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**ARAŞTIRMA MAKALESİ** **RESEARCH ARTICLE**

# Evaluation of Kidney Functions in Patients with Cirrhosis

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**Abstract**

**Aim:** Renal functions are frequently impaired in patients with cirrhosis. In this study, it was aimed to evaluate kidney functions in patients with cirrhosis**.**

**Materials and Methods:** The cross-sectional study were included 321 cirrhosis patients. Imaging, laboratory, and clinical approaches were used to diagnose cirrhosis. The Modification of Diet in Renal Diseases Study (MDRD) formula, which is based on serum creatinine, was used to calculate glomerular filtration rate (GFR).

**Results:** Of 321 cirrhotic patients, 189 (58%) were male, mean age was 55.6 ± 15.1 years, age range was 18-91 years. While 116 (36%) of the patients were compensated, 205 (64%) were decompensated. Etiological causes of cirrhosis 134 (42%) hepatitis B, 98 (30%) cryptogenic, 46 (14%) hepatitis C, 10 Wilson (3%), 10 delta hepatitis (3%), 23 (8%) other causes (alcoholic cirrhosis, cardiogenic cirrhosis, Budd-Chiari, biliary cirrhosis etc.).The mean GFR of the patients was 96.2 ± 27.8 ml/min. While GFR was within the normal range in 205 patients (63%), it was below the normal range in 118 (37%) patients. Of the patients with low GFR, 87 (73%) were at stage 1, 23 (20%) were at stage 2, 6 (5%) were at stage 3 and 2 (2%) were at the limit of end-stage renal disease.

**Conclusion:** The most common etiological cause in our region in patients with cirrhosis is hepatitis B, cryptogenic in the second place and hepatitis C in the third place. Nearly two-thirds of the patients had decompensated cirrhosis, and at least one-third of all cirrhotic patients had kidney injury.

***Key words:*** *cirrhosis, kidney injury, glomerular filtration rate*

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## INTRODUCTION

Cirrhosis is a progressive, common chronic liver disease. While it does not cause any obvious symptoms in the early period due to the strong compensation mechanisms of the liver, more than one system is affected in the decompensation phase (1). One of the most dangerous side effects, particularly in end-stage liver disease, is acute kidney injury (AKI), which is characterized by a sudden and substantial decline in glomerular filtration rate (GFR) (2).

GFR is one of the best indicators of kidney function; however there is not accepted standard method for measuring GFR. Serum creatinine (sCr) is the most commonly used parameter of kidney function because it can be measured simply, cheaply and widely (3). However; Body weight, race, age, gender and other factors are affected. In addition, sCr in patients with cirrhosis is also affected by the decrease in creatinine formation secondary to muscle loss, the increased volume of distribution due to increased renal tubular secretion and the interaction caused by high bilirubin (4).

The traditional definition used to diagnose renal dysfunction in cirrhosis is that the sCr should be greater than 1.5 mg/dl. However, when this definition is used, patients with milder renal dysfunction cannot be diagnosed and therefore early treatment cannot be started (5).

AKI is defined as sCr ≥50% increase in 7 days, or sCr ≥0.3 mg/dl increase in 2 days by the Kidney Disease Improving Global Outcomes (KDIGO) group; whereas it also is defined increasing of ≥50% in sCr within 3 months according to the International Club of Ascites (ICA) (6).

Cirrhosis patients are more likely to develop AKI than individuals without cirrhosis. The prevalence of AKI in hospitalized cirrhosis patients was reported to be approximately 20% to 50% (5).

In kidney function measurements, sCr is taken into account in prognostic scores such as *Model for End-Stage Liver Disease* (MELD) and *Chronic Liver Failure-Sequential Organ Failure Assessment* (CLIF-SOFA) and is used as an important criterion for liver transplantation. AKI is characterized as a prevalent and potentially fatal condition affecting cirrhosis patients. Renal functions are frequently impaired in patients with cirrhosis (7). In this study, it is aimed to evaluate kidney functions in patients with cirrhosis.

## MATERIALS AND METHODS

Ethical approval was obtained for the study from the Harran University Clinical Research and Ethics Committee (decision dated 07/06/2021 and numbered HRU/21.11.22). A cross-sectional study included 321 cirrhosis patients followed in the Gastroenterology department of Harran University Medical Faculty Hospital. The diagnosis of cirrhosis was made by clinical, laboratory, endoscopy, imaging and liver biopsy (within indication) methods. Ascites, variceal bleeding, jaundice, and encephalopathy were accepted as signs of decompensation (6). GFR was calculated using the serum creatinine-based *Modification of Diet in Renal Disaeses Study* (MDRD) formula. The diagnosis and grade of AKI was determined according to KDIGO and ICA (6). All data were obtained from patients' medical records. SPSS was used for statistical evaluation.

## RESULTS

Of 321 cirrhotic patients who age range was 18-91 years, 189 patients (58%) were male, 132 patients (42%) were female. Patients' mean age was 55.6 ± 15.1 years. While 116 (36%) of the patients were compensated, 205 (64%) were decompensated.Etiological causes of cirrhosis was 134 (42%) hepatitis B, 98 (30%) cryptogenic, 46 (14%) hepatitis C, 10 Wilson (3%), 10 delta hepatitis (3%) and 23 (8%) others (alcoholic cirrhosis, cardiogenic cirrhosis, Budd-Chiari, biliary cirrhosis etc.) (table 1).

**Table 1:** Etiology Causes of Liver Cirrhosis

| | n | % |
|---|---|---|
| Hepatitis B | 134 | 42% |
| Hepatitis C | 46 | 14% |
| Cryptogenic | 98 | 30% |
| Hepatitis Delta | 10 | 3% |
| Wilson' Disease | 10 | 3% |
| Others (Alcoholic cirrhosis, Cardiogenic cirrhosis, Budd-Chiari, Biliary cirrhosis etc.) | 23 | 8% |

n: number, %: percent

The mean GFR of the patients was 96.2 ± 27.8 ml/min. While GFR was within the normal range in 205 patients (63%), it was below the normal limit in 118 patients (37%). Of the patients with low GFR, 87 (73%) were at stage 1, 23 (20%) were at stage 2, 6 (5%) were at stage 3, and 2 (2%) were at the border of end-stage renal disease (table 2).

**Table 2:** Kidney Failure Staging

| Stage | n | % |
|---|---|---|
| Stage I | 87 | 73% |
| Stage II | 23 | 20% |
| Stage III | 6 | 5% |
| End-stage | 2 | 2% |
| **Total** | 118 | 100% |

n: number, %: percent

## DISCUSSION

Renal dysfunction is one of the common complications of liver cirrhosis (3, 4, 7). It is known that AKI is common in patients with advanced stage cirrhosis. Early diagnosis in AKI is important in terms of morbidity and mortality. It was reported that the development of AKI causes a poor prognosis in patients with cirrhosis (8). In our study, it was aimed to investigate the frequency of AKI in patients with cirrhosis. Previous studies have shown that hospitalized patients with cirrhosis have a prevalence of approximately 20% to 50% of the diagnosis of AKI (5). In a study, it was reported that AKI was 54% in patients followed up without hospitalization, and it was slightly higher than in hospitalized patients (9). Nabil et al. have demonstrated the frequency of AKI in 43.6% of 900 cirrhotic patients in their study. Similarly, in another study Jo et al. was reported in 40.5% the frequency of AKI in decompensated cirrhotic patients (10, 11). In our study, similar to the literature, AKI was detected in 118 (37%) of 321 followed-up patients. In a study by Thapa et al., in 42% of the patients, in a other study by Gomez et al., it was reported that 57.7% of them developed stage 1 AKI (12, 13). In our study, the mean GFR was 96.2 ± 27.8 ml/min. In the patients with low GFR, 87 (73%) were at stage 1, 23 (20%) were at stage 2, 6 (5%) were at stage 3 and 2 (2%) were at the limit of end-stage renal disease. Stage 1 AKI is the most common stage, and similarly it was detected at a slightly higher rate in our study.

It has been reported that cirrhosis is more common in males in the literature (7, 9-13). Karagozian et al. have shown that 62% of the patients in their study were male and the mean age was 57 years. Similarly, in our study, 189 of 321 patients (58%) were male, with a mean age of 55.6 ± 15.1 years. Age and gender are important for AKI. In our study, age and gender were found to be similar to other studies.

Thapa et al. have reported that alcohol was the most common cause of cirrhosis with 41 (82%)

(12), while Piano et al. have reported that the most common cause was hepatitis C (40.9%) (13). However; in our study, the most etiological causes of cirrhosis were 134 (42%) hepatitis B, 98 (30%) cryptogenic and 46 (14%) hepatitis C. Etiological causes and frequencies can vary according to the selected cohort and regional characteristics.

## CONCLUSION

The most common etiologic cause of cirrhosis in the Şanlıurfa region is hepatitis B, the second is cryptogenic, and the third is hepatitis C. 64% of the patients had decompensated cirrhosis, and AKI was found in approximately 37% of all cirrhotic patients.

**Author's Contribution:** Idea and Design– AU; Data Collection and/or Processing – AU, SS; Analysis and/or Interpretation – AU, SS; Writing – AU, SS; Critical Review – AU, SS.

**Conflict of Interest:** The authors have no conflict of interest to declare.

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