Section: General Medicine

Original Research Article

ANALYSIS OF RENAL MANIFESTATIONS IN PATIENTS OF LIVER CIRRHOSIS AT A TERTIARY CARE HOSPITAL

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Abstract

Background: Cirrhosis is characterized by the histological formation of regenerative nodules encased in fibrous tissue, resulting from chronic liver damage, which ultimately leads to portal hypertension and advanced liver disease. Regardless of its onset, renal dysfunction in cirrhotic patients is linked to heightened rates of morbidity and mortality. Hence, the present study was conducted for analyzing renal manifestations in patients of liver cirrhosis. **Materials & Methods:** A total of 75 patients with presence of cirrhosis of liver were enrolled during December 2023 to May 2024. Complete demographic and clinical details of all the patients were obtained. Serum bilirubin levels, serum albumin levels and prothrombin time were assessed. Ascites and hepatic encephalopathy were also evaluated. Combination of all these parameters was done for evaluating the severity grading of cirrhosis of liver. Renal dysfunction was evaluated. Correlation of renal dysfunction with severity grading of Child Pugh score (cirrhosis of liver) was also done. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** A total of 75 patients with cirrhosis of liver were enrolled. Renal dysfunction was seen in 20 percent of the patients. None of the patients of Child-Pugh class A showed renal dysfunction while 10 percent and 39.39 percent of the patients of Child-Pugh class B and Child-Pugh class C respectively. A significantly higher incidence of renal dysfunction was seen among patients with higher severity grading of Child Pugh score. **Conclusion:** Cirrhosis of liver is associated with significant morbidity and mortality. Renal dysfunction often accompanies later stages of the disease and has been associated with poor prognosis. Hence; early and periodic monitoring of renal profile of liver cirrhosis patients should be done so that prompt management could be done.

INTRODUCTION

Cirrhosis is characterized by the histological formation of regenerative nodules encased in fibrous tissue, resulting from chronic liver damage, which ultimately leads to portal hypertension and advanced liver disease. The global prevalence of cirrhosis remains largely undetermined, although estimates suggest it affects approximately 0.15% of the population, equating to around 400,000 individuals in the United States. The underlying causes of cirrhosis can typically be discerned through a combination of patient history, serological tests, and histological analysis.[1,2] In the Western world, the predominant etiologies are alcoholic liver disease and hepatitis C, whereas hepatitis B is more prevalent in many regions of Asia and sub-Saharan Africa. Following the discovery of the hepatitis C virus in 1989 and the identification of nonalcoholic steatohepatitis (NASH) in individuals with obesity and diabetes, instances of cirrhosis classified as cryptogenic (without a known cause) have become increasingly rare. Understanding the etiology of cirrhosis is crucial, as it can inform potential complications and guide therapeutic strategies.[3.4] Renal impairment is a common complication observed in patients with cirrhosis, affecting approximately 20% of hospitalized individuals with this condition. This renal dysfunction can manifest either as an acute event or as a consequence of pre-existing chronic

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kidney disease (CKD). Regardless of its onset, renal dysfunction in cirrhotic patients is linked to heightened rates of morbidity and mortality.[5-7] Hence; the present study was conducted for analyzing renal manifestations in patients of liver cirrhosis.

MATERIALS AND METHODS

The present observational cohort study was conducted among a total of 75 patients with liver cirrhosis who visited the Department of Medicine, Autonomous State Medical College (ASMC), Auraiya, Uttar Pradesh, and were enrolled from December 2023 to May 2024. Complete demographic and clinical details of all the patients were obtained. Blood samples were obtained and complete renal profile, biochemical profile and hematological profile of all the patients was evaluated. Serum bilirubin levels, serum albumin levels and prothrombin time was assessed. Ascites and hepatic encephalopathy were also evaluated. Combination of all these parameters was done for evaluating the severity grading of cirrhosis of liver. Renal dysfunction was evaluated. Correlation of renal dysfunction with severity grading of Child Pugh score (cirrhosis of liver) was also done. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software. Mann-Whitney U test was used for evaluation of level of significance.

RESULTS

A total of 75 patients with cirrhosis of liver were enrolled. The mean age of the patients was 48.3 years. 82.67 percent of the patients were males while the remaining were females. 29.33 percent of the patients were of class A, 26.67 percent of the patients were of class B and 44 percent of the patients were of class C of Child Pugh score.

Renal dysfunction was seen in 20 percent of the patients. None of the patients of Child-Pugh class A showed renal dysfunction while 10 percent and 39.39 percent of the patients of Child-Pugh class B and Child-Pugh class C respectively. A significantly higher incidence of renal dysfunction was seen among patients with higher severity grading of Child Pugh score.

Table 1: Demographic and clinical data

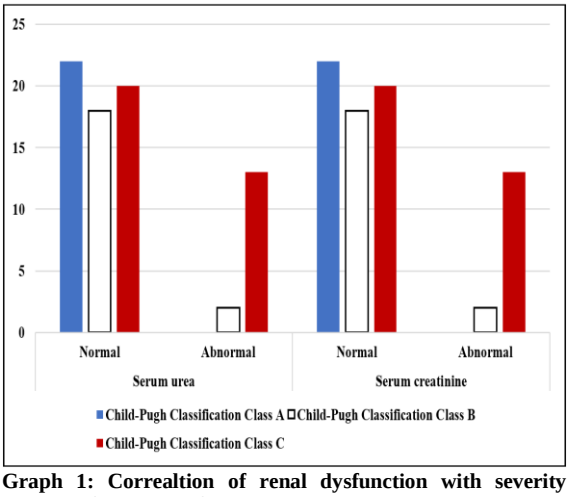
Variable		Number	Percentage
Mean age		48.3 years	
Gender	Males	62	82.67
	Females	13	17.33
Child-Pugh Classification	Class A	22	29.33
	Class B	20	26.67
	Class C	33	44

Table 2: Incidence of renal dysfunction

Renal dysfunction	Number	Percentage
Abnormal serum urea levels	15	20
Abnormal serum creatinine levels	15	20

Table 3: Correaltion of renal dysfunction with severity grading of cirrhosis of liver

Renal dysfunction		Child-Pugh Classification			Total	p-value
		Class A	Class B	Class C		
Serum urea	Normal	22	18	20	60	0.0130 (Significant)
	Abnormal	0	2	13	15	
Serum creatinine	Normal	22	18	20	60	0.0130 (Significant)
	Abnormal	0	2	13	15	



Graph 1: Correaltion of renal dysfunction with severity grading of cirrhosis of liver

DISCUSSION

Cirrhosis is a condition of significant global prevalence, arising from various etiological factors, including obesity, non-alcoholic fatty liver disease, excessive alcohol intake, infections such as hepatitis B or C, autoimmune disorders, cholestatic conditions, and the accumulation of iron or copper. The pathogenesis of cirrhosis involves a prolonged inflammatory process that culminates in the replacement of healthy liver tissue with fibrotic material and regenerative nodules, ultimately resulting in portal hypertension. The disease progresses from an asymptomatic stage, known as compensated cirrhosis, to a symptomatic stage referred to as decompensated cirrhosis. The latter is associated with complications that frequently

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necessitate hospitalization, diminish quality of life, and contribute to elevated mortality rates. The progression of portal hypertension, systemic inflammation, and liver failure are critical factors influencing disease outcomes. Management strategies for liver cirrhosis focus on addressing the underlying causes and associated complications, with liver transplantation being a potential intervention in certain cases. [5-7] Patients diagnosed with cirrhosis frequently exhibit a significant incidence of renal dysfunction. This vulnerability to renal impairment can be attributed to both pronounced splanchnic arterial vasodilation and the systemic inflammatory responses characteristic of this condition. It is advisable to conduct a thorough evaluation of renal function in all individuals suffering from cirrhosis. Such assessments are crucial as they inform patient management, enhance prognostic accuracy, and aid in the formulation of transplantation strategies. Although it has certain limitations, serum creatinine remains the predominant biomarker utilized for estimating the glomerular filtration rate (GFR) and for evaluating acute kidney injury (AKI) in cirrhotic patients. Emerging biomarkers, such as cystatin C, hold the potential to refine GFR assessment and improve prognostic stratification in this population. Given that AKI poses a significant risk to life, prompt management is essential. [8-10]

Fornari F et al demonstrated that 30% of patients diagnosed with cirrhosis presented with gallstones. The likelihood of developing these stones was most significantly correlated with Child's grade C and alcoholic cirrhosis, exhibiting an annual incidence rate of approximately 5%.[11] Yoo JJ et al. conducted a comparative analysis of two prevalent estimated glomerular filtration rate (eGFR) methods against measured glomerular filtration rate (mGFR) and investigated how low muscle mass contributes to the overestimation of renal function in cirrhotic patients. The study encompassed 779 consecutive patients diagnosed with cirrhosis, all of whom underwent 51Cr-ethylenediamine tetraacetic acid (EDTA) for mGFR assessment and abdominal computed tomography (CT) imaging. The eGFR values were derived from either creatinine or cystatin C levels. Muscle mass was quantified by evaluating total skeletal muscle at the L3 vertebral level via CT imaging. The findings revealed that the Modification of Diet in Renal Disease (MDRD)-eGFR was overestimated in 47% of the subjects. A multivariate analysis identified female gender, Child-Pugh class B and C compared to A, and skeletal muscle mass as independent risk factors for this overestimation. Specifically, the risk factors linked to overestimation included female gender, compromised liver function, and reduced muscle mass in male patients. It is particularly important to interpret eGFR values cautiously in male patients exhibiting sarcopenia. Furthermore, the overestimation of creatinine-based eGFR occurred more frequently than that of cystatin C-based eGFR, with the degree of overestimation being closely associated with unfavorable prognostic outcomes.[12] Chitra Purohit et al assessed renal profile in liver cirrhosis patients. A total of 40 liver cirrhosis patients were included. A total of 40 age and gender matched healthy controls were also included as study group. Mean serum creatinine levels and blood urea levels were assessed using an auto-analyzer. Mean blood urea levels of the subjects of study group (38.13mg/dl) were significantly higher than subjects of the control group (21.25 mg/dl). Mean serum creatinine levels of the subjects of study group (1.98 mg/dl) were significantly higher than subjects of the control group. Liver cirrhosis is significantly associated with altered renal profile.[13]

CONCLUSION

Cirrhosis of liver is associated with significant morbidity and mortality. Renal dysfunction often accompanies later stages of the disease and has been associated with poor prognosis. Hence, early and periodic monitoring of renal profile of liver cirrhosis patients should be done so that prompt management could be done.

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