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

KEYWORDS: Acute kidney injury, Tropical Acute febrile Illness, Etiological profile

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ABSTRACT Objectives of the study were to study the proportion of acute kidney injury in tropical acute febrile illness as well as to assess the etiological profile of acute kidney injury in tropical acute febrile illness. Study design was descriptive type. It was conducted at a tertiary care institute in Maharashtra between October 2014 to November 2016. We recruited 140 confirmed hospitalized cases of tropical acute febrile illnesses (TAFI) and studied the occurrence of AKI in TAFI by the RIFLE criteria as well as by their association with established diagnosis of tropical acute febrile illness. Out of total patients, 93 are male and 47 are female. Proportion of AKI in TAFI was 27.86% in present study. Proportion of AKI was highest in falciparum malaria 10(43.48%).

INTRODUCTION

Tropical Acute Febrile Illness (TAFI) is defined as all acute febrile syndromes with oral temperature over 37.5oc 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] TAFI with Acute Kidney Injury (AKI) was a major cause of mortality.[3,5] Renal diseases in the tropics aptly reflect the uniqueness of tropical diseases. Acute kidney injury (AKI) in tropics is predominantly community acquired.[7] In a recent study from a large tertiary care hospital in South India, AKI was seen in 41.1% of patients. Worldwide incidence of acute kidney injury (AKI) is variable 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]

This study was conducted with the objectives to highlight the occurrence of acute kidney injury by the RIFLE criteria as well as their association with established diagnosis of tropical acute febrile illness ,common being malaria, salmonellosis, dengue and leptospirosis scrub typhus in central India. The acronym RIFLE stands for the increasing severity classes Risk, Injury, and Failure; and the two outcome classes, Loss and End-Stage Renal Disease (ESRD).The three severity grades are defined on the basis of the changes in Serum Creatinine,eGFR(Estimated Glomerular Filtration Rate) or urine output where the worst of each criterion is used.

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 done was descriptive. 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 was 140.Ethical clearance was obtained from the Institutional Ethic Committee. Thorough counselling of the patients was undertaken and written informed consent was taken. All patients were subjected to standard protocol of clinical and laboratory assessment. Investigations done were Complete blood count ,Peripheral smear for malarial parasite,Bloodurea,Serum creatinine, eGFR(estimated Glomerular filtration rate) ,Serum sodium, Serum potassium ,Total bilirubin ,SGOT,SGPT, ABG (whenever necessary),Urine output , Malarial antigen (falciparum and vivax), Leptospira IgM antibody, Dengue serology ,Scrub typhus IgM antibody, Enteric fever TO/TH antibody titre ,Ultrasound abdomen, Chest x ray.

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.

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 cases of tropical acute febrile illnesses (TAFI) hospitalized in medicine wards, medical ICU and kidney unit from October 2014 to November 2016 and studied the occurrence of AKI in TAFI. There are total 140 patient of TAFI included in study with mean age of 41.76±12.51 years. Out of total patients, 93 are male and 47 are female.

By using chi square (p=0.446) there is no statistically significant difference in number of male and female in AKI group and non AKI group.

Proportion of AKI in TAFI was 27.86% in present study. Out of 140 patients included in study, AKI occur in 39 patients as shown in above table. Proportion of AKI was highest in falciparum malaria 10(43.48%), followed by leptospirosis 5 (41.67%), mixed malaria (3) and vivax malaria 4 (33.33%), dengue 10 (27.02%), scrub typhus 4 (25%) and enteric fever 3 (9.67%). In present study most common TAFI was malarial fever 44(31.43%), followed by dengue fever 37 (26.43%), enteric fever 31 (22.14%), scrub typhus 16 (11.43%), leptospirosis 12 (8.57%). In malarial fever plasmodium falciparum (23) contributes to maximum number of cases followed by vivax malaria (12) and mixed malaria (9).

Table no.1 Distribution of patients in relation to diagnosis.

Diagnosis	TotalCasesN=140	AKIN=39 (27.86%)	No AKI N =101(72.14%)
FalciparumMalaria	23(16.43%)	10(43.48%)	13 (56.52%)
Falciparum+Vivax	9(6.43%)	3(33.33%)	6(66.67%)
Vivax	12(8.57%)	4 (33.33%)	8(66.67%)
Lepto	12 (8.57%)	5 (41.67%)	7(58.33%)
Dengu	37(26.43%)	10(27.03%)	27 (72.97%)
Scrub Typhus	16(11.43%)	4(25%)	12(75%)
Enteric Fever	31 (22.14%)	3(9.68%)	28(90.32%)

Table No.2 Distribution of patients in relation to diagnosis and Rifle staging.

Diagnosis	RiskN=13 (9.29%)	InjuryN=10 (7.14%)	FailureN=16(11.43%)	P-Value

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FalciparumMalaria	3(13.04%)	1 (4.35%)	6 (26.09%)	0.474
Falci+Vivax	1(11.11%)	1 (11.11%)	1 (11.11%)	0.825
Vivax	2(16.66%)	2 (16.67%)	0	0.097
Lepto	2(16.67%)	2 (16.67%)	1 (8.33%)	0.334
Dengu	2(5.41%)	3 (8.11%)	5 (13.51%)	0.765
ScrubTyphus	1(6.25%)	1 (6.25%)	2 (12.5%)	0.995
EntericFever	2(6.45%)	0	1 (3.23%)	0.227

No statistically significant difference found in distribution of AKI into risk, injury and failure class in mixed malaria, vivax malaria,leptospirosis, scrub typhus, enteric fever, dengue fever.

DISCUSSION

Male outnumbered female in this study but by using chi square test(p=0.446) there was no statistically significant difference in number of male and female involved by TAFI. Numbers of men were more affected in our study as compared with women. This could be explained by the fact that Kanodia et al12 also had closely related findings with 63.00% males and 37.00% females of malaria with acute renal dysfunction. Men are more mobile and moving about, including the swampy areas as compared with women in Asian countries, since women are more confined to their homes and near cooking fire and females are better clothed than males, which offer them protection from biting mosquitoes.

Amongst malarial fever plasmodium falciparum(23) contributes to maximum number of cases followed by vivax malaria (12), and mixed malaria (9). According to study by Basu G et al2 in part of southern India common tropical acute febrile illness was due to scrub typhus (51.2%), falciparum malaria (10.4%), enteric fever (8.7%), dengue (7.6%), mixed malaria (6.5%), leptospirosis (3.3%), undifferentiated acute febrile illness (8.4%) and others (3.8%).

In present study malarial infection was common than scrub typhus because most of patient came from remote villages of Maharashtra and Madhya pradesh where malaria is predominant.54 According to study by Nair et al14 the spectrum of TAFI in decreasing order was vivax malaria, leptospirosis, dengue fever, falciparum malaria, mixed malaria, enteric fever, scrub typhus and the most common aetiology was malaria. Proportion of AKI in TAFI was 27.86% in present study.

This is supported with study by Basu G et al2 proportion of AKI was 41.1% in TAFI.

Malarial fever, most common infection in our study, most of these is caused by infection with P.falciparum and P. vivax. Infections caused by plasmodium falciparum have increased in India in recent years.15 Precise mechanism of renal failure in falciparum malaria is not clearly known. Several hypotheses including mechanical obstruction by infected erythrocytes, immune mediated glomerular pathology, fluid loss due to multiple mechanisms and alterations in the renal microcirculation, etc have been proposed.[16,17,18]

LIMITATION OF STUDY

This tertiary hospital data, with its inherent referral bias arising from more ill patients reaching a tertiary care centre, may overestimate the proportion of AKI. TAFI and AKI patients may be missed due to asymptomatic disease, uncomplicated disease manageable at lower centre, non referral, treatment initiation before presentation, death before admission. A larger sample size may provide more significant results.

CONCLUSIONS

Proportion of AKI in TAFI was 27.86% in present study. Most common TAFI was malarial fever 44 (31.43%) followed by dengue fever, enteric fever, scrub typhus, leptospirosis and maximum burden of AKI was due to falciparum malaria and dengue fever.

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