

Association Between Serum Uric Acid and Nonalcoholic Fatty Liver Disease: A Case Control Study

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ABSTRACT

Background: Nonalcoholic fatty liver disease (NAFLD) is one of the cardinal diseases of liver with wide spectrum of clinical features and its own complications in long run ranging from impaired glucose tolerance to frank liver cirrhosis

Objective: To determine the relationship between serum uric acid level and NAFLD

Materials and Methods: This case control study was conducted at MMC General Hospital Peshawar from January 2022 to June 2022. The total sample size is 100. In this study we included 50 cases and 50 controls. Cases were patients who were diagnosed with fatty liver disease on ultrasound and controls were normal without having fatty liver disease. Data entry and analysis was done with SPSS version-25. Quantitative variables were presented with mean±SD and qualitative variables with frequency and percentage. Box plot was made to compare uric acid level among cases and controls. Uric acid level (Normal/Raised) was compared among cases and controls with Chi Square test with p value less than 0.05 as significant.

Results: Among cases 35(70%) patients and among controls 20(40%) participants were had raised uric acid. Frequency of raised uric acid was significantly higher among cases as that of controls. i.e. 70% vs. 40%, p-value=0.003 Odds ratio of 3.5 shows that risk of raised uric acid is 3.5 times higher for cases as that of controls.

Conclusion: There is an association between NAFLD and high uric acid level indicating the need for regularly screening such patients.

Keywords: NAFLD, Cirrhosis

INTRODUCTION

Non alcoholic fatty liver (NAFLD) is the cornerstone in terms of illness of hepatology diseases and has evolved into one of the common reason for all experts to think over because of its devastating complications.¹ For most of the people it is accumulation of excessive fat in the liver. In the long run it does interfere with blood glucose level causing diabetes mellitus. In addition there is a risk of cardiovascular disease, obesity and metabolic syndrome.²

The exact cause of NAFLD is not known but it is believed to be the disease of overweight individuals not cautious about their life style and consuming high fat diet.³ The prevalence of NAFLD in Pakistan is quite high and it is of the commonest findings on Ultrasound Abdomen done as a screening investigation for other indications referred by physicians. Most of the patients are asymptomatic initially. It is when end stage liver disease ensues that the patient starts experiencing symptoms of liver cirrhosis.⁴ Some hepatologists call it as burn out cirrhosis as well.

NAFLD has been the centre of attention for all clinicians from all specialities in terms of what should be the most appropriate treatment. Some of them advocate low fat diet and exercise as main stay of treatment. Metformin has also been proved to be beneficial according to some studies but for end stage liver disease liver transplantation is the cure.⁴

There has been association reported between hyperuricemia and helicobacter pylori in patients in different parts of the world but it's still unclear in our setup whether the fatty liver disease can definitely be attributed to increased uric acid level and vice versa.⁵ Because of the magnitude of the problem is high and there are quite large number of fatty liver patients in our population investigation of this correlation is of tremendous importance

MATERIALS & METHODS

This case control study was conducted at MMC General Hospital Peshawar from January 2022 to June 2022. The total sample size was 100. The sampling technique was non probability convenience sampling. In this study we included 50 cases and 50 controls. Well informed consent was obtained and rationale was explained in

simple words to all the study participants with choice to withdraw from the study. Cases were patients who were diagnosed with fatty liver disease on ultrasound and controls were normal without having fatty liver disease.

Sample Size: Sample size of 100 patients (50 Cases and 50 Controls) was calculated with 95% power of study, 3% level of significance and by taking expected percentage of high uric acid among cases and controls as 56% and 22% respectively. Following formula was used for sample size calculation from WHO calculator of Sample Size determination for Health Studies.

Abbasi S, Haleem N, Jadoon S, Farooq A. Association of Non-Alcoholic Fatty Liver Disease With Serum Uric Acid. Journal of Ayub Medical College, Abbottabad: JAMC. 2019 Jan 1;31(1):64-6.

Data Analysis: Data entry and analysis was done with SPSS version-25. Quantitative variables were presented with mean±SD and qualitative variables with frequency and percentage. Box plot was made to compare uric acid level among cases and controls. Uric acid level (Normal/Raised) was compared among cases and controls with Chi Square test. Odds ratio was calculated to see the risk raised uric acid among fatty liver disease patients as that of controls. Odds ratio >1 considered significant risk. p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Patients Characteristics among Cases and Controls

	Cases (n=50)	Controls (n=50)
Age (Mean±SD)	41.10±12.64	40.76±11.89
Gender (Male/Female)	25/25 [50%/50%]	21/29 [42%/58%]
Ultrasound Findings		
Fatty Liver Disease	50(100%)	0(0%)
Normal	00(0%)	50(100%)
Uric Acid Level	6.83±1.73	5.87±1.70

In this study we included 50 cases and 50 controls. Cases were patients who were diagnosed with fatty liver disease on ultrasound and controls were normal without having fatty liver disease. Mean age of cases and controls was 45.54±10.76 and

39.90±14.38. Among cases 25(50%) patients were male and 25(50%) were female while among controls 21(42%) were male and 29(58%) were female. (Table-1)

Table-2: Pylori among Cases and Controls

	Cases	Controls	Total
Raised	35(70%)	20(40%)	55
Normal	15(30%)	30(60%)	45
Total	50	50	100
Mean±SD	6.83±1.73	5.87±1.70	
Odds Ratio	3.5 (1.529-8.012)		
p-value	0.003		

Among cases 35(70%) patients and among controls 20(40%) participants were had raised uric acid. Frequency of raised uric acid was significantly higher among cases as that of controls. i.e. 70% vs. 40%, p-value=0.003 Odds ratio of 3.5 shows that risk of raised uric acid is 3.5 times higher for cases as that of controls. (Table-2)

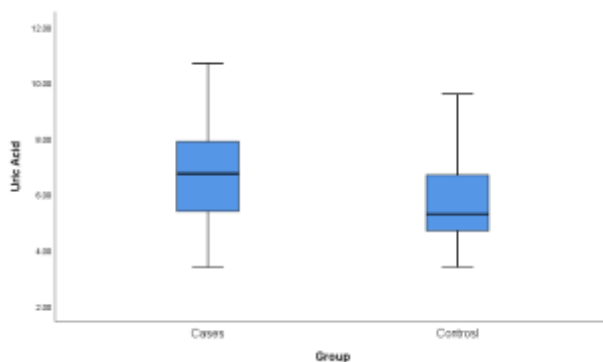


Figure-1: Box plot for Uric acid level among cases and controls

DISCUSSIONS

The results of this study can be compared with previously published relevant ones. One of them was conducted by Li et al.³⁸ in 2009 which came to a conclusion that high serum uric acid levels were consistently common in patients diagnosed as fatty liver.⁶ The study included more than 800 participants further adding credence to our findings. In our study mean age of cases and controls was 45.54±10.76 and 39.90±14.38. Among cases 25(50%) patients were male and 25(50%) were female while among controls 21(42%) were male and 29(58%) were female. Among cases 35(70%) patients and among controls 20(40%) participants were had raised uric acid. Frequency of raised uric acid was significantly higher among cases as that of controls. i.e. 70% vs. 40%, p-value=0.003 Odds ratio of 3.5 shows that risk of raised uric acid is 3.5 times higher for cases as that of controls.

A cross sectional study, with over 10,000 patients with a prime objective of determining the relationship between high

serum uric acid levels and NAFLD diagnosed by Ultrasound, there was a significant association between two of them. In fact this association was even more significant after removing and adjustment of cofounding factors that were present in the study.⁷

Another study done at Hepatology Unit, Yantai Qishan Hospital, between April 2012 to Dec 2018 on 583 patients meeting the inclusion criteria were enrolled into two groups, 227 patients were included in the non-NAFLD group and 356 patients were included in the NAFLD group. It came to a conclusion that high uric acid level was significantly associated with fatty liver disease in type 2 diabetics.⁶

Since our study was at a single centre, our findings can be further validated by doing multi centres studies throughout the Pakistan further validating our findings.⁸

CONCLUSION

Our study found a significant association between NAFLD and high serum uric acid level.⁹ It is essential to screen such patients on time to prevent the complication such as cirrhosis and liver failure in the long run.¹⁰

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