e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(6); 1054-1056

Original Research Article

Etiology, Clinical Profile and Outcome in Patients with Fever, Jaundice and Acute Kidney Injury: A Prospective Study

Praveen Kumar Singh[1], Abhilok Kumar Jha[2], Umesh Chandra Jha[3]

[1]Assistant Professor, Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar

[2]Senior Resident, Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar

[3]Associate Professor, Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar

Received: 25-01-2024 / Revised: 23-02-2024 / Accepted: 26-03-2024

Corresponding Author: Dr. Abhilok Kumar Jha

Conflict of interest: Nil

Abstract:

Background: Previously referred to as acute renal failure, acute kidney injury (AKI) is defined by an abrupt reduction of kidney function that causes the kidneys to retain waste products that are normally eliminated by the kidneys, including nitrogenous waste. This study aims to investigate the etiology, risk factors, clinical and laboratory characteristics, and outcome of patients who report with acute renal damage, fever, and jaundice.

Methods: This prospective study was done on 100 patients presented with triad of fever, jaundice and acute kidney injury (AKI) in the Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from November 2020 to October 2021. Patients having temperature more than $>100^0$ F, serum creatinine ≥1.3 mg/dL or a 50 % increase from baseline or a reduction in urine output (documented oliguria of <0.5 ml/kg/hr for >6 hours), serum bilirubin >1.8 mg/dL were included in the study. A detailed history, clinical examination and investigations were done to find the cause of these derangements and all the patients were managed accordingly.

Results: A total 100 patients were included in study out of which 70% were males. Out of 100 patients, 50% were of septicemia, 34% were having malaria, 12% had acute pancreatitis and 4% patients were of dengue. Out of 50 septicemia patients, 35(70%) were male, out of which 11(31.42%) were of 56-65 years of age. Out of 17 deaths, 13(76%) were males. Among total death, 11(22%) were in septicemia followed by 5(14.70%) in malaria patients.

Conclusion: Many infectious and non-infectious diseases like malaria, septicemia, acute pancreatitis, dengue fever etc. can present with fever, jaundice and deranged renal functions. This triad of presentation is associated with high morbidity and mortality and the advanced age, male gender presences of anemia were the risk factors for high mortality. AKI occurs most commonly in association with P. falciparum malaria. Early diagnosis and prompt management including dialysis can reduce mortality and expedite recovery of renal function.

Keywords: Acute kidney injury, Malaria, Septicemia, Acute pancreatitis.

Introduction

Fever, jaundice and acute kidney injury (AKI) can be a common presentation of many tropical infections and some non-infectious diseases. Infections are an important cause of morbidity and mortality; responsible for around 13 million deaths in a year; out of which majority are in developing countries. [1]

The causes of the triad of fever, jaundice and acute kidney injury can be but not limited to malaria, viral hemorrhagic fevers including dengue, leptospirosis, and septicemia of any etiology. [2] Septicemia is characterized by a generalized inflammatory reaction and activation of coagulation and fibrinolytic cascades, leading in endothelial injury.3 AKI is one of the complications of sepsis. [3] Studies have shown higher mortality in patients with septic AKI (74.5%) compared to in those whose renal failure did not result from sepsis (45.2%). [3]

Clinical presentation of severe malaria more frequently involves liver and kidney. The incidence of AKI in severe malaria varies from 1-60% with a very high mortality, whereas incidence of jaundice varies from 8 – 37 %. [4,5]Dengue is one of the most quickly spreading mosquito-borne viral diseases in the world.6 Incidence of hepatic and

renal dysfunction along with bleeding is increasing in dengue fever. [6]

AKI is a complication of Septicemia, malaria and Dengue.[3,4,6] AKI is a protean syndrome characterized by a rapid decline in the glomerular filtration rate and retention of nitrogenous waste products such as creatinine. [4] The etiology of AKI is usually multifactorial due to hyperbilirubinemia, intravascular hemolysis, volume depletion, hypoxia, shock, pigment nephropathy, disseminated intravascular coagulation and sepsis.[7]

The differential diagnosis of patients presenting with fever and multiorgan involvement is important particularly in tropical countries where malaria and dengue are epidemic.

Material and Methods

This prospective study was done on 100 patients presented with triad of fever, jaundice and acute kidney injury (AKI) in the Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from November 2020 to October 2021.

Patients presented with temperature >100^0F, serum creatinine ≥1.3 mg/dL or a 50% increase from baseline or a reduction in urine output (documented oliguria of <0.5 ml/kg/hr for >6 hours), serum bilirubin >1.8 mg/dL were included in the study. Patients with established chronic liver and kidney disease were excluded from the study.

A detailed history and clinical examination was done along with investigation like complete blood count (CBC), peripheral blood smear (thin and thick) for malaria parasite (MP), blood sugar, serum bilirubin, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), urea, creatinine, serum protein, serum electrolyte, x-ray chest, arterial blood gas (ABG) if needed, and serum IgM for dengue in selective patients. The tests were repeated as indicated. Microscopic examination of blood films was done which is accepted as the current universal "gold standard" for the diagnosis of malaria. All statistical analysis was done using epical 2000. P value of <0.05 was taken as significant.

Results

Out of 100 patients 50% were of septicemia, 34% were having malaria, 12% had acute pancreatitis and 4% patients were of dengue (table 1).Out of 50 septicemia patients, 35(70%) were male and 15(30%) were female. Out of 35 male patients of septicemia, 11(31.42%) were of > 55 years of age and from 15 female, 3 (20%) belong to age group of >55 years. Among 34 malaria patients there were 24 (70%) males and 6 (18%) were of age >55 years.

Table 1: Distribution of the patients and mortality according to etiology

Etiology	No. of cases			Mortality		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
Septicemia	35(70%)	15(30%)	50(100%)	8(72.72%)	3(27.27%)	11(100%)
Malaria	24(70.58%)	10(29.41%)	34(100%)	4(80%)	1(20%)	5(100%)
Acute pancreatitis	8(66.66%)	4(33.33%)	12(100%)	1(100%)	0(0)	1(100%)
Dengue	3(75%)	1(25%)	4(100%)	0(0)	0(0)	0(0)

Maximum mortality [11(22%)] was seen in septicemia patients followed by malaria [5 (14.70%)]
All 12 patients of acute pancreatitis were of > 55 years of age and anemia was present in 3(25%). All patients of dengue were below the age of 50 years.
Out of 100 patients, 12% had abdominal pain, 67% had decreased urine output and diarrhea was present in 30% of patients. Fever, yellowish discoloration of sclera (marker of jaundice) was present in all the patients. Total Leukocyte count (TLC), serum bilirubin and serum creatinine were deranged in all cases of septicemia, malaria and acute pancreatitis (table 2). Out of 11 mortality in septicemia patients, 9(81.81%) were having serum creatinine ≥3 times baseline or serum creatinine>4 mg/dL. Out of 5 mortality in malaria patients, 4(80%) were with serum creatinine ≥3 times of baseline or serum creatinine> 4 mg/dL.

Table 2: Distribution of various parameters in mortality cases

Etiology	Parameters				
	Anemia*	TLC$	Serumbilirubin#	Serumcreatinine@	Total
Septicemia	7(63.63%)	11(100%)	11(100%)	11(100%)	11(100%)
Malaria	3(60%)	5(100%)	5(100%)	5(100%)	5(100%)
Acute pancreatitis	1(100%)	0(0)	1(100%)	1(100%)	1(100%)
Dengue	0(0)	0(0)	0(0)	0(0)	0(0)

***Male < 13 mg%, Female < 12 mg%, $Total Leukocyte Count>12000, #>1.18 mg/dl, @ >1.3 mg/dL or 50% increase from baseline.**

Out of 11 mortality in septicemia group, 7(63.63%) were of age >55 years; among them 4(57.14%) were male and 3(42.85%) were female. Out of 5 deaths in malaria cases, 3 (60%) were male of age >55 years. The only death in acute pancreatitis case was of male of >65 years of age.

Discussion

Since ages infectious diseases are the major cause of morbidity and mortality. The presentation of triad of fever, jaundice and acute kidney injury is common in various infections like malaria, dengue or septicemia of any underlying cause. Out of our 100 patients, septicemia, malaria, acute pancreatitis and dengue were seen in 50%, 34%, 12% and 4% respectively.

Our study showed that septicemia was more common in males with age more than 55 years, which is similar to the findings of Souza et al. [8] He also showed that deranged renal and liver function was present in all septicemia (84%) patients. Anemia was present in 92% patients in present study.

Amravati et al has reported malaria with AKI as more common in adult males. Our analysis of malaria patients with AKI revealed that it was observed more commonly in males, similar to earlier studies. [7] Reason could be explained by more outdoor activities among males in Asian countries as compared with females. In present study all cases of malaria were found with raised serum creatinine and bilirubin level and 79.41% patients had anemia, similar to Amravati et al who had reported jaundice in 40% and AKI in 34% patients. Halonen KI et al observed renal and liver dysfunctions in 63% and 83% respectively in patients with acute pancreatitis. [9] Similar results were observed in present study which shows that both complications can results in to mortality. Jain PK et at reported increased level of bilirubin in 15% and renal failure in 61% of dengue patients, [6] whereas our all patients had raised bilirubin and slightly raised serum creatinine. Moreover, all the patients of dengue had anemia.

There was 34% mortality in septicemia patients and it was more among males (57.14%) with the age of more than 55 years (14 %), this is similar to the reports of Salive ME et al. [10] The mortality due to malaria was 14.7% in our study and was higher in males which is similar to other workers. [7] The only death in acute pancreatitis group was male of age >55 years. These results confirm that mortality was more common among male adults.

In our study the advanced age, male gender and anemia were the probable risk factor for poor outcome in cases of septicemia, malaria and acute pancreatitis. However the limitation of our study is the small no of patient population.

Conclusion

To conclude in tropical countries like India, triad of fever, jaundice and AKI can be a common presentation and needs detailed differential diagnostic work up for institution of prompt treatment to reduce the morbidity and mortality.

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