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Original Research Article

A Study to Assess the Clinical Profile of Patients with Acute Kidney Injury Following Acute Gastroenteritis: A Prospective Study

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Abstract

Aim: The aim of the present study was to assess the clinical profile of patients with acute kidney injury following acute gastroenteritis.

Methods: The Present study was conducted in patients who were diagnosed to have AKI following acute gastroenteritis. Study was prospective, observational type. Study was conducted in Department of General Medicine for the period of one year. Total 100 patients of AGE with AKI were considered for this study.

Results: Most common age group in this study was age group of 61–70 years (30%), followed by age group of 51–60 years (26%). Mean age of study patients was 54.6 ± 12.8 years. Male patients (65%) were more than female patients (35%). According to clinical presentation most common symptom was loose stools (100%), followed by fever (78%) and vomiting (66%). Other complaints were shortness of breath (20%) and altered sensorium (16%). AKI was staged for severity according to the KDIGO criteria2. At the time of diagnosis most patients were in stage 1 (60%), while 30% and 10% were in stage 2 and 3 respectively.

Conclusion: Acute kidney injury in patients with acute gastroenteritis had good prognosis if detected earlier. Early recognition of AKI is essential to ensure prompt and appropriate management, and to avoid progression to deadlier stages of the disease.

Keywords: Acute Gastroenteritis, Acute Kidney Injury, KDIGO criteria.

Introduction

Acute kidney injury (AKI), previously known as acute renal failure (ARF), characterized by sudden impairment of kidney function resulting in retention of nitrogenous and other waste products normally cleared by kidneys. AKI is not a single disease but, rather a heterogenous group of condition that share a common diagnostic features, especially increase in the blood urea nitrogen concentration and/or increase in plasma or serum creatinine concentration, often associated with reduction in urine volume. [1] AKI can range in severity from asymptomatic and transient changes in laboratory parameters of glomerular filtration rate to overwhelming and rapidly fatal derangements in effective circulating volume regulation and electrolyte and acid-base composition of the plasma. [2]

AKI complicates 5-7% of acute care hospital admissions and up to 30% of admissions to Intensive Care Unit (ICU). AKI is associated with a markedly increased risk of death in hospitalized individuals, particularly in those admitted to the ICU where in hospital mortality rates may exceed 50%. [3] AKI is one of the most common clinical conditions encountered by physicians and nephrologists throughout the world. Due to the climatic conditions, overcrowding and poor socioeconomic factors, AKI in India differs from the world. There is no clear-cut data on the incidence, causes, and recovery from the disease. Most common causes of AKI in India are acute diarrheal disease, malaria, leptospirosis, snakebite, insect stings, intravascular hemolysis due to septicemia, chemical poisoning such as copper sulfate, vasmol, and pregnancy. Overall, these causes constitute 40% ARF in India. [4]

All stages of AKI are associated with significantly high short‐ and long‐term mortality. [5] However, early detection and treatment leads to partial or total reversal of renal damages caused by AKI. The exact incidence of AKI has been a subject of significant debate because of the rapid change in

criteria for the definition of AKI. According to available literature, the incidence varies from 1% to 31%, depending on the definition used. [6] Severe acute gastroenteritis (AGE) may lead to acute fluid loss followed by oliguria, azotemia, and hyperkalemia (due to supervening catabolic state and lactic acidosis) renal hypoperfusion and AKI. This may progress to renal shutdown with oligoanuria and its functional consequences with or without significant structural damage. Increasing number of patients of AGE are now diagnosed with AKI.. Over the recent years there has been increasing recognition that relatively small rises in serum creatinine in a variety of clinical settings are associated with worse outcomes. [7]

The aim of the present study was to assess the clinical profile of patients with acute kidney injury following acute gastroenteritis.

Materials and Methods

The Present study was conducted in patients who were diagnosed to have AKI following acute gastroenteritis. Study was prospective, observational type. Study was conducted in Department of General Medicine, Jeevandeep Hospital, Morbi, Gujarat, India for the period of one year. Total 100 patients of AGE with AKI were considered for this study.

Inclusion Criteria

- Patients above 18 years, admitted with acute gastroenteritis.
- Patients with acute kidney injury (AKI), diagnosed by KDIGO criteria.

Exclusion Criteria

- Age less than 18 years
- Patients with chronic renal insufficiency
- Patients who are initially considered as AKI but subsequently found to be suffering from long- standing renal disease.

An informed consent was taken from patients for participation. Demographic and clinical details, thorough examination findings were noted. Renal function tests with electrolytes are done daily and recorded. Other laboratory parameters such as CBC, ESR, Urine examination, Stool Examination, HIV, blood glucose, liver function test are also done. ABG, ECG, abdominal ultrasound examination were done whenever required. AKI was diagnosed according to Acute Kidney Injury Working Group of KDIGO (Kidney Disease: Improving Global Outcomes)2 which diagnoses AKI by an absolute increase in Serum Creatinine, at least 0.3 mg/dL within 48 hours or by a 50% increase in Serum Creatinine from baseline within 7 days, or a urine volume of less than 0.5 mL/kg/h for at least 6 hours. Primary treatment was done with adequate fluid replacement and antibiotics (gram-negative spectrum for ongoing gastroenteritis). Dialysis was done in patients with hyperkalemia, pulmonary edema and severe metabolic acidosis, who did not respond to medical treatment and prophylactically in patients whose creatinine is more than 4 mg/dl. Data recorded include patients' characteristics, comorbid medical conditions, dialysis requirement, total duration of hospital stay, and complications that occurred in their hospital stay were recorded and final outcome. The clinical and laboratory parameters were analyzed to assess the role of each of these factors as the possible outcome i.e. recovery or death. All patients were followed up till discharge or death. Statistical analysis was done using descriptive statistics. Results were expressed as mean and standard deviation for continuous data and frequency as number and percentage.

Results

Table 1: Age and gender distribution

Age in years	Male	Female	Total
19–30	2	2	4 (4%)
31–40	4	6	10 (10%)
41–50	12	5	17 (17%)
51–60	19	7	26 (26%)
61–70	20	10	30 (30%)
71–80	6	4	10 (10%)
>80	2	1	3 (3%)
Total	65	35	100 (100)

Most common age group in this study was age group of 61–70 years (30%), followed by age group of 51–60 years (26%). Mean age of study patients was 54.6 ± 12.8 years. Male patients (65%) were more than female patients (35%).

Table 2: Symptom wise distribution

Symptoms	N	%
Loose stools	100	100
Fever	78	78
Vomiting	66	66
Shortness of breath	20	20
Altered sensorium	16	16

According to clinical presentation most common symptom was loose stools (100%), followed by fever (78%) and vomiting (66%). Other complaints were shortness of breath (20%) and altered sensorium (16%).

Table 3: AKI staging (KDIGO)

Stage	Serum creatinine	Urine output	No. of patients (%)
1	1.5–1.9 times baseline OR ≥0.3 mg/dl (≥26.5 μmol/l) increase	<0.5 ml/kg/h for 6–12 hours	60 (60%)
2	2.0–2.9 times baseline	<0.5 ml/kg/h for ≥12 hours	30 (30%)
3	3.0 times baseline OR Increase in serum creatinine to ≥4.0 mg/dl (≥353.6 μmol/l) OR Initiation of renal replacement therapy OR In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 m2	<0.3 ml/kg/h for ≥24 hours OR Anuria for ≥12 hours	10 (10%)

AKI was staged for severity according to the KDIGO criteria[2]. At the time of diagnosis most patients were in stage 1 (60%), while 30% and 10% were in stage 2 and 3 respectively.

Discussion

Acute kidney injury (AKI) previously known as Acute Renal Failure, is a clinical syndrome characterized by an abrupt decline in glomerular filtration rate sufficient to decrease the elimination of nitrogenous waste products (urea and creatinine) and other uremic toxins. [8] The causes of AKI have traditionally been divided into three broad categories as prerenal (due to renal hypoperfusion), intrinsic (due to renal parenchymal pathology), postrenal (due to urinary tract obstruction). [9] Common causes for AKI are acute volume depletion (diarrheal diseases, haemorrhage), sepsis, infection (malaria, pneumonia, viral hepatitis), snake bite, acute cardiac failure, nephrotoxic drug use, malignancy, SLE, hypertension, major surgeries, radio contrast agents. etc.[2]

Lewington AJ noted that the pooled incidence rates of AKI in adult was 21.6–20% of hospitalized adult patients experienced AKI during a hospital care which is associated with high expenditure of resources and lead to adverse outcomes.7 AKI with a rise in serum creatinine as modest as 0.3 mg/dL is associated with a 70% increase in mortality risk and increased risk of death by 6.5 times. [10] Early in the course of AKI, optimization of the hemodynamic status and correction of any volume deficit will have a salutary effect on kidney function. Diuretics do not have any significant effect on progression or outcome of AKI. [11] Most common age group in this study was age group of 61–70 years (30%), followed by age group of 51–60 years (26%). Mean age of study patients was 54.6 ± 12.8 years. Male patients (65%) were more than female patients (35%). In the study by Satri V et al [12] sepsis was found to be the most common cause of AKI followed by acute gastroenteritis, while Eswarappa M et al[13] noted acute gastroenteritis as most common cause of AKI in their study.

According to clinical presentation most common symptom was loose stools (100%), followed by fever (78%) and vomiting (66%). Other complaints were shortness of breath (20%) and altered sensorium (16%). AKI was staged for severity according to the KDIGO criteria2. At the time of diagnosis most patients were in stage 1 (60%), while 30% and 10% were in stage 2 and 3 respectively. The prognosis of patients with AKI is directly related to cause of renal failure and, to great extent, to the duration of renal failure before therapeutic intervention. Prognostic factors are older age, multiorgan failure (i.e., the more the organ that fails, the worser is prognosis), circulatory failure, vasopressor support, and need for renal replacement therapy (RRT). Factors influencing patient survival in acute kidney injury are severity of injury and underlying disease and other factors such as age, severity of coexistent illnesses and associated complications like Intravascular overload, hyperkalemia and other metabolic complications and systemic life-

threatening complications like cardiac arrhythmia, myocardial infarction, pulmonary embolism, gastrointestinal ulcers, seizures, coma, hemolysis, bleeding tendencies and severe infections.16 Regardless of cause, the management of AKI is mainly supportive, with dialysis being indicated when medical management fails to treat the complications. [13] The duration and severity of AKI is a risk factor for the development of complications such as a 10‑fold increase in the risk of chronic kidney disease and a 3‑fold risk of end‑stage renal disease. [14,15] Failure to detect and treat timely and/or adequately usually leads to significant untoward consequences. It is associated with a high morbidity and permanent loss of kidney function. [16]

Conclusion

Acute kidney injury in patients with acute gastroenteritis had good prognosis if detected earlier. Early recognition of AKI is essential to ensure prompt and appropriate management, and to avoid progression to deadlier stages of the disease.

References

1. Kellum JA, Levin N, Bouman C, Lameire N. Developing a consensus classification system for acute renal failure. Current opinion in critical care. 2002 Dec 1;8(6):509-14.
2. Mehta RL, Kellum JA, Shah SV, Molitoris BA, Ronco C, Warnock DG, Levin A, Acute Kidney Injury Network. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Critical care. 2007 Apr; 11:1-8.
3. Levy MM, Fink MP, Marshall JC, Abraham E, Angus D, Cook D, et al. 2001 SCCM/ESICM/ACCP/ATS/SIS international sepsis definitions conference. Intensive Care Med. 2003; 29:530–8.
4. Nagamani R, Sudarsi K, Amaravati KS, Khan M, Sakuntala P. A study on clinical profile of acute kidney injury. Int J Sci Res Publ. 201 5; 5:3–8.
5. Hofhuis JG, van Stel HF, Schrijvers AJ, Rommes JH, Spronk PE. The effect of acute kidney injury on long-term health-related quality of life: a prospective follow-up study. Critical Care. 2013 Feb; 17:1-3.
6. Kellum JA, Levin N, Bouman C, Lameire N. Developing a consensus classification system for acute renal failure. Current opinion in critical care. 2002 Dec 1;8(6):509-14.
7. Praught ML, Shlipak MG. Are small changes in serum creatinine an important risk factor? Current opinion in nephrology and hypertension. 2005 May 1;14(3):265-70.
8. Susantitaphong P, Cruz DN, Cerda J, Abulfaraj M, Alqahtani F, Koulouridis I, Jaber BL. World incidence of AKI: a meta-analysis. Clinical journal of the American Society of Nephrology: CJASN. 2013 Sep 9;8(9):1482.
9. Kellum JA, Lameire N, Aspelin P, Barsoum RS, Burdmann EA, Goldstein SL, Herzog CA, Joannidis M, Kribben A, Levey AS, MacLeod AM. Kidney disease: improving global outcomes (KDIGO) acute kidney injury work group. KDIGO clinical practice guideline for acute kidney injury. Kidney international supplements. 2012 Mar;2(1):1-38.
10. Soren B, Papareddy A, Kommareddy SR, Meriga RK, Midathala NV, Sarikonda GR. Clinical profile of acute kidney injury in patients admitted to medical wards in a tertiary care setting. Int J Med Sci Public Health 2019; 8(2):110-113.
11. Ho KM, Sheridan DJ. Meta-analysis of frusemide to prevent or treat acute renal failure. Bmj. 2006 Aug 24;333(7565):420.
12. Satri V, Kumar VS, Satyanarayana V, Ramakrishna BS, Srinivasa Rao PVLN, Madhusudan M. Epidemiology and outcome of acute kidney injury in patients presenting to emergency department – Our experience. J Clin Sci Res 2020; 9:77-81.
13. Eswarappa M, Gireesh MS, Ravi V, Kumar D, Dev G. Spectrum of acute kidney injury in critically ill patients: A single center study from South India. Indian journal of nephrology. 2014 Sep;24(5):280.
14. Chawla LS, Amdur RL, Amodeo S, Kimmel PL, Palant CE. The severity of acute kidney injury predicts progression to chronic kidney disease. Kidney international. 2011 Jun 2;79 (12):1361-9.
15. Coca SG, Singanamala S, Parikh CR. Chronic kidney disease after acute kidney injury: a systematic review and meta-analysis. Kidney international. 2012 Mar 1;81(5):442-8.
16. Wald R, Quinn RR, Luo J, Li P, Scales DC, Mamdani MM, Ray JG, University of Toronto Acute Kidney Injury Research Group. Chronic dialysis and death among survivors of acute kidney injury requiring dialysis. Jama. 2009 Sep 16;302(11):1179-85.