoum, Sudan.

<sup>2</sup>Department of Clinical Chemistry, College of Medical Laboratory Science, Sudan University of Science and Technology, Khartoum, Sudan.

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## Abstract

**Background:** Some cases of Tonsillitis may progressively lead to multiple organ failure including fulminant liver failure which following acute tonsillitis. The aim of this study was to assess the activity of AST, ALT and calculate AST/ALT ratio as markers for liver disease among Sudanese Patients with Tonsillitis. **Methods:** a case-control study was conducted during the period from August to October 2017, fifty samples from diagnosed patients with tonsillitis (admitted to Ear-Nose and Throat hospital in Khartoum state) as cases and twenty five samples from healthy individuals as controls, the activity of AST, ALT and were measured by spectopotometric method, using biosystem reagents, then AST/ALT ratio was calculated. **Results:** There was a highly significant increased in AST activity in tonsillitis patients with p-value = 0.0001 and The (Mean±SD) was (27.36 ± 3.02) and (13.80 ± 5.39 U/L) in tonsillitis patients and healthy individuals respectively, also There was insignificant variation in ALT activity, tonsillitis and control group with p-value= 0.060 and the (Mean±SD) was (12.98±2.37U/L) and (11.44±4.64)U/L in tonsillitis patients and healthy individuals respectively, and also there was significant increased of AST/ALT ratio in tonsillitis patients, when compared to healthy individual, with p-value = 0.0001 and The (Mean±SD) of AST/ALT ratio in tonsillitis patient was (2.18±0.44), and it is was (1.25±0.211) of healthy individual, also there was no correlation between activity of AST, ALT and ages with (R= -0.198, p-value= 0.168, R= -0.057and P-value=0.692) of AST and ALT respectively. **Conclusion:** the activity of AST and AST/ALT ratio increased in tonsillitis patients.

**Keywords:** Tonsillitis, liver diseases, AST, ALT, Activity, AST/ALT ratio.

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## INTRODUCTION

The tonsils serve immune acquisition and immune defense by antigen presentation, which is why they contain T-lymphocytes, macrophages and germinal centers of B-lymphocytes (Westermann, 2010). They are the first and easiest to reach station of the mucosa

associated lymphoid tissue system in humans (Brandtzaeg, 1996; Nave *et al.*, 2001; Vestnik, 2012). Pyogenic (that is bacterial) tonsillitis may often be observed and it is known to account for a large number of pre-clinical consultations. In severe cases, it may require antibiotic treatment or even hospitalization and a prompt clinical response will often be noted (Bird *et al.*, 2014; Pratt and Kaplan, 1999). Aminotransferase levels are sensitive indicators of liver-cell injury and are helpful in

recognizing hepatocellular diseases such as hepatitis (Piton *et al.*, 1998). Both aminotransferases are normally present in serum at low levels, usually less than 30 to 40 U per liter. The normal range varies widely among laboratories. Bacterial sepsis can cause liver damage by various mechanisms (Jansen *et al.*, 1995; Ursina *et al.*, 2016). Many studies conducted among tonsillitis subjects as its recurrence could be effective in human health state in other ways or organs. One study concerned about the causes of tonsillitis as it involved a case study had tonsillitis and acute liver failure then occurred (David, 2007).

Another study also included a case study with tonsillitis which caused by Epstein-Barr virus (EBV) and accompanied with liver disease (Amir *et al.*, 2012). Another study conducted after the observation that in primary care settings in UK abnormal liver enzymes accompanied with bacterial sepsis. Therefore the aim of this study was to assess the activity of AST, ALT and AST/ALT ratio as an early indicator for liver diseases among Sudanese patients with tonsillitis.

## **MATERIALS AND METHODS**

### **Study design**

This was a Case control study.

### **Study Area and Period**

Ear, nose and throat hospital, Khartoum state, during the period from August to October 2017.

### **Study Population**

Fifty Patients with recurrent tonsillitis (chronic and acute tonsillitis) as a case and twenty five normal individuals as control, gender and age (7-35 years).

### **Inclusion criteria**

Tonsillitis patients.

### **Exclusion criteria**

patients diagnosed with disorders rather than tonsillitis, such as renal diseases, heart diseases, leukemia, malaria and known subjects with liver diseases were excluded.

### **Ethical Consideration**

The study was approved by ethical committee of medical laboratory science Alneelain University. Subjects involved in this study were informed by this study and its importance.

## **Data Collection**

Data was collected by using a questionnaire.

## **Sampling**

Blood samples were collected and serum was separated.

## **Method**

The activity of AST and ALT were measured by spectopotometric method, using biosystem reagents. Then AST/ALT ratio was calculated.

## **Quality Control**

Pathological and Normal control sera were measured, to assure accuracy and precision of results.

## **Data Analysis**

Statistical package for the social science computer program (SPSS) was used.

## **RESULTS**

Statistical analysis showed a significant increased in activity of AST, AST/ALT ratio among tonsillitis patients when compared to healthy individuals (table 1), also statistical analysis showed no correlation between activity of AST, ALT and AST/ALT ratio with ages among tonsillitis patients, (figure 1, 2 and 3) respectively, also statistical analysis showed positive correlation between AST/ALT ratio and activity of AST (figure 4), and negative correlation between AST/ALT ratio and activity of ALT (figure 5).

## **DISCUSSION**

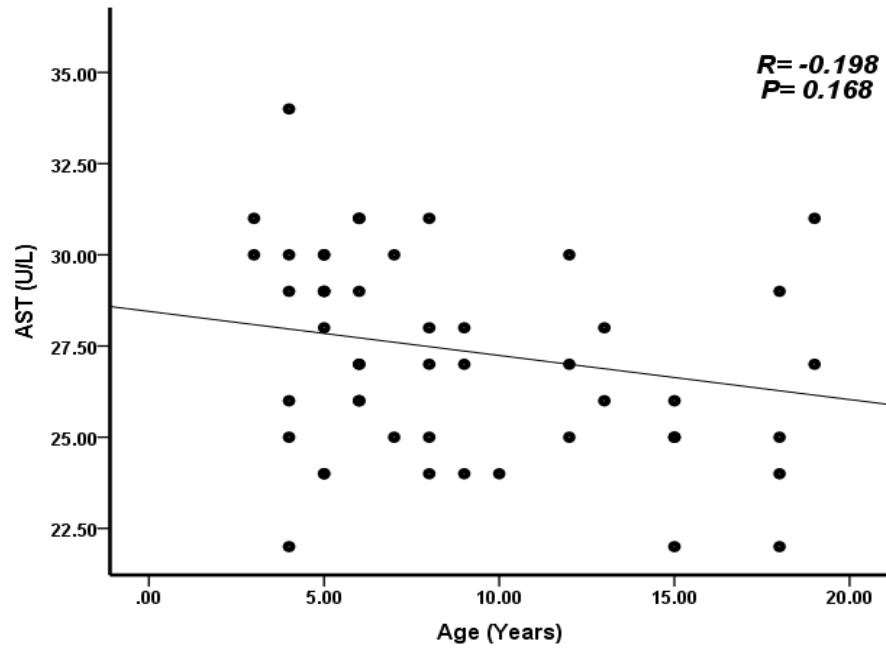
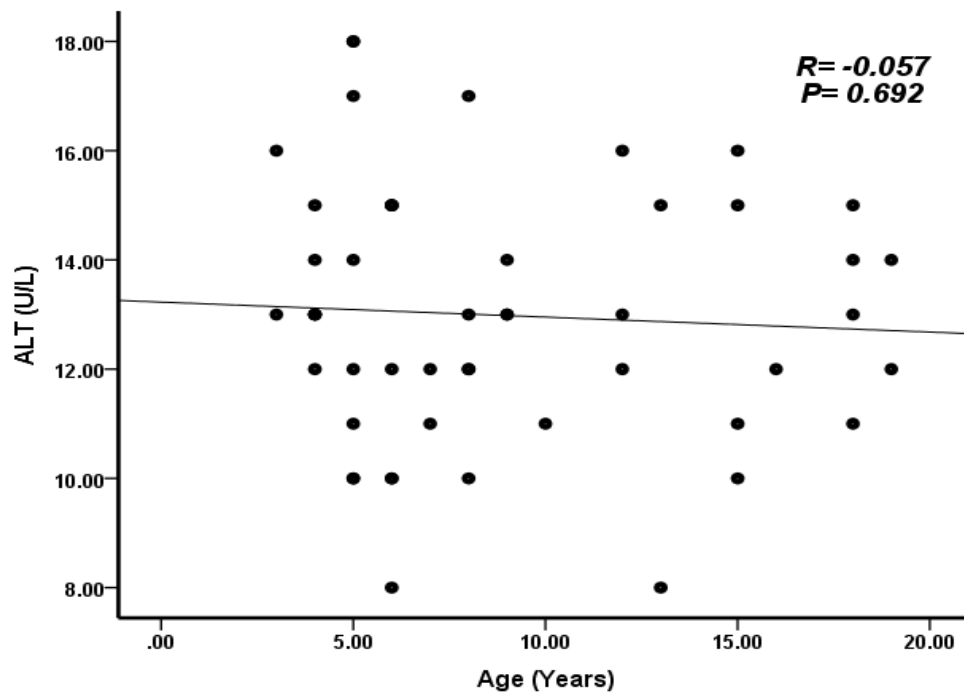
In the current study, activity of AST and AST/ALT ratio showed significant increase in tonsillitis patients when compared to healthy individuals with p-value (0.0001), this finding was in agreement with many studies which reported that, Bacterial sepsis and tonsillitis can cause liver damage by various mechanisms and increase the level of liver enzymes (Shield *et al.*, 2002; Jansen *et al.*, 1995). Many studies conducted among tonsillitis subjects as its recurrence could be effective on human health state in other ways or organs.

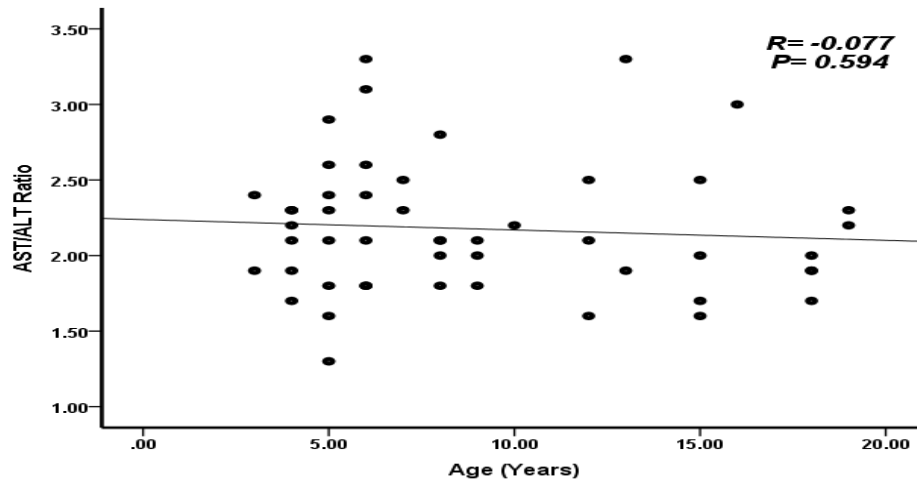
One study concerned about causes of tonsillitis as it involved a case study had tonsillitis and acute liver failure then occurred (Ursina *et al.*, 2016). The results of this study showed insignificant variation in ALT activity among patients with tonsillitis and control group. No studies conducted about tonsillitis subjects and ALT activity

**Table 1.** The activity of AST, ALT and AST/ALT ratio in case versus control

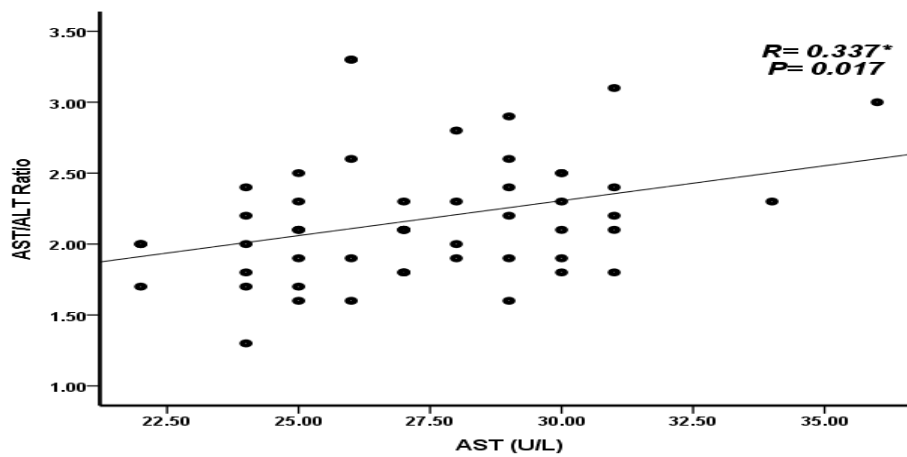
Parameters	Case (Mean $\pm$ SD)	Control (Mean $\pm$ SD)	P-value
AST (U/L)	27.36 $\pm$ 3.02	13.80 $\pm$ 5.39	0.0001
ALT (U/L)	12.98 $\pm$ 2.37	11.44 $\pm$ 4.64	0.060
AST/ALT Ratio	2.18 $\pm$ 0.44	1.25 $\pm$ 0.21	0.0001

P-value less than 0.05 considered significant

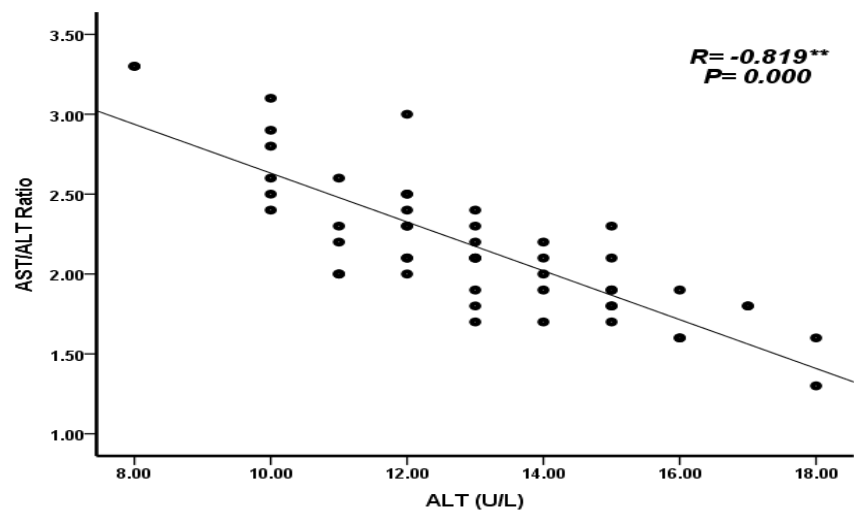
**Figure 1.** Correlation between AST activity and ages**Figure 2.** Correlation between ALT activity and ages



**Figure 4.** Correlation between AST/ALT ratio and AST activity



**Figure 3.** Correlation between AST/ALT ratio and ages



**Figure 5.** Correlation between AST/ALT ratio and ALT activity

P-value less than 0.05 consider as significant

variation. Also, there was no correlation between the activity of AST, ALT and ages.

## CONCLUSIONS

Activity of AST and AST/ALT ratio increased in tonsillitis patients, and there is no correlation between activity of AST, ALT and AST/ALT ratio and ages.

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