



A Prospective Study to Evaluate Causes and Outcomes of Acute Kidney Injury in Patients of Cirrhosis of Liver in a Tertiary Care Centre

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Introduction

Acute kidney injury (AKI) frequently occurs in patients with cirrhosis and was associated with significant mortality.^{1,2} mortality in cirrhosis has been shown to increase progressively in association with an increase in the severity of AKI.² The most common causes of AKI in cirrhosis are pre-renal azotemia (volume-responsive pre-renal AKI), acute tubular necrosis (ATN) and hepatorenal syndrome (HRS), a functional type of pre-renal AKI exclusive of cirrhosis that does not respond to volume repletion. Recent studies suggest using the Acute Kidney Injury Network (AKIN) definition of AKI, which closely correlates with mortality in cirrhosis.

Aim of the Study

- To study the incidence of different patterns of AKI in cirrhosis.
- To evaluate the impact of AKI severity on patient survival

Materials & Methods

This was a prospective observational study carried at GEMS hospital, department of General medicine, Srikakulam, Andhra Pradesh from November 2017 to January 2019, and followup for three months. Patients with a diagnosis of cirrhosis of the liver were evaluated for the presence of AKI. All data was collected as part of the routine clinical care in hospitalized patients, which included demographics, medical history, laboratory findings like CBC, LFT, viral markers, ascitic fluid analysis, coagulation profile, cultures of blood, urine, ascitic fluid, radiology, procedural findings including medications

Inclusion Criteria

- 1) Age of the patient's ≥ 18 years
- 2) Patients with a diagnosis of cirrhosis
- 3) Presence of AKI Based on AKIN criteria

Exclusion Criteria

- 1) Patients with less than 18 years of age
- 2) Chronic kidney disease
- 3) Patients with uncontrolled Diabetes, HTN, using nephrotoxic agents
- 4) Acute or chronic renal replacement therapy before admission

In one year period, a total of 217 cirrhotic patients were identified, out of which 87 had different forms of renal disorders. After the exclusion of C.K.D and h/o structural abnormalities, a total of 80 patients with cirrhosis and renal failure were enrolled in the study over a period of 12 months.

Statistical Analysis

For descriptive statistical analysis, mean, standard deviation, and frequencies were calculated. Different characteristics were represented as

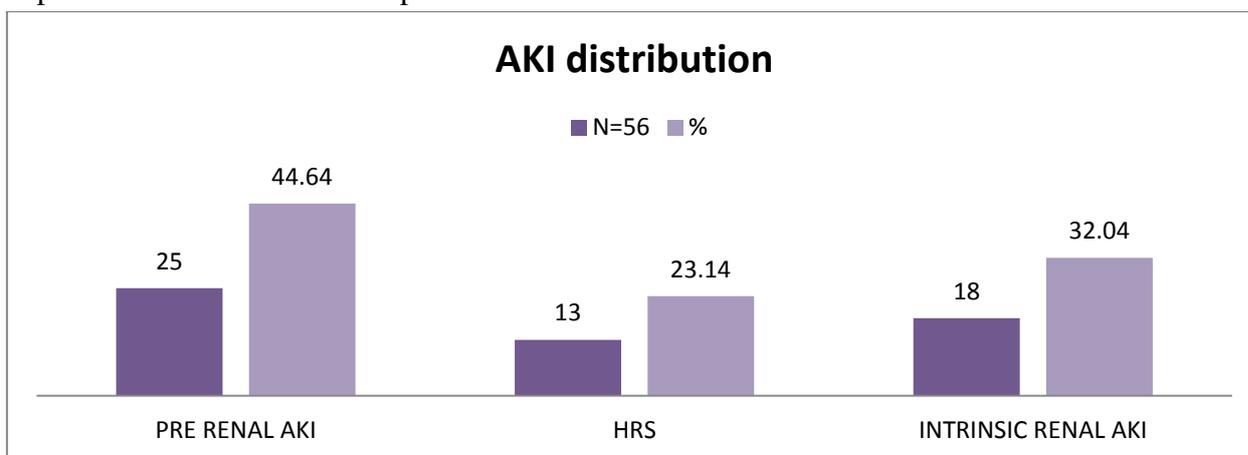
numbers or percentages wherever required. Statistical analysis was done by statistical software SPSS for Windows v21.0. *P-Value* shows statistical significance when it was < 0.05.

Outcome

Outcome was mortality during the hospitalization or follow up for 90 days.

Results

In one year period total of 217 cirrhotic patients identified out of which 56 had different forms of AKI.



The spectrum of AKI in Patients with Cirrhosis of Liver (figure 1): The incidence of AKI in patients with cirrhosis of the liver in present study was 25.8% (56/217). Out of 56

patients, the spectrum of AKI includes pre-renal (44.64%) intrinsic renal (32.04%) and HRS (23.14%). Even though HRS is a type of pre-renal AKI, it is not volume responsive.

Stage wise distribution of AKI

AKIN stage	TOTAL	SURVIVORS	NON -SURVIVORS
1	8 (14.3%)	8 (19.5%)	0(0%)
2	17 (30.4%)	16 (39.0%)	1 (6.7%)
3	31 (55.4%)	17 (41.5%)	14(93.33%)

AKIN stages 1,2 and 3 attained in 14.3%, 30.4% and 55.4% of patients respectively. Mortality increased in a stage response manner with the

severity of AKI. Higher the AKIN stage higher the mortality, with p-value of 0.002 which is statistically significant.

Association of HRS with Mortality

	HRS	NON HRS	TOTAL
NON SURVIVORS	8	7	15
SURVIVORS	5	36	41
TOTAL	13	43	56

HRS associated with higher mortality when compared with non HRS with P value of 0.004, which is statistically significant.

Association of DIALYSIS with NON DIALYSIS in predicting MORTALITY

	DIALYSIS	NON DIALYSIS	TOTAL
NON SURVIVORS	9	6	15
SURVIVORS	9	32	41
TOTAL	18	38	56

Significant P Value of 0.0001, indicating that RRT has a significant impact on mortality

Discussion

The incidence of AKI in patients with cirrhosis of the liver in the present study was 25.8% (56/217); the result is similar to the study by Jai Prakash et al³. where the incidence of AKI was 24.5%.

Incidence of HRS in our study was 23% of the total cases of AKI, and the majority (10/13; 76%) were of type 1 HRS. This is in agreement with the study of Moreau et al. .25, who reported that the incidence of HRS was 20% in their cirrhotic patients.

A strong step-wise association was noted between the degree of progression of AKI and mortality. AKI in the setting of cirrhosis was ultimately severe with peak AKIN stages 1, 2, and 3 attained in 14%, 30%, and 55% of patients, respectively. The present study is similar to Belcher JM et al⁴. Mortality increased in a stage response manner with the severity of AKI. In the Present study, high mortality is associated with AKIN stage 3 with significant P value 0.002 ($p < 0.05$). Remarkably, patients with a peak severity of AKIN stage 1 did exceptionally well. Non-survivors ultimately experienced significantly more severe AKI.

Dialysis was required for 18 (32%) patients and was utilized more frequently among non-survivors with P-value 0.001, which was statistically significant, similar to Belcher JM et al⁴.

Conclusion

The incidence of AKI in patients with cirrhosis of the liver was 25.8% (56/217). The spectrum of AKI was pre-renal (44.64%) intrinsic renal (32.04%) and HRS (23.14%). Mortality was correlated with the severity of AKI and the need for hemodialysis

References

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