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Original Research

A study of clinical profile of acute kidney injury in acute febrile illness

Dr. Hemant Ashok Edge[1], Dr. Abhijit A Nikam[2], Dr. Madhulika L Mahashabde[3], Dr. Gaurav Chaudhary[4], Dr. Drawpathy S[5]

[1]Resident, [2]Associate Professor, [3]Professor, [4]Assistant Professor, [5]Senior Resident, Department of General Medicine, Dr D.Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune

***ABSTRACT*:**
Background: Acute Febrile Illness (AFI) is defined as all acute febrile syndromes with oral temperature over 37.5°C which last from 24 hours to less than two weeks, including nonspecific symptoms that are not helpful for us to localize to a particular system. Acute kidney injury (AKI) is defined as heterogenous syndrome of sudden decline in glomerular filtration rate (GFR) culminating into retention of metabolic waste products like urea and creatinine along with dysregulation of electrolytes and fluid and changes in acid base homeostasis. Hence; the present study was undertaken for assessing the clinical profile of acute kidney injury in acute febrile illness. **Materials & methods:** A total of 100 patients of acute febrile illness admitted in all medical wards and MICU were selected for the study. The diagnoses were made as per the standard diagnostic criteria. Detailed history of all participants was taken which included past, personal, medication and addiction history. Detail evaluation of all symptoms like fever, body ache, rash and other non-specific symptoms. Complete demographic and clinical profile was evaluated. Blood samples were obtained and complete biochemical profile was analysed. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** The male to female ratio is 6.1:1. 2 (2.0) participants had mild hepatomegaly, 6 (6.0) participants had mild splenomegaly, 6 (6.0) participants had mild hepato-splenomegaly and 86 (86.0) participants had normal USG findings. 60 (60.0) participants were in Normal Grade, 17 (17.0) participants were in Risk Grade. Haemodialysis was required in 4 normal participants, 1 participant in Grade 2 group and 2 participants in Grade 3 group. **Conclusion:** Acute Kidney injury in Acute Febrile Illness is common in tertiary care hospital. Adults are at more risk for Acute Kidney injury. Dengue, Malaria, Leptospirosis and Enteric fever are among most common causes of acute febrile illness.

Key words: Acute kidney injury, Febrile, Illness

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Corresponding author: Dr. Hemant Ashok Edge, Resident, Department of General Medicine under Dr D.Y. Patil Medical College, Hospital & Research Centre, situated in Pimpri, Pune.

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INTRODUCTION

Acute Febrile Illness (AFI) is defined as all acute febrile syndromes with oral temperature over 37.5°C which last from 24 hours to less than two weeks, including nonspecific symptoms that are not helpful for us to localize to a particular system.

Acute Febrile Illness can present with fever, generalized body pain, vomiting, generalized swelling of the body, loose stools, decreased urine output, swelling of legs, breathlessness, headache, cough, chest pain, altered sensorium and signs like fever, rashes, tachycardia, myalgia, conjunctival congestion and others.[1–7]

Acute kidney injury (AKI) is defined as heterogenous syndrome of sudden decline in glomerular filtration rate (GFR) culminating into retention of metabolic waste products like urea and creatinine along with

dysregulation of electrolytes and fluid and changes in acid base homeostasis.[8]

Acute kidney injury presents as major complication of infective and non-infective aetiology. Acute febrile illness is a major cause of mortality.[4, 6]

The importance of this quest is to reduce mortality and renal morbidity which is amplified by the fact that among all critically ill patients, the mortality is around 60% during hospitalization and dialysis dependency is 13% in survived patients.[9]

In patients who recovered from acute renal failure after different periods of renal replacement therapy, 41% showed decline in renal function and five-year survival was present in 50% patients.[10] This puts an additional burden on health infrastructure and economy.[11] Infectious disease resulting from established as well as novel bacterial and viral diseases are increasing with 13 million deaths annually.[12]

In developing countries infectious diseases account for about 50% deaths, as a result of increase in incidence of these diseases and poor health care infrastructure.[4] Most of these diseases are sub optimally managed in the community, often presenting with complications to higher centres. Alternately long hours spent in travel to health care centres contribute to deterioration in organ function and reserve. Hence; the present study was undertaken for assessing the clinical profile of acute kidney injury in acute febrile illness.

MATERIALS & METHODS

The study was conducted in The Department of General Medicine under Dr D.Y. Patil Medical College, Hospital & Research Centre, situated in Pimpri, Pune. Approval was taken from Institutional Ethical Committee. All patients admitted to medical wards and MICU in Dr D.Y Patil Hospital, during September 2018 – August 2020, diagnosed with acute febrile illness were subjected to the study as per study design. A total of 100 patients of acute febrile illness admitted in all medical wards and MICU were selected for the study. The diagnoses were made as per the standard diagnostic criteria. Approval was taken from the Institutional Ethical Committee before commencing the study. Consent (informed and written) was taken from all patients included in the study. The patients were informed about the study in their own comprehensible language. Detailed history of all participants was taken which included past, personal, medication and addiction history. Detail evaluation of all symptoms like fever, body ache, rash and other non-specific symptoms. Complete demographic and clinical profile was evaluated. Blood samples were obtained and complete biochemical profile was analysed. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

13 (13.0) participants were less than 20 years, 31 (31.0) participants were between 21-30 years, 20 (20.0) participants were between 31-40 years, 18 (18.0) participants were between 41-50 years, 10 (10.0) participants were between 51-60 years, 5 (5.0) participants were between 61-70 years and 3 (3.0) participants were between 71-80 years. 86 (86.0) participants were male and 14 (14.0) participants were female. The male to female ratio is 6.1:1. 2 (2.0) participants had mild hepatomegaly, 6 (6.0) participants had mild splenomegaly, 6 (6.0) participants had mild hepato-splenomegaly and 86 (86.0) participants had normal USG findings. 60 (60.0) participants were in Normal Grade, 17 (17.0) participants were in Risk Grade, 9 (9.0) participants were in Injury Grade and 14 (14.0) participants were in Failure grade. 61 (61.0) participants were in Normal Grade, 21 (21.0) participants were in Grade 1, 11 (11.0) participants were in Grade 2 and 7 (7.0) participants were in Grade 3. 60 (60.0) participants were in Normal Grade, 17 (17.0) participants were in Grade 1, 9 (9.0) participants were in Grade 2 and 14 (14.0) participants were in Grade 3.

Among the 11 Malaria NS1 positive participants, 6 participants were in Normal Grade, 1 participant was in Risk Grade, 2 participants were in Injury Grade and 2 participants were in Failure grade.

Among the 5 Widal positive participants, 0 participants were in Normal Grade, 3 participants were in Risk Grade, 1 participant was in Injury Grade and 1 participant was in Failure grade. Among the 7 Leptospirosis positive participants, 1 participant was in Normal Grade, 2 participants were in Risk Grade, 0 participant was in Injury Grade and 4 participants were in Failure grade. statistically significant difference observed in Urea and Creatinine level at day 0, day 2 and day 5 level between Normal participants and RIFLE grading with p value less than 0.05. Statistically significant difference observed in Sodium, Potassium, Uric Acid and Calcium level between Normal participants and RIFLE grading with p value less than 0.05. statistically significant difference observed in Phosphorous, Magnesium, pH and HCO3 level between Normal participants and RIFLE grading with p value less than 0.05. Haemodialysis was required in 4 normal participants, 1 participant in Grade 2 group and 2 participants in Grade 3 group.

DISCUSSION

In the present study, it was observed that mean age of the study participants was 36.8 ±15.1 years. In the study conducted by C.M.Atkar et al., it was observed that mean age of the study participants was 41.76±12.51 years.[11]In the study conducted by Jayalal

Jayapalan Nair et al., it was observed that mean age of the study participants was 40.34±15.42 years.[12]
According to AKIN grading, it was observed that in 21 -30 years age group, 18 participants were in Normal Grade, 6 participants were in Grade 1, 4 participants were in Grade 2 and 3 participants were in Grade 3 while among the 31 – 40 years age group, 15 participants were in Normal Grade, 2 participants were in Grade 1, 3 participants were in Grade 2 and 0 participants were in Grade 3. In the study conducted by Jayalal Jayapalan Nair et al., it was observed that 152 (46.9) participants were in Grade 1, 101 (31.2) participants were in Grade 2 and 71 (21.9) participants were in Grade 3.[12]

Table 1: Age wise distribution

Age Group	Frequency	Percent
<20	13	13.0
21 - 30	31	31.0
31 - 40	20	20.0
41 - 50	18	18.0
51 - 60	10	10.0
61 - 70	5	5.0
71 - 80	3	3.0
Total	100	100.0

Table 2: Distribution of patients according to RIFLE grade

RIFLE Grade	Frequency	Percent
Normal	60	60.0
Risk	17	17.0
Injury	9	9.0
Failure	14	14.0
Total	100	100.0

Table 3: Distribution of patients according to AKIN grade

AKIN Grade	Frequency	Percent
Normal	61	61.0
Grade 1	21	21.0
Grade 2	11	11.0
Grade 3	7	7.0

Table 4: Distribution of patients according to KDIGO grade

KDIGO Grade	Frequency	Percent
Normal	60	60.0
Grade 1	17	17.0
Grade 2	9	9.0
Grade 3	14	14.0

In the present study, it was observed that 60 (60.0) participants were in Normal Grade, 17 (17.0) participants were in Risk Grade, 9 (9.0) participants were in Injury Grade and 14 (14.0) participants were in Failure grade. In the study conducted by C.M.Atkar et al., it was observed that 101 (72.1) participants were in Normal Grade, 13 (9.3) participants were in Risk Grade, 10 (7.1) participants were in Injury Grade and 16 (11.4) participants were in Failure grade.[11]

Table 5: Comparison of various diseases distribution with RIFLE grading

Disease	Normal	Risk	Injury	Failure	Total
Widal	0	3	1	1	5
Lepto IgM	1	2	0	4	7
Dengue NS1	52	10	5	7	74
Dengue IgM	52	10	5	7	74
Dengue IgG	0	0	0	0	0
Chikungunya	1	1	1	0	3
Malaria	6	1	2	2	11
Bl. Culture	0	3	1	1	5
Urine culture	0	0	0	0	0

Table 6: Comparison of haemodialysis as per AKIN Grade

Haemodialysis	Normal	Grade 1	Grade 2	Grade 3	Total
Yes	4	0	1	2	7
No	57	21	10	5	93

In the present study, it was observed that among the 74 Dengue NS1 positive participants, 52 participants were in Normal Grade, 12 participants were in Grade 1, 7 participants were in Grade 2 and 3 participants were in Grade 3. In the study conducted by C.M.Atkar et al., among the Falciparum Malaria participants, in 10 (43.5) participants AKI was present while in 13 (56.5) participants AKI was absent; among the Falciparum Vivax Malaria participants, in 3 (33.3) participants AKI was present while in 6 (66.7) participants AKI was absent; among the Vivax Malaria participants, in 4 (33.3) participants AKI was present while in 8 (66.7) participants AKI was absent; among the Leptospirosis participants, in 5 (41.7) participants AKI was present while in 7 (58.3) participants AKI was absent; among the Dengue participants, in 10 (27.0) participants AKI was present while in 27 (73.0) participants AKI was absent; among the Scrub typhus participants, in 4 (25.0) participants AKI was present while in 12 (75.0) participants AKI was absent; among the enteric fever participants, in 3 (9.7) participants AKI was present while in 28 (90.3) participants AKI was absent.[11]
In the present study, it was observed that all the participants showed improved prognosis. In the study conducted by Kallol Bhattacharjee et al., out of 52 participants who developed AKIN, 5 participants required Renal replacement therapy. Mortality was observed in 2 participants. Among this 1 was suffering from Mixed malaria and other one from dengue fever which complicated to Dengue shock syndrome.[13]
In the study conducted by Gopal Basu et al., according to RIFLE category, among the Falciparum Malaria participants, 7 (18.4) participants had Risk grade, 3 (7.9) participants had Injury grade and 14 (36.8) participants had Failure grade; among the Falciparum+vivax Malaria participants, 6 (25.0) participants had Risk grade, 2 (8.3) participants had Injury grade and 5 (20.8) participants had Failure grade; among the Vivax participants, 2 (33.3) participants had Risk grade, 0 participants had Injury

grade and 0 participants had Failure grade; among the leptospirosis participants, 3 (25.0) participants had Risk grade, 1 (8.3) participant had Injury grade and 2 (16.7) participants had Failure grade; among the Dengue participants, 4 (14.3) participants had Risk grade, 1 (3.6) participant had Injury grade and 5 (17.9) participants had Failure grade; among the scrub typhus participants, 38 (20.2) participants had Risk grade, 21 (11.2) participants had Injury grade and 21 (11.2) participants had Failure grade; among the enteric fever participants, 0 participants had Risk grade, 1 (3.1) participant had Injury grade and 1 (3.1) participant had Failure grade.[3]

CONCLUSION

Acute Kidney injury in Acute Febrile Illness is common in tertiary care hospital. Adults are at more risk for Acute Kidney injury. Dengue, Malaria, Leptospirosis and Enteric fever are among most common causes of acute febrile illness. The incidence of AKI in among these patients is 40%. Dengue is most common cause of AFI and AKI in this study. Maximum burden of AKI is due to Dengue, Malaria and Leptospirosis.

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