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Level of Serum Uric Acid in Patients with Cirrhosis of Liver.

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ABSTRACT… Objectives: To determine the serum uric acid levels among the patients of liver cirrhosis. **Study Design:** Cross Sectional, Descriptive study. **Setting:** Department of Medicine, Indus Medical College, Tando Muhammad Khan. **Period:** 6 months (23 April 2019 to 23 October 2019). **Material & Methods:** Patients of liver cirrhosis attending the medical OPD or admitted in the Medicine ward, meeting selection criteria included in this study. Any diseases other than liver disease, disturbing uric acid levels were excluded from the study. Other exclusion criteria were type 2 and 1 Diabetes mellitus, drugs altering serum uric acid levels, gout, pregnancy and chronic kidney disease. **Results:** In this study, the causes of liver cirrhosis revealed were hepatitis B 5 (5.15%), hepatitis C 44(45.36%), both hepatitis B and C 4(4.12%), NAFLD 34 (34.05%) and alcohol 10(10.31%) respectively. Mean of the serum uric acid (mg/dl) compared in liver cirrhosis due to different etiologies Mean ±SD of uric acid levels due to hepatitis B, hepatitis C, both hepatitis B and C, NAFLD and alcohol were 2.66±1.4, 2.22±0.3, 2.34±1.0, 7.70±0.9 and 6.69±2.0 respectively; theses all compared by one way ANOVA, (p value <0.01) with df (degree of freedom) 4. Serum uric acid levels are raised among the NAFLD patients in this study that is warning factor for cardiovascular disease. In this research hypouricemia has been observed among the patients of liver cirrhosis due to hepatitis B, hepatitis C, both hepatitis B and C, NAFLD and alcohol as 5.15%, 45.36%, 4.12 %, 2.06% and 8.25% respectively while hyperuricemia has been observed among the cirrhotic patients due to NAFLD. **Conclusion:** Serum uric acid levels are raised among the liver cirrhosis patients with NAFLD while decreased among cirrhotic patients with viral hepatitis. Further the area is open for further research to determine the underlying mechanisms.

Key words: Hepatitis B, Hepatitis C, Liver Cirrhosis, NAFALD, Uric Acid.

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INTRODUCTION

Uric acid is formed as the end-product after the metabolism of purine nucleotides. It accounts about 60 % of the antioxidant capability in plasma.[1] Cirrhosis is a grave and irreparable disease and fundamental cause of death and also ill health globally. It develops as the result of worsening of chronic liver disease (CLD). It is characterized by fibrosis and generation of regenerative nodules in hepatic tissue, leading to advanced loss of normal hepatic architecture as well as liver functions. Cirrhosis has been identified as the most leading cause of mortality amongst the Pakistan population and also the frequent reason for admission in the hospitals and visiting outpatient department.[2] Liver cirrhosis remains in a silent stage until decompensating. Decompenstation is determined by ascites, bleeding from esophageal varices or hepatic encephalopathy. There are chances of evolving to hepatocellular carcinoma among the almost 15% of cirrhotic patients.[3] Hepatitis C virus (HCV), hepatitis B virus (HBV) and hepatocellular carcinoma has been observed as the key reasons for severe liver disease and also the cirrhosis-related end-stage liver disease. According to World Health Organization (WHO) estimations, 350 million individuals are suffering from hepatitis B as well as 170 million patients has been found infected with HCV at global level.[4]

Setiawan et al has shown in his study about non-alcoholic fatty liver disease (NAFLD) as the highest source of cirrhosis in the entire cohort (29.3%).[5] Prevalence of NAFLD among Sindhies was 35.3%

according to a study conducted by Shah AS and his coworkers.[6] Independent of their etiologies, all chronic liver disease patients eventually lead to hepatic cirrhosis, that is the major health concern throughout world.[7] There are adequate suggestions that raised serum uric acid has been allied with cardiovascular complications that may lead to death.[8] It has been hypothesized that levels of the serum uric acid may be amplified in liver cirrhosis; with this background the current study was piloted to assess the serum uric acid levels among liver cirrhosis patients.

OBJECTIVE

To determine the serum uric acid levels among the patients of liver cirrhosis.

MATERIAL & METHODS

This cross sectional study was conducted. Medicine Department of Indus Medical College, Tando Muhammad Khan for 6 months (23 April 2019 to 23 October 2019).

The Sampling technique was nonprobability purposive sampling.

Inclusion Criteria

Patients of liver cirrhosis attending the medical OPD or admitted in the Medicine ward included in the study.

Exclusion Criteria

Any diseases other than liver disease, disturbing uric acid levels were excluded from the study. Other exclusion criteria were type 2 and 1 Diabetes mellitus, drugs altering serum uric acid levels, gout, pregnancy and chronic kidney disease.

After thorough history, taking informed consent, explaining the purpose of study, confirmation of liver cirrhosis on abdominal ultrasound, all the patients meeting the selection criteria were recruited in the study. After all aseptic measures their i/v blood samples were taken to determine serum uric acid levels. Hyperuricemia considered when serum uric acid levels were found > 7 mg/dl among male and > 6.0 mg/dl in female individuals.

RESULTS

Mean age in this study is 44.56 years ±5.7 in males and 44.50 years ±6.0 in females. Mean serum uric acid in mg/dl among males is 5.52±2.8 and among females is 3.71±2.4 (p value 0.009). Table-I

In this study, the causes of liver cirrhosis revealed were hepatitis B 5 (5.15%), hepatitis C 44(45.36%), both hepatitis B and C 4(4.12%), NAFLD 34 (34.05%) and alcohol 10(10.31%) respectively. Figure-1

Mean of the serum uric acid (mg/dl) compared in liver cirrhosis due to different etiologies Mean ±SD of uric acid levels due to hepatitis B, hepatitis C, both hepatitis B and C, NAFLD and alcohol were 2.66±1.4, 2.22±0.3, 2.34±1.0, 7.70±0.9 and 6.69±2.0 respectively; theses all compared by one way ANOVA, (p value <0.01) with df (degree of freedom) 4. Serum uric acid levels are raised among the NAFLD patients in this study that is warning factor for cardiovascular disease. Table-II

In this research hypouricemia has been observed among the patients of liver cirrhosis due to hepatitis B, hepatitis C, both hepatitis B and C, NAFLD and alcohol as 5.15%, 45.36%, 4.12 %, 2.06% and 8.25% respectively while hyperuricemia has been observed among the cirrhotic patients due to NAFLD. Figure-2

DISCUSSION

Different uric acid levels has been observed by diverse research studies among the patients of liver cirrhosis. Among the CLD patients, raised serum uric acid levels are found to be linked to more severe disease condition.[9] Nevertheless, there are limited numbers of studies showing the trends of uric acid levels in liver cirrhosis due to different etiologic factors. Most common cause of liver cirrhosis in this study (n=97) is hepatitis C, that is similar to various studies that also reveal hepatitis C as the extreme frequent basis of liver cirrhosis amongst the developing nations[10,11,12], and this is probable that more than 185 million publics exist anti-HCV seropositive generally.[12]

	Gender	N	Mean	Std. Deviation	Std. Error Mean	P-Value
Age	Male	49	44.69	5.702	.815	0.376
	Female	48	44.50	6.049	.873	
Serum uric acid (mg/dl)	Male	49	5.5282	2.85277	.40754	0.009
	Female	48	3.7159	2.40704	.34743	

Table-I. Descriptive statistics of study population (n=97)

Serum Uric Acid (mg/dl)	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		P-Value
					Lower Bound	Upper Bound	
Hepatitis B	5	2.6600	1.40996	.63056	.9093	4.4107	
Hepatitis C	44	2.2235	.39179	.05906	2.1043	2.3426	
Both hepatitis B and C	4	2.3400	1.04970	.52485	.6697	4.0103	0.000**
NAFLD	34	7.7003	.95353	.16353	7.3676	8.0330	
Alcohol	10	6.6940	2.01141	.63606	5.2551	8.1329	
Total	97	4.6314	2.78124	.28239	4.0708	5.1919	

Table-II. Mean of the serum uric acid levels (mg/dl) among patients of liver cirrhosis (n=97)
P value <0.01 with df =4
****highly significant**

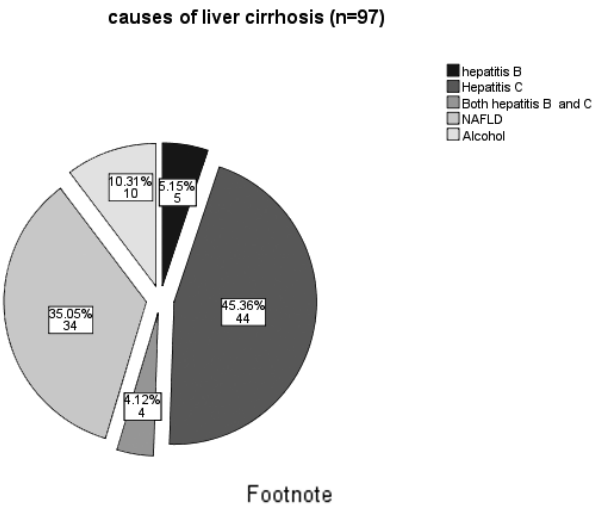


Figure-1. Frequency of causes of liver cirrhosis (n= 97)

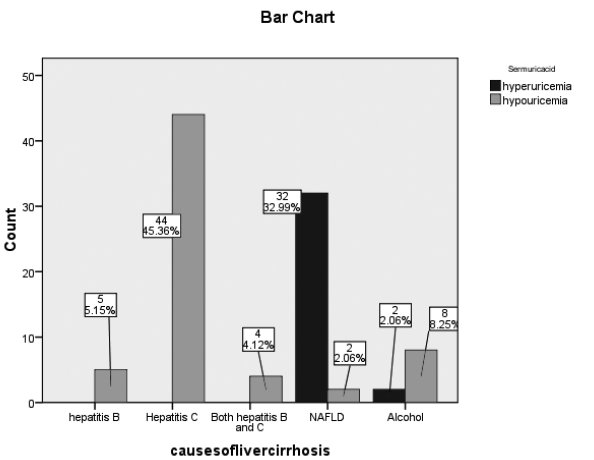


Figure-2. Frequency of hyperuricemia and hypouricemia among the different cases of liv er cirrhosis

Next to the hepatitis C, NAFLD has been found to be the utmost widespread ground for advancement towards liver cirrhosis. NAFLD leads to steatohepatitis and ultimately hepatocellular carcinoma.[13] This finding is in contrast to other Pakistani studies that reveal NAFLD most prevalent in European countries.

Blood uric acid was detected in 223 patients with hepatitis B cirrhosis and 106 normal controls by some researcher and results showed that the level of serum uric acid in patients with cirrhosis were significantly lower than normal.[14] Similarly, in this study also, decreased uric acid levels has been revealed in patients with cirrhosis due to hepatitis B as well as in the patients suffering from both hepatitis B and C. In this study, uric acid levels are raised among the patients of NAFLD, this finding is similar to research studies by Millic S et al.[9], Khosla UM, et al.[15] and Sertoglu E et al.[16]

who revealed that hyperuricemia is a common finding in patients with NAFLD. Mean serum uric acid levels observed in this study are 7.7 mg/dl. A higher mean ±standard deviation of serum uric acid level observed among patients with NAFLD (7.04±1.61) in one of the research study similarly. Elevated serum uric acid levels intensely reflect and might lead to the oxidative stress, insulin resistance as well as the progression to metabolic syndrome and these all are well known risk factors for poor prognosis of CLD patients.[17]

CONCLUSION

Serum uric acid levels are raised among the liver cirrhosis patients with NAFLD while decreased among cirrhotic patients with viral hepatitis. Further, the area is open for further research to determine the underlying mechanisms.

REFRENCES

1. Mikami T, Sorimachi M. **Uric acid contributes greatly to hepatic antioxidant capacity besides protein.** Physiological research. 2017 Nov 1; 66(6):1001-7.

2. Almani SA, Memon AS, Memon AI, Shah I, Rahpoto Q, Solangi R. **Cirrhosis of liver: Etiological factors, complications and prognosis.** J Liaquat Uni Med Health Sci. 2008 May; 7(2):61-.

3. Nilsson E, Anderson H, Sargenti K, Lindgren S, Prytz H. **Clinical course and mortality by etiology of liver cirrhosis in Sweden: A population based, long term follow-up study of 1317 patients. Alimentary pharmacology & therapeutics.** 2019 Jun; 49(11):1421-30.

4. Ali SA, Donahue RM, Qureshi H, Vermund SH. **Hepatitis B and hepatitis C in Pakistan: Prevalence and risk factors.** International journal of infectious diseases. 2009 Jan 1; 13(1):9-19.

5. Setiawan VW, Stram DO, Porcel J, Lu SC, Le Marchand L, Noureddin M. **Prevalence of chronic liver disease and cirrhosis by underlying cause in understudied ethnic groups: The multiethnic cohort. Hepatology.** 2016 Dec; 64(6):1969-77.

6. Shah AS, Khan S, Rahim H, Chishti KA, Khan G, Khan AG. **Prevalence of non alcoholic fatty liver and Non alcoholic Steatohepatitis in Peshawar Cantonment, Khyber Pakhtunkhwa, Pakistan.** Pakistan journal of pharmaceutical sciences. 2018 Jan 1; 31(1).

7. Mueller S. **Does pressure cause liver cirrhosis? The sinusoidal pressure hypothesis. World journal of gastroenterology.** 2016 Dec 28; 22(48):10482.

8. Gertler MM, Garn SM, Levine SA: **Serum uric acid in relation to age and physique in health and coronary heart disease.** Ann Intern Med 1951; 34:1421-1431.

9. Milić S, Lulić D, Štimac D. **Non-alcoholic fatty liver disease and obesity: Biochemical, metabolic and clinical presentations.** World journal of gastroenterology: WJG. 2014 Jul 28; 20(28):9330.

10. Schuppan D, Afdhal NH. **Liver cirrhosis.** The Lancet. 2008 Mar 8; 371(9615):838-51.

11. Tsochatzis EA, Bosch J, Burroughs AK. **Liver cirrhosis.** The Lancet. 2014 May 17; 383(9930):1749-61.

12. Jang TY, Yeh ML, Huang CI, Lin ZY, Chen SC, Hsieh MH, Dai CY, Huang JF, Huang CF, Chuang WL, Yu ML. **Association of hyperuricemia with disease severity in chronic hepatitis C patients.** PloS one. 2018 Nov 5;13(11):e0207043. https://doi.org/10.1371/journal.pone. 0207043.

13. Kimura T, Tanaka N, Tanaka E. **What will happen in patients with advanced nonalcoholic fatty liver disease?.** Hepatobiliary surgery and nutrition. 2019 Jun; 8(3):283.

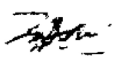
14. Zhang Daimin, Cui Qing, Xu Huibin, Zhang Ying, Li Wei. **The significance of serum uric acid detection in cirrhosis (Doctoral dissertation).** 2007.

15. Khosla UM, Zharikov S, Finch JL, et al. **Hyperuricemia induces endothelial dysfunction.** Kidney Int 2005; 67(5):1739-1742.

16. Sertoglu E, Ercin CN, Celebi G, Gurel H, Kayadibi H, Genc H, Kara M, Dogru T. **The relationship of serum uric acid with non-alcoholic fatty liver disease.** Clinical biochemistry. 2014 Apr 1; 47(6):383-8.

17. Lombardi R, Pisano G, Fargion S. **Role of serum uric acid and ferritin in the development and progression of NAFLD.** International journal of molecular sciences. 2016 Apr; 17(4):548.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Ramesh Kumar Suthar	Data collection, concept and drafting.	
2	Kavita Bai	Statics and Data analysis.	
3	Mumtaz Ali Memon	Critical Revistion and Finalizing of article.