

**Evaluation of Renal Function in Liver Cirrhosis in a Tertiary care Hospital at Kolkata.**

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**Abstract**

**Introduction:** Liver disease accounts for approximately 2 million deaths per year worldwide, 1 million due to complications of cirrhosis. About 2 billion people consume alcohol worldwide and up to 75 million are diagnosed with alcohol-use disorders and are at risk of alcohol-associated liver disease. Current epidemiological trends of the most common liver diseases in Asia-Pacific countries reveals that alcoholic liver disease, non-alcoholic fatty liver disease (NAFLD), hepatitis B virus (HBV) remains the primary cause of cirrhosis. Renal dysfunction is one of the most common complications of cirrhosis with high morbidity and mortality.

The prevalence of chronic kidney disease (CKD) among patients with cirrhosis has increased due to the increased prevalence of CKD-associated comorbidities, such as diabetes. Wong F. et al in 2019 observed 46.8% of chronic kidney disease among cirrhosis patients.

**Aims and objectives:** To evaluate renal function in patients of liver cirrhosis attending ESI-PGIMSR & ESIC Medical College, Kolkata.

**Materials and Methods:** Cross Sectional hospital-based study conducted in Department of Medicine, ESI-PGIMSR & ESIC Medical College within a period of

nine months. Data analysed by SPSS software ver. 15 using appropriate statistical tests.

**Results:** Male preponderance 72 % (n=144) observed out of 200 patients of cirrhosis of liver. Mean age of liver cirrhosis was 52.28 +/- 8.983 years. Female preponderance was found among non-alcoholic liver cirrhosis patients.

The commonest profile of liver cirrhosis was alcohol induced liver cirrhosis 67% (n=134). 58% (n=116) were found to be diabetic and 42% (n=84) nondiabetic. 76% (n=152) was found to be only liver cirrhosis, 24% had liver cirrhosis along with chronic kidney disease. Among 24% chronic kidney disease patients, 4% were found to be stage 3a chronic kidney disease, 2% stage 3b chronic kidney disease, 5% stage 4 chronic kidney disease & 13% were found to be stage 5 chronic kidney disease. So this study revealed that end stage renal disease was most common among liver cirrhosis patients compared to other stages of chronic kidney disease.

Prevalence of chronic kidney disease among non-alcoholic liver cirrhosis was more compared to alcohol related liver cirrhosis. Pearson Chi-Square test revealed strong association between nonalcoholic liver cirrhosis and chronic kidney disease [ p value 0.003 (<0.05)];

serum potassium and encephalo pathy [ p value of 0.003 (<0.05)]; & between serum sodium and minimal encephalopathy [p value of 0.002 (<0.05)].

**Conclusion:** Among 200 liver cirrhosis patients, 24% (n=48) were found to have liver cirrhosis along with chronic kidney disease and among them,13% (n=26) were found to have stage 5 chronic kidney disease.

## Introduction

Cirrhosis is a condition that is defined histopathologically and has a variety of clinical manifestations and complications, some of which can be life threatening. In the past, it has been thought that cirrhosis was never reversible; however, it has become apparent that when the underlying insult that has caused the cirrhosis has been removed, there can be reversal of fibrosis [1]. Liver disease accounts for approximately 2 million deaths per year worldwide. Cirrhosis is currently the 11th most common cause of death globally.

Cirrhosis is within the top 20 causes of disability-adjusted life years and years of life lost, accounting for 1.6% and 2.1% of the worldwide burden. According to the WHO, alcohol consumption accounts for 3.8% of the global mortality [2]. Current epidemiological trends of the most common liver diseases in Asia-Pacific countries reveals that alcohol consumption, non-alcoholic fatty liver disease (NAFLD), hepatitis B virus (HBV) remains the primary cause of cirrhosis [3].

Renal dysfunction is one of the most common complication of cirrhosis with high morbidity and mortality [4,5,6,7,8]. Renal dysfunction in this population may present acutely, or may be a result of underlying chronic kidney disease (CKD).

An accurate assessment of renal function is recommended in all patients with cirrhosis. Indeed, the renal function assessment guides the management of patients, helps to refine prognosis and to define transplant

strategies. Despite its limitations, serum creatinine is still the most used biomarker for the estimation of glomerular filtration rate (GFR) in patients with cirrhosis [10,7,8,9]. The most important chronic liver diseases associated with chronic renal disease are alcohol intake, nonalcoholic fatty liver disease, hepatitis B and C [11].

The prevalence of chronic kidney disease (CKD) among patients with cirrhosis has increased due to the increased prevalence of CKD-associated comorbidities, such as diabetes [12]. So valuation of renal function is of immense value in the management of cirrhosis of liver and outcome of intervention have definite role with variations in renal function.

## AIM

To evaluate renal function in patients of liver cirrhosis attending ESI-PGIMSR & ESIC Hospital, Kolkata

## Objectives

1. To assess renal function by estimating serum urea, creatinine, uric acid, urine analysis, serum cystatin, estimated glomerular filtration rate among the patients of cirrhosis of liver admitted in medicine department.
2. To study the association of risk factors namely alcohol, Hepatitis B infection, Hepatitis C infection and Non-Alcoholic Fatty Liver Disease causing liver cirrhosis.

## Methodology

A cross sectional hospital-based study (IPD) at department of medicine, ESI-PGIMSR & ESI Hospital for 9 months. All the patients suffering from liver cirrhosis admitted in ESI-PGIMSR & ESIC Hospital, Kolkata was included in the study and their renal function estimated.

## Results and analysis

A total of 200 patients were worked up according to the procedure detailed in the methodology.

Figure 1: Gender distribution.

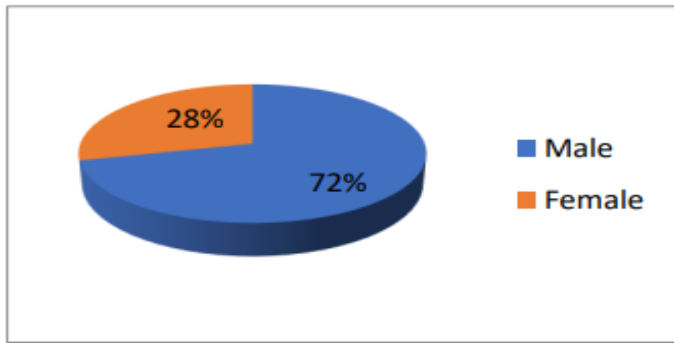


Figure 2: Gender distribution in non-alcoholic liver cirrhosis.

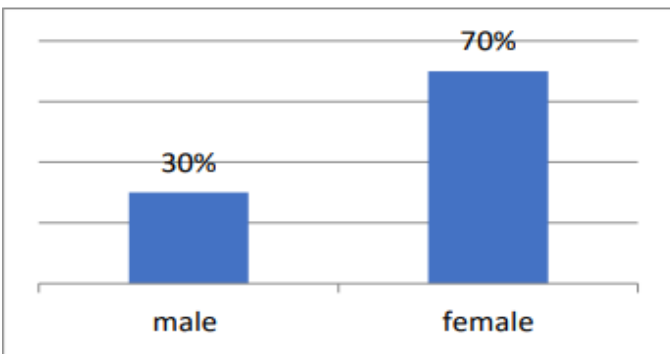


Figure 3: Distribution of Diabetes among liver cirrhosis.

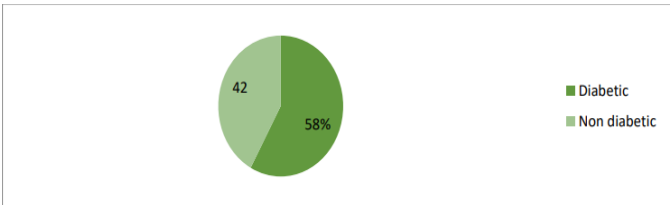


Figure 4: Distribution of different causes of liver cirrhosis

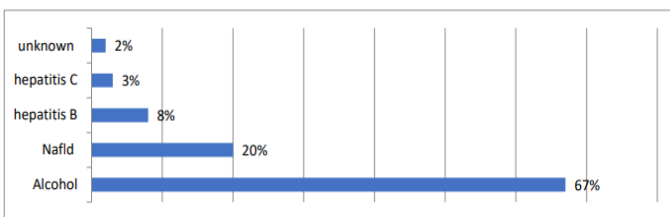


Figure 5: Distribution of chronic kidney disease among liver cirrhosis patients.

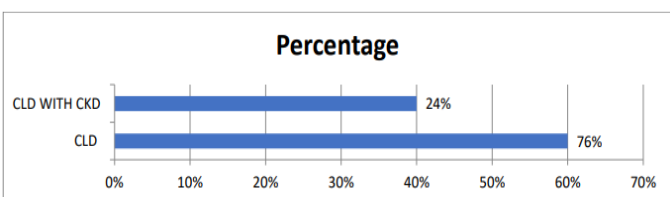


Figure 6: Glomerular filtration rates among liver cirrhosis patients

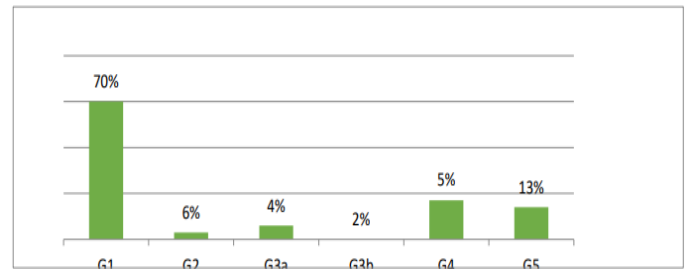


Figure 7: Glomerular filtration rate among non-alcoholic liver cirrhosis patients.

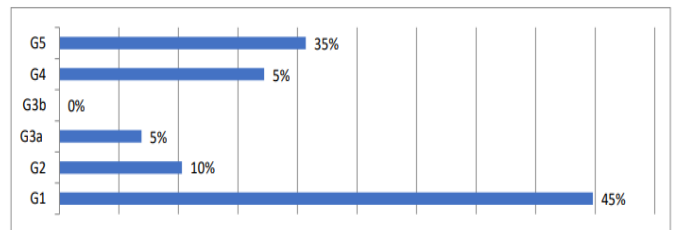


Figure 8: CTP scoring among liver cirrhosis patients.



Figure 9: Association between hypokalaemia with encephalopathy liver cirrhosis patients.

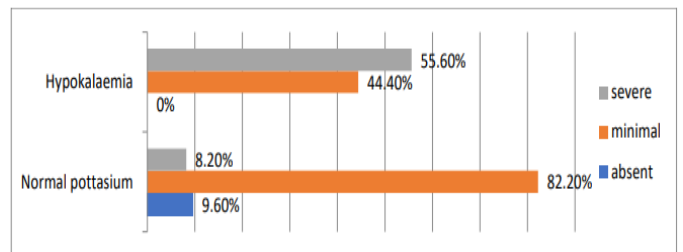


Figure 10: Association between hyponatraemia with encephalopathy liver cirrhosis patients

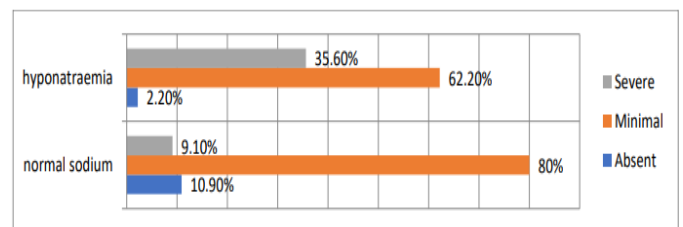
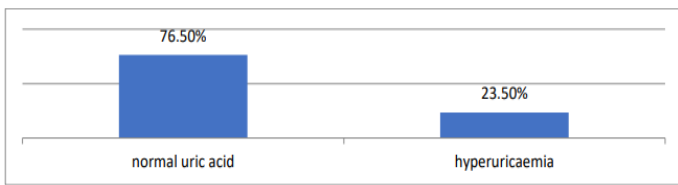


Figure 11: Association between serum uric acid with liver cirrhosis.



## Discussion

This cross-sectional study was conducted to see the renal function of liver cirrhotic patients and to find out the association of risk factors namely alcohol, Hepatitis B infection, Hepatitis C infection and Non-Alcoholic Fatty Liver Disease causing liver cirrhosis. Out of 200 liver cirrhosis patients, 72 % (n=144) were male and 28% (n=56) were female. The mean age of all liver cirrhosis patients were 52.28 years. Female preponderance among non-alcoholic steatohepatitis liver cirrhosis. Among 200 patients, 58% (n=116) was found to be diabetic and 42% (n=84) nondiabetic. 67% (n=134) was found to be alcohol induced liver cirrhosis, 20% (n=40) non-alcohol liver cirrhosis and 8% (n=16) hepatitis B related cirrhosis, 3% (n=6) hepatitis C related cirrhosis & unknown 2%(n=4) cases. So this study showed that alcohol intake was the leading cause of liver cirrhosis, followed by non-alcoholic fatty liver disease. 24%(n=48) were found to have liver cirrhosis along with chronic kidney disease. Florence et al study showed 46.8% (n=1099) liver cirrhosis with chronic kidney disease patients among 2346 patients. Among 200 liver cirrhosis patients 4% (n=08) were found to be stage 3a chronic kidney disease, 2% (n=04) stage 3b chronic kidney disease, 5% stage 4 chronic kidney disease, 13% (n=26) stage 5 chronic kidney disease. So this study revealed that end stage renal disease was most common among liver cirrhosis patients compared to other stages of chronic kidney disease. Out of 24% (n=48) chronic kidney disease patients, 40% (n=18) patients were

suffering from non-alcoholic liver cirrhosis with chronic kidney disease. Pearson Chi-Square test is applied to find out the association between non-alcoholic liver cirrhosis and chronic kidney disease, which shows that they have a strong association with a p value of 0.003 (<0.05) that is patients with non-alcoholic liver cirrhosis are more prone to develop chronic kidney disease than alcohol related liver cirrhosis. Pearson Chi-Square test also showed strong association between diabetes and chronic kidney disease [p value of 0.039 (<0.05).

So prevalence of chronic kidney disease among non-alcoholic liver cirrhosis was more common than alcohol related liver cirrhosis. This study revealed that hypo kalaemia precipitates severe encephalopathy. Among 47 hyperuricemic patients, 40.4% (n=19) had liver cirrhosis only and 59.6.% (n=28) had liver cirrhosis with chronic kidney disease. Lee et al conducted study showed that liver cirrhosis with chronic kidney disease patients had raised serum uric acid. This study reveals that prevalence of chronic kidney disease is most common in those who are suffering from non-alcoholic liver cirrhosis and females are more prone to develop non-alcoholic liver cirrhosis compared to males. We should look for NAFLD in diabetics, especially in the presence of metabolic syndrome.

Once found, aggressive management of cardiovascular and renal morbidity should be the primary goal. It has only recently been appreciated that chronic kidney disease represents an important burden of disease for patients with non-alcoholic liver cirrhosis. The present study was carried out over a period of only 9 months and included a modest sample size of two hundred subjects. Other studies on larger scales including those from general population conducted over longer time periods are required to properly validate the findings of this study. Few numbers of studies are available across

various parts of India. On this point the current study will be considered as a foundation stone for further studies which can be conducted over long period of time, which could yield more accurate results.

### Conclusion

This particular study has revealed some interesting facts about liver and renal disease occurrence in this region and its various clinico-biochemical associations. This study showed that though alcohol was the most common cause of liver cirrhosis and male were more prone to develop compared to female. Prevalence of 24% (n=48) were found to be liver cirrhosis along with chronic kidney disease among 200 liver cirrhosis patients and 13% (n=26) were found to be stage 5 chronic kidney disease. The prevalence of chronic kidney disease among non-alcoholic liver cirrhosis was more compare to alcohol related liver cirrhosis. Females had higher prevalence of non-alcoholic liver cirrhosis than males & diabetes was the most common cause non-alcoholic liver cirrhosis. Most of the studies across the various parts of the world had shown similar results. Most of the patients were in decompensated phase of liver cirrhosis. 80% of liver cirrhosis patients were in minimal hepatic encephalopathy state. Hyperuricemia were detected more in liver cirrhosis with chronic kidney patients. In the course of the study, various literatures from different authors across the globe were referred to. Since, it was a cross-sectional study, these results need to be validated by further long-term prospective studies with more number of study sample. Further experimental and follow-up studies are needed to elucidate the patho mechanism of renal dysfunction in liver cirrhosis patients.

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