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Original Research Article

A Hospital Based Observational Assessment of Acute Kidney Injury of Infectious Etiology in Monsoon Spell

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Abstract

Aim: To assess the acute kidney injury of infectious etiology in monsoon season.

Material & Methods: The study was planned in the Department of Nephrology, Nalanda Medical College & Hospital, Patna, Bihar, India to assess incidence, etiology, clinical profile, and outcome of AKI of infectious origin during monsoon season.

Results: A total of 120 cases were recruited for the study, among which 100 were males and 20 were females. Among all the patients, 105 showed clinical feature of fever, followed by vomiting (98), oliguria (85) and High-colored urine (77). 31 cases presented with malaria as the most common diagnosis.

Conclusion: Tropical AKI presents in severe stage and in significant proportion during monsoon. Malaria and AGE are still the predominant etiologies while leptospirosis and dengue are emerging etiologies causing AKI during monsoon.

Keywords: acute kidney injury (AKI), infectious ethology, monsoon season

Introduction

Acute kidney injury (AKI) refers to any sudden decrease in kidney function, which may be reversible if detected early enough [1,2]. AKI is responsible for significant morbidity and mortality worldwide, but data on the global burden of disease are clearly lacking. AKI is a major problem frequently encountered in hospital patients and its incidence is increasing. This is due to the ageing population, but also to the wider use of therapeutic methods and/or diagnostic techniques with a risk of renal damage. The occurrence of AKI is accompanied by an increase in the length of hospital stay and short- and long-term mortality [3,4].

Beyond routine supportive care, there exists little established medical therapy for AKI. [5] Many current lines of research are focused on the prevention of AKI. However, few prospective, population-based studies have evaluated the development of AKI.[6] Hsu *et al.* [7] along with multiple observational series in various clinical settings, have clearly established older age and CKD as risk factors for AKI.[8-14]other observed associations with AKI include black race and male gender. [15] Proteinuria, an established risk factor in the development of cardiovascular disease, [16-17] ESRD,

[18] and death, [19] is less studied in its role in the development of AKI.

There is an increased incidence of AKI in agricultural workers, particularly those paid by the piece. No other traditional risk factors, including age, BMI, diabetes, or hypertension, were associated with incident AKI. Agricultural workers are at increased risk for AKI because of occupational hazards such as dehydration and heat illness [20].

Studies which have addressed AKI due to infectious etiology in epidemic proportions during monsoon are very less. Hence this study was planned with the objective to assess the acute kidney injury of infectious etiology in monsoon season.

Material & Methods:

The study was planned in the Department of Nephrology, Nalanda Medical College & Hospital, Patna, Bihar, India to assess incidence, etiology, clinical profile, and outcome of AKI of infectious origin during monsoon season. The patients visited to Outpatient Department (OPD) and in-patient department (IPD) of IGIMS were considered in the study. The entire patient's clinical history was collected.

Inclusion and Exclusion criteria

The patients above 20 years of age hospitalized in the department of nephrology and referred from department of general medicine to nephrology, suspected of infectious etiology and AKI, were included in the study. AKI was defined as an absolute increase in serum creatinine concentration of 0.3 mg/dl or greater as per the AKI Network (AKIN) consensus definition. The patients identified with the chronic kidney disease were excluded from the study.

Methodology

Detailed history taking and clinical examination of patients were carried out and noted. Biochemical investigations were carried out.

Results:

A total of 120 cases were recruited for the study, among which 100 were males and 20 were females. Mean age of study population was 32-45 years. Among all the patients, 105 showed clinical feature of fever, followed by vomiting (98), oliguria (85) and High-colored urine (77). Stage III (66) Severity of AKI as per the A KIN criteria was seen in majority of the patients. Complete recovery of renal function was seen in 102 patients. [Table 1]

Among all the patients, 31 cases presented with malaria as the most common diagnosis. 12 cases of each Falciparum and Acute gastroenteritis were also seen. Dengue was in 13 patients followed by Leptospirosis (10) and Typhoid (7). [Table 2]

Table 1: Demographic Data

Clinical details	Observations in Cases
Total number of admissions with AKI	120
Mean age of study population in years	32-45 years
Sex distribution	
Males	100
Females	20
Presenting features	
Fever	105
Vomiting	98
Oliguria	85
High-colored urine	77

Breathlessness	56
Diarrhea	46
Altered sensorium/convulsions	35
Bleeding	19
Severity of AKI as per the A KIN criteria	
Stage I	67
Stage II	20
Stage III	66
RRT requirement	53
Mortality	18
Complete recovery of renal function	102

Table 2: Distribution of study group as per infectious disease etiology

Diagnosis	**Observations in Cases**
Malaria	31
Falciparum	12
Vivax	9
Mix malaria	3
Acute gastroenteritis	12
Dengue	13
Leptospirosis	10
Multiple etiology :	7
Malaria + dengue	3
Malaria + leptospirosis	1
Leptospirosis + dengue	1
Typhoid	6
Undifferentiated	12
Total	120

Discussion:

As noted by Xue and colleagues, [21] the crude rate of in-hospital mortality was lower for those participants experiencing hospitalization with AKI as the first discharge diagnosis (thus, theoretically, hospitalized for AKI rather than with AKI).

Hsu and colleagues' findings that the presence of dipstick proteinuria (as a binary measure) is associated with dialysis-requiring AKI.[7]In their population-based study, baseline dipstick proteinuria (roughly corresponding to _30 mg per 100 ml of urine) conferred an adjusted odds ratio of dialysis-requiring AKI of 2.79. Here, we have extended this association across the full range of albuminuria and to all AKI hospitalizations, including those that did not require dialytic support. In addition, using a standardized measure of serum creatinine, we estimated the risk of AKI not only for participants with CKD, but also for those with an eGFR in the normal range.

Many previous studies have attempted to provide estimates of the incidence of AKI, but it is important to note that there is significant variability between studies due to the type of study, the definition of AKI, the location of patient recruitment and the length of the observation period for AKI occurrence [22]. Despite the use of new classifications, the epidemiology of AKI remains difficult to define. It varies greatly according to the population studied,

depending on whether we are assessing a general population, a population of hospitalized patients or a population of patients requiring care in an intensive care unit; moreover, within the intensive care units themselves, it will depend on the type of pathologies managed locally (cardiac surgery, septic shock, major burns, etc.) [23].

AKI is a frequent and formidable complication because it is costly to manage and associated with a high rate of prolonged hospitalization and in-hospital mortality [24]. +e development of AKI in hospitalized patients increases direct and indirect healthcare costs. AKI is associated with increased investigation and monitoring, unplanned or longer ICU stays, prolonged hospital stays and increased risk of early re hospitalisation [25]. While definitions of AKI and its classifications vary, the diagnostic approach is always the same, based on clinical, radiological and biological findings with creatinine and diuresis as the usual markers, despite the criticism [26].

The main causes of ICU admission were AIDS-related diseases, pneumonia, leptospirosis, meningitis, and tetanus. Basu *et al* [27]. From CMC Vellore in South India in 2007– 2008 reported an incidence of 41.1%of AKI in infectious diseases, one of the highest incidences noted among tropical infections. Most of the patients in the study done by Basu *et al*. were in risk class and had milder degree of renal dysfunction. Our study included patients of AKI due to infections in monsoon season, in prominent metropolitan city of a tropical country. The enormous burden of infectious diseases is reflected in the number of patients being admitted in the present study in 8 months which is more than four times the number of patient sad mitted in 1 year in the study done by Basu *et al* [27].

Conclusion:

Tropical AKI presents in severe stage and in significant proportion during monsoon. Malaria and AGE are still the predominant etiologies while leptospirosis and dengue are emerging etiologies causing AKI during monsoon.

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