Original Article

Presentation of Acute Kidney Injury in Diarrhoeal Disease

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ABSTRACT

Background: Diarrhea is one of the common illnesses requiring hospitalization globally. A significant contributor to acute kidney injury is dehydration brought on by diarrhea.

Methods: A cross-sectional study was carried out in the department of Medicine of the Patuakhali Medical College during June 2019 to July 2020. Total 746 Patients with diarrhea were included. Serum creatinine level>50 mmol/L considered as acute kidney injury. Categorical data were displayed as number percentages and the chi-square test was done for statistical significance and p value <0.05 considered as significant. Continuous scale data were provided as mean standard deviation.

Results: Out of 746 diarrhea cases 37% has developed acute kidney injury. Among them 33.8% presented with fever, vomiting and dehydration at admission, 13.1% convulsion with fever and 15.6% vomiting with dehydration at admission.

Conclusion: Diarrhoea with fever, vomiting and dehydration at admission, diarrhoea with convulsion and fever, diarrhoea with vomiting and dehydration at admission found to be related with acute kidney injury.

Key Words: Diarrhoea, Acute kidney injury, Dehydration

INTRODUCTION

Acute kidney injury (AKI) is characterized as a sudden or rapid deterioration in renal filtration function, as shown by a significant increase in serum creatinine content and/or a decrease or absence of urine output.[1]

One of the most prevalent diseases requiring hospitalization on a global scale is diarrhoea.[2,3] Volume depletion caused by severe diarrhoea is a well-known risk factor for AKI, although other factors such as co-morbidity and polypharmacy are also possible causes. Further describing the prevalence of AKI in diarrheal sickness is critical since AKI has been linked to an increased chance of developing chronic kidney disease, longer hospital stays, higher expenses, and death.[4-7] The measurement of creatinine is inexpensive, simple, and has quick results. The National Institute of Health Care and Excellence guideline advises that creatinine measurement be coupled with monitoring of urine output to monitor the renal functions.[8] Creatinine may gradually build up after the decline in kidney function, therefore serum creatinine tests may not represent the new situation for several days. Prevalence of acute kidney injury in diarrhoeal disease is higher in the community, because children with acute kidney injury are being treated by primary care practitioners who have not come to the hospital.[9] Also the real data regarding the frequency of diarrhea as well as kidney disease is always not available in developing countries.[10] Because of missing the community data and health care systems of developing counties usually preserve the hospital data only. There are different causes of acute kidney injury in the community. Community-acquired AKI is usually associated with diarrhea and sepsis.[9] There are some challenges also remains in the management of AKI with diarrhoea.[10] This study focuses on the presentation of

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diarrhoea to find out its relationship with acute kidney injury.

METHODS

This cross-sectional study was carried out in Patuakhali Medical College Hospital at the Department of Medicine during June 2019 to July 2020. The study design was approved by the institutional review committees of Patuakhali Medical College. A total of 746 patients with diarrhoea were selected for this study. The study excluded all patients with AKI due to conditions other than diarrhea, including septic shock, excessive diarrhea, intrinsic renal dysfunction, urethral obstruction, chronic renal failure, and autoimmune kidney diseases such interstitial nephritis and bloody diarrhea. Patients were classified as having AKI if they had diarrhea and increased serum creatinine (>50 mmol/L). Demographic features, laboratory measurements, and information of hospital course that included medication exposures, length of hospital stay, and recovery of AKI were the variables of interest retrieved from the database. Events occurring from admission to discharge with recovery or referred to another hospital were analyzed and evaluate to see the relationship of acute renal damage in diarrhea patients with their presentations. Data were process and analyses using SPSS (Statistical Package for Social Sciences) software version 23. The chi- square test was used to analyze the data and $p < 0.05$ is considered as significant. Categorical data were presented as number percentage and continuous scale data were presented as mean standard deviation. The summarize data were present in the table and chart.

RESULTS

In this study 275(37%) of these patients developed AKI, and 471 of these patients had normal creatinine levels and were not considered to have AKI. The average age was 56.38 (±11.67) years, the minimum age was 23 years, and the maximum age was 72 years. The majority age was found in the fifth and sixth decade (Table-1). Figure 1 shows female patients were predominant in this study (56.0%) and rest male was 44.0%.

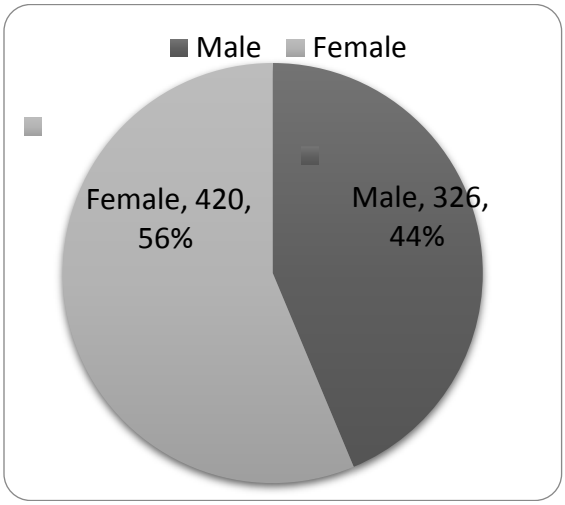

Figure 1: Sex distribution of the study population (n=746)

About one third patients found acute kidney injury (Figure-2). Among these acute kidney injury patients about one third had presented with fever, vomiting and dehydration at admission; about 13.1% presented with convulsion and fever; about 15 % presented with vomiting and dehydration at admission (Table-2).

Table 1: Age wise distribution of study population Age (yrs)

Age in years	Number	Percentage
21-30 yrs	86	11.53
31-40 yrs	135	18.10
41-50 yrs	147	19.71
51-60 yrs	193	25.87
>60 yrs	185	24.80
Total	746	100.00

Table 2: Factors related with acute kidney injury in patients with diarrhea in Patuakhali Medical College Hospital (n=746)

Factors	AKI n=275	Without AKI n= 471	p value
Fever+Vomiting +Dehydration at admission	93 (33.8)	69 (14.6)	0.001
Convulsion+Fever	36 (13.1)	11 (2.3)	0.001
Vomiting +Dehydration at admission	43 (15.6)	17 (3.6)	0.001
Vomiting	36 (13.1)	132 (33.8)	0.001
Fever	16 (5.8)	117 (24.8)	0.001
Dehydration at admission	14 (5.1)	23 (7.0)	0.299
Convulsion	12 (4.4)	22 (5.1)	0.653
Abdominal distension	25 (9.1)	41 (8.7)	0.858
Total	275(100)	471(100)	

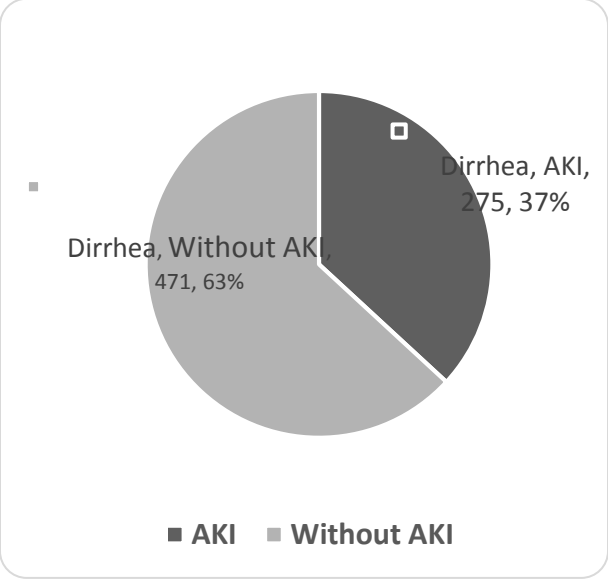

Figure 2: AKI in patients with diarrhea in Patuakhali Medical College Hospital

DISCUSSION

In present study observed that the mean age was 56.38 (±11.67) years, minimum age was 23 and maximum age was 72 years. Desai P and Deokar study also observed that the mean age of study participants was 53.71 ± 17.34 years, with maximum age 85 and minimum 16 years. A total of 48.3% patients were from 51-70 years of age, 58.6% patients were male and rest 41.4% was female.[11] Kim et al. reported the mean age was 44.5 ± 13.1 years and the proportion of female was 38.1%.[12]

In our study about one-third patients with diarrhoea has found acute kidney injury and most of our cases recovered. In a study, it is found that about 26.2% of patients presented with AKI at the time of admission with diarrhoea.[13] Most of them also recovered. But incomplete recovery from acute kidney injury is associated with progress in kidney disease and resulting into prolonged hospital stay and sometimes into chronic kidney disease. Acute kidney injury needs supportive care. Therefore, early identification of acute kidney injury in patients with diarrhea is an important issue.[14-16]

In this study we observed convulsion with fever is related with AKI in 13.1% cases. Shahrin et al. also reported convulsions in AKI.[1] vomiting with dehydration at admission 15.6% in AKI; fever, vomiting, and dehydration at admission 33.8% in AKI. Several factors may contribute to acute kidney injury. Among them hypernatremic dehydration is important in diarrhea. In diarrhea hypernatremia is developed due to the inability of excretion of a sodium.[17,18] In hypernatremic dehydration, fluid shift occurs to maintain intravascular volume.[19,20] Dehydration in the patients with diarrhoea is

frequently underestimated.[21] In this time some form of volume depletion as well as hypernatremia is developed. Thus dehydration closely related to AKI in diarrhea.[12]

CONCLUSION

Diarrhoea with fever, vomiting and dehydration at admission, diarrhoea with convulsion and fever, diarrhoea with vomiting and dehydration at admission are related to AKI. And only fever and only vomiting is also related with AKI but only dehydration at admission, only convulsion and only abdominal distension is not significantly related to AKI.

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