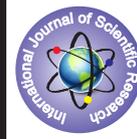# A STUDY OF OUTCOME OF ACUTE KIDNEY INJURY IN TROPICAL ACUTE FEBRILE ILLNESS IN TERTIARY CARE HOSPITAL

Medical Science

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ABSTRACT The objective of research was to study the outcome of acute kidney injury (In tropical acute febrile illness) with mortality and dialysis requirement. The study was conducted at our a tertiary care institute in Maharashtra between October 2014 to November 2016. We studied application of RIFLE criteria for AKI classification, outcome of AKI with RRT requirement and mortality. It was a descriptive longitudinal study. We recruited 140 confirmed cases of tropical acute febrile illnesses (TAFI) hospitalized in medicine wards, medical ICU and kidney unit. Out of total 39 patient of AKI in present study maximum 16(11.43%) belong to failure class, 13(9.29%) belong to risk class and 10(7.14%) belong to injury class according to RIFLE staging. Mortality of patient in AKI group10 (25.60%) was significantly higher than non AKI group6 (5.90%). Hence, AKI is a significant risk factor for mortality.

INTRODUCTION

Tropical Acute Febrile Illness (TAFI) is defined as all acute febrile syndromes with oral temperature over 37.5°c within the last 24 hours and less than two weeks, in tropical and sub tropical developing countries with non specific symptoms and signs.[1-6]

Acute kidney injury (AKI) in tropics is predominantly community acquired and affects young[7].Though infections have been typically considered as a cause of AKI, there is increasing realization that residual damage, which may be subclinical, leads to CKD.[8] Worldwide incidence of acute kidney injury (AKI) is variable9,[10] and even more among the developed and the developing countries .[11] Tropical acute febrile illnesses such as malaria, typhoid, leptospirosis, dengue and others are major cause of AKI in the tropics .[12,13] Recently, a few observational studies demonstrated that there was an increased risk for mortality with small increments in serum creatinine; this finding made the case for the adoption of more sensitive creatinine-based criteria for acute kidney injury (AKI) .[14, 15] Severity of AKI by the RIFLE criteria can be used for predicting both requirements for RRT(Renal replacement therapy) and mortality rates particularly in critically ill patients.[16]

This study is conducted with the objectives to highlight the occurrence of acute kidney injury by the RIFLE criteria as well as their association with requirement for RRT and in-hospital mortality in patients with established diagnosis of tropical acute febrile illness, common being malaria, salmonellosis, dengue and leptospirosis scrub typhus in central India.

METHODOLOGY

The present study was conducted at our parent institute between October 2014 to November 2016.Study setting included patients admitted in medicine wards, intensive care unit, and kidney unit. Study design used was descriptive longitudinal. With reference to study by Basu G et al[2] incidence of AKI in TAFI was 41.1%. With precision of 20% and 95% confidence interval minimal sample size required for present study was 140.We included Inpatients (aged ≥18 years) who had fever within the last 24 hours and for less than 2 weeks, oral temperature of more than 37.5°c whose blood test is positive for tropical febrile illnesses [malaria, dengue, leptospirosis, enteric fever, rickettsial fever].Patients with renal dysfunction because of any cause other than tropical acute febrile illness (TAFI) were excluded from the study.

These patients were subjected to detail history and physical examination. Data collected was noted in predesigned proforma.

Ethical clearance was obtained from the Institutional Ethic Committee.Written informed consent was taken from patients.All patients were subjected to standard protocol of clinical and laboratory assessment. Investigations done were Complete blood count ,Peripheral smear for malarial parasite ,Blood urea, Serum creatinine , eGFR (estimated Glomerular filtration rate) ,24 hours urine output was calculated from the time of hospitalization using urometer to time of discharge or death. Thick and thin smear done stained with JSB stain or Giemsa stain and seen under oil immersion microscope to see malarial parasite. [17,18]

RIFLE classification was used in order to define and stratify the severity of acute kidney injury (AKI). Statistical software STATA version 16.0 was used for data analysis. Continuous variables were presented as mean ±SD. Categorical variables were expressed in actual numbers and percentages. Sample population was divided into two groups, those with AKI and those without AKI. Population with AKI further grouped into risk, injury and failure group. Continuous variables were compared in both the groups by performing unpaired t-test. Categorical variables were compared by performing chi-square test. P-value <0.05 was considered as statistically significant.

RESULTS

We recruited 140 confirmed hospitalized cases of tropical acute febrile illnesses (TAFI).Out of 140 patients included in study, AKI occured in 39 patients. In this study on admission AKI were present in 30 (21.43%) (30/140) patients. After admission total number of patients with AKI were 39. It reveals that 9 (6.43%) (9/140) patient developed AKI after admission. With applying Chi-Square Tests and p<0.001, there were significant (21.43%) number of patient developed AKI before admission.

TABLE NO.1 Comparison of egfr and acute kidney injury as per rifle class.

eGFR(ml/min/1.73m²)	risk	injury	failure	P-VALUE
on admission	42.12± 3.22	26.71 ±2.21	17.46± 17.69	<0.0001,HS
lowest	39.75± 3.10	25.71± 2.75	14.66± 15.88	<0.0001,HS
on discharges	63.75 ±8.58	46.85	30.93± 27.19	<0.0001,HS

From the above table eGFR decreases significantly from risk to injury to failure class with mean eGFR on admission in risk class was (42.12±3.22) ml/min/1.73m² and (17.46±17.69) ml/min/1.73m² in failure class in patient with AKI. Mean urine output in AKI group on admission was (728.86±659.31) ml/24hr which was significantly

lower than (1560.49±386.03) ml/24hr no AKI group. Level of serum creatinine on admission in patient who received RRT was(5.5±0.943) mg/dl and in patient who not received RRT was(1.55±1.243) mg/dl ,which shows that serum creatinine on admission was significantly(p<0.001,by unpaired t-test) higher in those who received RRT. Level of eGFR on admission in patient who received RRT was (13.6±2.951) ml/min/1.73m^2 and in patient who not received RRT was (70.48±23.083) ml/min/1.73m^2,which shows that eGFR on admission was significantly (p<0.001, by unpaired t-test) lower in those who received RRT.

TABLE NO. 2 Relation of serum creatinine and eGFR on admission to non survival of patient.

		Group Statistics			
	Outcome	No.	Mean	SD	SEM
Creat	S	124	1.61	1.251	0.112
	NS	16	3.53	2.677	0.669
eGFR	S	124	68.26	22.042	1.979
	NS	16	52.19	48.608	12.152

creat= creatinine on admission (mg/dl), eGFR= eGFR on admission(ml/min/1.73m^2), s=survival,Ns=non survival, SD=Standard deviation,SEM=Standard Error of Mean

By applying unpaired t-test (p=0.023), it was found that eGFR on admission in case of non survival was significantly lower than survival.

RRT was received by 0% patient in risk and injury class, 100% patient receiving RRT belong to failure class. By applying chi square test (p<0.001) it reveals that as AKI stage changes from risk-injury to failure RRT requirement increases significantly (p<0.001).Mortality of patient in AKI group was 10 (25.60%) and mortality in non AKI group was 6 (5.90%) found to be significantly different(p=0.001).

Out of total 39 patient of AKI in present study maximum patient 16(11.43%) belong to failure class, 13(9.29%) belong to risk class and 10(7.14%) belong to injury class according to RIFLE staging. However there was no statistically significant difference found in distribution of AKI into risk, injury and failure class.

DISCUSSION

Above study shows that most of the AKI occurred before admission to the hospital and only minority occurred after admission. Hence measures to prevent AKI are best initiated at the community and primary healthcare level rather than at a tertiary hospital.

Study by Nair et al[19] also shows increased in-hospital mortality among patients with AKI stage 1, 2 and 3.Similar observation thatincrease in stage of AKI had increased in-hospital mortality and RRT initiation was observed in other study by Thanachartwet V et al.[20]

It was also seen in study by Nair et al[19] that about 10% of AKI patients required RRT and mortality in AKI group was 5.6%. Relatively higher RRT requirement and mortality in our study may be due to referral of more serious patient in late stages of disease.

CONCLUSION

Mortality of patient in AKI group was significantly higher than non AKI group. Hence, AKI is a significant risk factor for mortality. RIFLE criteria are valid and applicable in AKI related to tropical acute febrile illnesses showing both an incremental risk of in hospital mortality and RRT requirement. Most of the AKI occurred before admission to the hospital and only minority occurred after admission. Hence measures to prevent AKI are best initiated at the community and primary healthcare level .

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