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Original Research Article

A Study of Tropical Febrile Illness's Clinical Profile and Reaction to Acute Kidney Damage

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Abstract:

Background: One of the leading causes of morbidity in the community is Tropical Acute Febrile Illness (TAFI). A significant consequence is Acute Kidney Injury (AKI) from both infectious and non-infectious causes. One of the main causes of death for TAFI patients is the existence of AKI. In tropical nations like India, acute febrile fever ranks among the leading causes of morbidity and mortality. Fever-related acute kidney damage (AKI) is a common, potentially fatal consequence that also increases morbidity and death. Prerenal and intrarenal factors account for the majority of acute kidney injury in cases of tropical diseases. The rising occurrence of tropical infections linked to thrombocytopenia, which raises the risk of acute kidney injury, may be caused by the growth of risk factors such as migration, urbanization, international travel, and global warming.

Aim: The aim of the study was to Study the Clinical Profile and Outcome of Acute Kidney Injury in Acute Febrile Illness.

Material and Method: This cross-sectional observational study was conducted in the General Medicine department. We assessed thirty patients with acute renal injury who also had acute febrile sickness and thrombocytopenia, and we tracked their progress until they were discharged. The inclusion and exclusion criteria were used to choose patients for the observational trial who had a history of acute febrile illness at the time of admission. Acute kidney injury patients had extensive study and were monitored till they were discharged or passed away. Thorough medical history at the time of admission on the length of the fever and any accompanying symptoms, such as nausea, vomiting, chest discomfort, dyspnea, and decreased urine production. The next step was a thorough physical examination to check for petechiae or purpura in the event of bleeding manifestation brought on by low platelet count, and eschar in the case of scrub typhus.

Results: After applying inclusion and exclusion criteria, 104 individuals were admitted with acute febrile illness during the study period. Thirty of them experienced AKI at some point throughout their illness. These thirty cases underwent extensive research. About 12.5% of cases of acute febrile fever also have acute renal damage. Of these, four had dialysis, and the other twenty-six were treated conservatively. Of those, the dengue virus is responsible for about 14 cases. Yet among individuals who test positive for dengue, dengue AKI makes up a smaller percentage of AKI.

Conclusion: In the study population, the incidence of AKI is approximately 14%. AKI is more prevalent in older age groups and in men. The most frequent cause of acute renal damage is malaria. A significant epidemic outbreak of dengue fever has occurred recently. Acute renal damage is increasingly being caused by dengue infection. In the event that AFI is not identified and treated as soon as feasible, the death rate is significant. In individuals with AFI, multiorgan dysfunction is the cause of death. The rising trend of mixed infections is challenging to both diagnose and treat. The single most effective life-saving intervention is awareness of probable renal problems and the prevention and treatment of them when necessary.

Keywords: Acute Kidney Injury, Acute Febrile Illness and Tropical Disease

Introduction

Tropical Acute Febrile Illness (TAFI) is defined as any acute febrile syndrome in tropical and sub-tropical developing countries that has resulted in an oral temperature higher than 37.5°C within the last 24 hours and less than two weeks. Non-specific symptoms include any symptoms that are not specific to any one system and are the typical complaints of an individual suffering from an acute febrile illness, such as fever, generalized body pain, loose stools, vomiting, swelling of the legs, generalized body swelling, decreased urine output, cough, chest pain, altered sensorium, headache, and

others, as well as non-specific signs such as fever, tachycardia, myalgia, conjunctival congestion, rashes, joint pains, and others. [1]

The severe fever illness is defined as an oral temperature that was higher than 37.5 degrees Celsius in the last 24 hours and less than 14 days, together with nebulous symptoms that make it difficult to pin down the cause to a particular system. [2,3] The hazy symptoms include fever, rash, body discomfort, loose stools, vomiting, summed-up body expansion, decreased urine yield, headache, hacking, and dyspnea. [4]

Perhaps the most well-known cause of horror and death in tropical countries like India is a severe fever illness. [5,6] Fever with thrombocytopenia-induced acute kidney damage (AKI) is one of the many subsequent, potentially fatal, and deadly complications and causes of grimness and mortality. The current situation calls for an improved syndromic strategy, prompt treatment, and foresight of complications.

In illnesses that cause fever, such as malaria, dengue, typhoid, rickettsial fever, leptospira, and chikungunya infections, AKI is typical. [7,8] Prerenal and intrarenal factors account for the majority of the severe kidney damage that occurs when tropical illnesses strike. The increased incidence of tropical diseases linked to thrombocytopenia may be caused by the rise in risk factors such as international travel, relocation, urbanization, and global temperature rise. This, in turn, may lead to an increased frequency of severe kidney injury. A primary cause of death was Acute Kidney Injury (AKI) along with TAFI. [5] Complicating factors include pandemics, global warming, migration, urbanization, population expansion, and reemerging and emerging illnesses. The most recent guidelines are needed for AKI management. [9] The present situation demands a better syndromic approach, early treatment, and prevention of complications. [10]

Tropical infections are widespread in the nation. We are primarily exposed to Dengue, Malaria, Typhoid, Leptospirosis, Scrub Typhus, and so forth among them. Rodents, houseflies, and mosquitoes are the main vectors that spread these illnesses. Certain illnesses, such leptospirosis, are more prevalent throughout specific seasons. Additionally, we are currently dealing with difficult-to-treat mixed infections. All of these infections have the potential to raise morbidity and mortality rates by resulting in respiratory and renal failure, as well as occasionally multi-organ dysfunction and patient death. These patients' development of acute kidney injury has numerous underlying causes. thereby lengthening the hospital stay and serving as a sign of chronic kidney disease (CKD). [11]

Primary care doctors ought to receive training and consideration for the warning indicators of dengue. All levels of primary health care must develop and adhere to a referral protocol. Strict adherence to the treatment regimen is required for the management of acute febrile sickness in tropical regions.[12] The increased occurrence of tropical diseases linked to thrombocytopenia, which raises the risk of acute kidney injury, may be caused by risk factors such as migration, urbanization, foreign travel, and global warming.

Material and Methods

This was an observational cross-sectional study carried out in the department of General Medicine. We evaluated 30 patients who were having acute kidney injury in acute febrile illness with thrombocytopenia and studied their outcome till discharge. Patients who were admitted with a history of acute febrile illness were selected for the observational study according to the inclusion and exclusion criteria. Patients who developed Acute Kidney Injury were studied in detail and followed up till the discharge or death of the patient. At the time of admission, detailed history about the duration of the fever, and associated symptoms like vomiting, abdominal pain, chest pain, breathlessness, and reduced urine output. After that, a complete physical examination was done to look for eschar in case of scrub typhus, and petechiae or purpura in case of bleeding manifestation caused by low platelet count.

Patients aged more than 18 years with TAFI were included in the study. Patients aged less than 18 years with nosocomial and chronic infections, fever with single system involvement, non-infectious aetiologies of unknown origin, chronic kidney disease, acute kidney injury secondary to non-infectious aetiologies, and lastly, immunocompromised and immunosuppressed individuals and pregnant females were excluded from the study.

Inclusion Criteria

- Patients above 18 years of age having an acute febrile illness with platelet count less than 1.5 lakhs/cumm with acute kidney injury due to Dengue, Malaria, Leptospira infection, Rick-ettsial fever, Typhoid, and Chikungunya will be taken after laboratory confirmation.

Exclusion Criteria

- Patients below 18 years.
- Pregnant women.
- Snakebite.
- Bacterial sepsis– Clinical and Radiological features suggestive of pyelonephritis, pneumo-nia, meningitis, gastroenteritis, acute viral hep-atitis & intra-abdominal abscess.
- Immunocompromised.

- Inherited thrombocytopenia, chronic liver disease.

Procedure:

AKI is common, harmful, and potentially treatable. Even a minor acute reduction in kidney function has an adverse prognosis. Early detection and treatment of AKI may improve outcomes. As per the recent KDIGO AKI Guidelines - AKI is defined as any of the following:

- Increase in SCr by ≥0.3 mg/dl (≥26.5 μmol/l) within 48 hours
- Increase in SCr to ≥1.5 times baseline, which is known or presumed to have occurred within the prior 7 days
- Urine volume <0.5 ml/kg/h for 6 hours.

A complete number of hospitalized Patients with Acute febrile ailment with Thrombocytopenia is read for the period and to associate the turn of events and range of intense kidney injury among them and its result is estimated. On the off chance that standard creatinine isn't referred to, we have considered it as 0.8. We have likewise seen a decrease of creatinine in the medical clinic stay till release for thinking about a case as intense kidney injury. The result is estimated by eGFR utilizing the MDRD equation at the release of the patient and separated into three gatherings,

- Complete recuperation: >60ml per min.
- Partial recuperation: 60-15 ml for each min.
- No recuperation: <15 ml per min.
- Death.

Statistical Analysis

The data collected from the inpatients of the SS institute of medical science and research center will be analyzed, and the results will be tabulated. Data analysis was done using SPSS version 17.0 with statistical significance calculated using chi-square and Fisher's exact t-test for which p-value < 0.05 was considered significant.

Result: -

After applying inclusion and exclusion criteria, 104 individuals were admitted with acute febrile illness during the study period. Thirty of them experienced AKI at some point throughout their illness. These thirty cases underwent extensive research. About 12.5% of cases of acute febrile fever also have acute renal damage. Of these, four had dialysis, and the other twenty-six were treated conservatively. There has only been one death in the entire study population. Our study reveals that multiorgan dysfunction was the cause of mortality.

Table 1: Age-Wise Distribution of Fever and AKI Among Acute Febrile Illness

Age Group	Frequency	Percentage
18 - 20 Years	44	30.2
21-30 Years	35	34.2
31-40 Years	10	17.8
41-50Years	10	13.8
Above 50 Years	5	4.0
Total	104	100.0

In our study, most acute febrile illness affects young and middle age group people. Among them, most of the population falls between the range of 18-30 yrs.

Table 2: Distribution of Etiology of AKI Among Acute Febrile Illness

ETIOLOGY			GROUP		TOTAL
			NON-AKI	AKI	
		Count	30	14	44
	Dengue				
		Percentage	38.7%	45.2%	39.6%
		Count	12	4	16
	Leptospirosis				
		Percentage	9.3%	12.9%	9.8%
		Count	13	6	19
	Malaria				
		Percentage	10.8%	19.4%	12.0%
		Count	5	2	7
	Mixed Infection				
		Percentage	4.6%	6.5%	4.9%
		Count	2	2	4
	Scrub Typhus				
		Percentage	1.0%	6.5%	1.8%
		Count	3	2	5

	Typhoid				
		Percentage	4.1%	9.7%	4.9%
		Count	8	0	8
	Undiagnosed				
		Percentage	31.4%	0.0%	27.1%
		Count	73	30	104
Total					
		Percentage	100.0%	100.0%	100.0%

Thirty participants in our study experienced acute renal damage. Of those, the dengue virus is responsible for about 14 cases. Yet among individuals who test positive for dengue, dengue AKI makes up a smaller percentage of AKI. On the other hand, among IgM scrub typhus, blood culture, and smear for Mp/Mf positive patients, respectively, scrub typhus, typhoid, and malaria occupy a very high share of AKI. According to our research, scrub typhus accounts for around 50% of acute kidney injury (AKI), while typhoid and malaria account for approximately 27.3% and 22.2% of AKI, respectively. Dengue accounts for approximately 15.7% of all AKI patients.

Table 3: Distribution of Platelet Among Acute Febrile Illness

Platelet Group	Frequency	Percentage
<10 Thousand	10	4.9
10 -50 Thousand	40	42.7
0.5-1 Lakh	30	31.1
1-1.5 Lakh	14	11.6
Above 1.5 Lakh	10	9.8
Total	104	100.0

In our study, the majority of patients around 90% had thrombocytopenia. Among 90%, most of them had a platelet count between 10,000 – 50,000 which constitutes around 43%. Around 5% of cases had platelet less than 10,000.

Discussion

It is critical to identify the prevalence, etiological profile, and outcome of AKI in order to compare epidemiological research and implement suitable management for better clinical decision-making. According to the current prospective observational study conducted at a tertiary facility in southern India, 25.1% of critically sick children admitted to the PICU had AKI. In 27.8% of cases, RRT was necessary. The incidence of AKI has been reported to vary widely from 10% to 82% in some recent pediatric studies using risk, injury, failure, loss, end-stage criteria, or its modifications. These reports highlight the heterogeneity of patient populations, diverse regional differences, sample sizes, and study designs. [13,14]

Kasper MR et al.2012 [15], influenza, bacterial bloodstream infections and broadly, bacterial zoonoses. Malaria is the most common cause of TAFI, and this may be due in part to its endemicity in the coastal Karnataka areas. The proportion of vivax, falciparum, and mixed malaria was also different from studies by Bhandary N.2011 [6], Basu G et al.2011 [1], and Kasper et al.2012 [15]. The epidemiological and demographic characteristics of the patients—manual laborers exposed to daytime bites from Aedes mosquitoes and farmers exposed to tainted water, respectively—may help to explain the proportion of dengue fever and leptospirosis.

Chrispal et al.2010 [4] conducted a similar study in South India, and were unable to elucidate a clear diagnosis in 8% of cases and had an alternate diagnosis (unspecified fever) in 7.3% of cases. Patients with AFI were diagnosed with scrub typhus (47.5%), malaria (17.1%), enteric fever (8%), leptospirosis (3%), rickettsiosis (1.8%), and Hantavirus (0.3%). Renal failure was found most frequently in malaria (38.2%), scrub typhus (19.6%), dengue (17.9%), and leptospirosis (16.7%), according to a similar study done in 2010. Although overt renal failure was not measured in our analysis, abnormal renal function tests were most frequently associated with scrub typhus (68%), leptospirosis (60%), malaria (36%), and dengue (32%).

The majority of diseases spread by vectors have a certain seasonal rhythm, and meteorological variables like temperature, precipitation, and other conditions affect both the vector and the infection they carry. As a result, rainy seasons witness the highest number of cases due to water logging, which serves as a mosquito breeding ground. The increased farming activity and rapid development of scrub vegetation during the monsoon and post-monsoon periods, which encouraged the mites' proliferation, are likely to blame for the higher number of cases of scrub typhus in our study. [6]

In a study done by Nair et al,2003 [17] out of 109 patients 45(41.3%) patients had bleeding

manifestations. In our study, petechiae/purpura affected 40(20%) of the patients, and the most prevalent bleeding manifestation was melena, which affected 14(7%), hematuria, 8(4%), subconjunctival hemorrhage, 4(2%), epistaxis, 2(1%), hematemesis, and 1(.5%) of the patients.

The study provides a comprehensive picture of all tropical acute febrile disorders since it includes all patients with acute febrile sickness. In accordance with their National and International Guidelines, strict protocols were adhered to for the management of all acute febrile illnesses. Only thirty AKI have been examined since the research period. As a result, the study does not fully capture the range of acute febrile illnesses associated with AKI. The study did not include renal biopsy. Dengue accounts for the bulk of the cases of acute febrile illness that were collected for the study. As a result, not all acute fever illnesses may be similarly affected by the outcome and other results.

Conclusion

In the study population, the incidence of AKI is approximately 14%. AKI is more prevalent in older age groups and in men. The most frequent cause of acute renal damage is malaria. A significant epidemic outbreak of dengue fever has occurred recently. Acute renal damage is increasingly being caused by dengue infection. In the event that AFI is not identified and treated as soon as feasible, the death rate is significant. In individuals with AFI, multiorgan dysfunction is the cause of death. The rising trend of mixed infections is challenging to both diagnose and treat. The single most effective life-saving intervention is awareness of probable renal problems and the prevention and treatment of them when necessary.

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