Original Article

Examine the Predictor of Mortality in Cirrhotic Patients with Acute Kidney Injury

Mortality in Cirrhotic Patients

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ABSTRACT

Objective: To analyze the predictors that were involved in-hospital mortality associated to acute kidney injury with cirrhosis.

Study Design: Prospective study

Place and Duration of Study: This study was conducted at the Department of Nephrology, Shaikh Zayed Hospital Lahore from 1st July 2018 to 31st December 2018.

Materials and Methods: A total of 100 cirrhotic patients of both genders with acute kidney injury were included. Patient's ages were 25 to 70 years. Patients demographic including age, sex, co-morbidities, etiology of cirrhosis and stages of acute kidney injury were recorded after taking written consent. In-hospital mortality according to the types of acute kidney injury and outcomes were analyzed.

Results: There were 88% males and 12% were females with mean age 42.6±8.22 years. 20% patients had acute kidney injury stage I, 25% patients had stage II and 55% patients had stage III. 40% patients had acute tubular necrosis acute kidney injury type, 44% patients had hepatorenal syndrome and 16% patients had pre-renal azotemia. In-hospital mortality was 47%, in which 22% had hepatorenal syndrome type of acute kidney injury, 20% patients had acute tubular necrosis type. Mortality rate was high in acute kidney injury stage III patients and who required hemodialysis (p=0.001).

Conclusion: In-hospital mortality was high in acute kidney injury patients with cirrhosis. Patients with hepatorenal syndrome and acute tubular necrosis had high mortality as compared to pre-renal azotemia. Severity of acute kidney injury was the major predictor of in-hospital mortality.

Key Words: Acute kidney injury, Liver cirrhosis, Mortality

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INTRODUCTION

Worldwide, acute kidney injury considered most common disorder with high rate of morbidity and mortality in patients with cirrhosis of liver.[1–3] This malignant and life threatening disorder had different etiologies such as glomerulonephritis, drugs toxicity and ascites but the most common types of AKI are pre-renal azotemia, acute tubularnecrosis and hepatorenal syndrome. Many of studies demonstrated hepatorenal syndrome and acute tubular necrosis are the most common classification of acute kidney injury in cirrhotic patients.[3,4]

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Acute kidney injury patients seen to have very low survival rate and many of factors associated with high mortality rate.[5–7] Serum creatinine, MELD score are the prominent measures for examine renal function in patients with liver cirrhosis.[8–10]

There are many causes of acute kidney injury in cirrhotic patients but hepatorenal syndrome is the leading cause in these patients and is directly associated with in-hospital mortality. Many of studies demonstrated that the severity of acute kidney injury is directly associated to high mortality rate.[11]

Many of studies illustrated patients with HRS type of AKI has high risk of mortality among all types of acute kidney injury with very low survival rate.[12]

MATERIALS AND METHODS

This prospective/observational study was conducted at Department OF Nephrology Shaikh Zayed Hospital, Lahore from 1st July 2018 to 31st December 2018. A total of 100 cirrhotic patients of both genders with acute kidney injury were included. Patient's ages were 25 to 70 years. Patients demographic including age, sex, co-morbidities, etiology of cirrhosis and stages of acute kidney injury were recorded after taking written consent. Acute kidney injury stages were accessed according to the new 2015 Ascites Cub Criteria. Patients with pre-existing chronic kidney disease were

excluded. All patients were categorized according to the types of acute kidney injury. Mortality and factors associated to in-hospital mortality were examined. All the data was analyzed by SPSS 20. Mean+SD was applied. P-value <0.05 was considered as significant.

RESULTS

Out of 100 patients, 88% were males and 12% were females with mean age 42.6±8.22 years. Comorbidities such as diabetes mellitus, chronic liver disease, cardiovascular disease and hypertension found in 12%, 10%, 8% and 10% patients. According to the etiology of cirrhosis 30% patients had hepatitis C, 50% patients had B & C and 20% patients had alcohol consumption. 20% patients had AKI stage I, 25% patients had stage II and 55% patients had stage III. 40% patients had acute tubular necrosis AKI type, 44% patients had hepatorenal syndrome and 16% patients had pre-renal azotemia. At enrollment mean serum creatinine was 2.2±1.32 mg/dl and mean serum urea 90.36±37.76 mg/dl. Mean peak serum creatinine 3.56±1.42 mg/dl (Table 1).

Table No.1: Demographic information of all the patients

Variable	No.	%
Mean age (years)	42.6±8.22	
Gender		
Male	88	88.0
Female	12	12.0
Comorbidities		
Diabetes	12	12.0
CLD	10	10.0
Cardiovascular disease	8	8.0
Hypertension	10	10.0
Etiology of Cirrhosis		
Hepatitis C	30	30.0
Hepatitis B& C	50	50.0
Alcohol	20	20.0
AKI stages		
I	20	20.0
II	25	25.0
III	55	55.0
AKI type		
PRA	16	16.0
HRS	44	44.0
ATN	40	40.0
Laboratory values		
Mean serum creatinine (admission)	2.2±1.32mg/dl	
Mean serum urea	90.36±37.76mg/dl	
Mean peak creatinine	3.56±1.42mg/dl	

In-hospital mortality was 47%, in which 22% had HRS type of AKI, 20% patients had ATN type and 5% patients had pre-renal azotemia. According to the stages of AKI 6% patients were died of stage I, 12% patients with stage II were died and 29% patients belongs to stage III were died. Severity of AKI is significantly associated to higher mortality (p=0.001) [Table 2]. According to the metabolic parameters as a predictor of mortality, we found out of 47 died patients 43 patients had peak serum creatinine >3mg/dl and 40 patients had peak serum urea >100mg/dl. 40 patients required hemodialysis in which 30 patients were died and 10 patients survived (Table 3).

Table No.2: In-hospital mortality associated to types and stages of AKI

Variable	Died	Survivor	P value
Mortality	47 (47%)	53 (63%)	-
Types of AKI			
HRS	22 (22%)	22 (22%)	0.001
ATN	20 (20%)	20 (20%)	
Pre-renal A	5 (5%)	11 (11%)	
Stages of AKI			
I	6 (6%)	14 (14%)	<0.001
II	12 (12%)	13 (13%)	
III	29 (29%)	26 (26%)	

Table No.3: Metabolic Parameters and hemodialysis as a predictor for mortality

Metabolic parameters	Died	Survivor	P value
Peak serum creatinine >3mg/dl			
Yes	43	10	0.001
No	4	43	
Peak serum urea >100 mg/dl			
Yes	40	12	0.001
No	7	41	
Required Hemodialysis			
Yes	30	10	0.001
No	17	43	

DISCUSSION

Cirrhotic patients with acute kidney injury had a high rate of mortality. Worldwide prevalence of acute kidney injury in liver cirrhosis patients accounted 20-50% and mortality rate varies 10 to 60%.[13] Many of factors associated to high rate of mortality in acute kidney injury with liver cirrhosis and several studies have been conducted to examine the predictor of mortality in patients with AKI with liver cirrhosis.[14,15] We also conducted this study to examine the predictors of in-hospital mortality in acute kidney injury patients with cirrhosis of liver. We prospectively analyzed 100 cirrhotic patients of acute kidney injury. In this study majority of patients 88% were males as compared to females with mean age 42.6±8.22 years. These results were similar to many other studies in which male patients population was high as compared to females and majority of patients were ages above 35 years.[16,17]

In present study diabetes mellitus was the most frequent comorbidity found in 12% patients followed by chronic

liver disease and hypertension. Several studies illustrated diabetes mellitus and hypertension were the most frequent comorbidities in AKI patients with liver cirrhosis.[18] In our study 20% patients had AKI stage I, 25% patients had stage II and 55% patients had stage III. We found 40% patients had acute tubular necrosis AKI type, 44% patients had hepatorenal syndrome and 16% patients had pre-renal azotemia. These results were similar to some other studies in which majority of patients had AKI stage III and most of the patients had hepatorenal syndrome and acute tubular necrosis.[19,20]

In present study mortality was 47%, in which 22% had HRS type of AKI, 20% patients had ATN type and 5% patients had pre-renal azotemia. We found that patients with hepatorenal syndrome and acute tubular necrosis had poor survival as compared to pre-renal azotemia patients. According to the stages of AKI 6% patients were died of stage I, 12% patients with stage II were died and 29% patients belongs to stage III were died. Severity of AKI is significantly associated to higher mortality (p=0.001). These results showed similarity to many other studies in which patients with AKI type hepatorenal syndrome and acute tubular necrosis had a high rate of mortality as compared to pre-renal azotemia.[19,21]We found that patients with AKI stage III had poor survival rate and these results were similar to many other studies in which increase in severity of AKI is significantly associated to high rate of mortality.[22,23]

In present study according to the metabolic parameters as a predictor of mortality, we found out of 47 died patients 43 patients had peak serum creatinine >3mg/dl and 40 patients had peak serum urea >100mg/dl. 40 patients required hemodialysis in which 30 patients were died and 10 patients survived. A study conducted by Bhattacharya et al[24] reported that peak serum creatinine and those who required hemodialysis and severity of AKI and hepatorenal syndrome were the most important predictors of in-hospital mortality.

CONCLUSION

Acute kidney injury in patients with liver cirrhosis had a poor survival rate in all over the world. We concluded that in-hospital mortality was high in acute kidney injury patients with cirrhosis. Patients with hepatorenal syndrome and acute tubular necrosis had high mortality as compared to pre-renal azotemia. Severity of AKI and hemodialysis were the major predictors of in-hospital mortality.

Author's Contribution:

Concept & Design of Study:	Abad ur Rehman Awan
Drafting:	Ali Saqlain Haider
Data Analysis:	Syed Waseem Ahmad Mujtaba
Revisiting Critically:	Abad ur Rehman Awan
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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