RENAL INVOLVEMENT IN ACUTE GASTROENTERITIS; OUR POPULATION AT PRESENTATION AND ITS OUTCOME WITH FOLLOW UP FOR SIX MONTHS

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ABSTRACT… Objective: Acute renal failure is one of the important complications of acute gastroenteritis. Early intervention and proper fluid replacement may lessen this risk. We conducted this observational study to see the renal involvement and its outcome in patients with acute gastroenteritis. **Design:** Observational study. **Setting:** This study was done in three different hospitals which are tertiary care and teaching hospitals. **Period:** May 2009 to September 2009. **Material and Method:** A total of 200 patients were included in this study who presented with acute gastroenteritis. All patients were assessed properly for their clinical examination and laboratory tests including renal functions, electrolytes and other routine tests were done and evaluated. These patients were treated either in Emergency department or indoor departments. Only those patients were included in our study who met our inclusion criteria which was set before conducting study. **Results:** A total of 200 patients were included in our study, among them 160 were male patients and 40 were female patients. At presentation 32 (16%) patients had deranged renal functions, 18 (09%) patients had urea in range of 50-100mg/dL and creatinine in the range of 1.4-2.0mg/dL. 10 (05%) patients had urea in range of 101-150mg/dL and creatinine 2.1-3.5mg/dL. 04 (02%) patients had urea in range of 151-200mg/dL and creatinine 3.6-7.0mg/dL. 12 patients were received in hypovolemic shock at presentation. After one week of follow up most of these patients improved but 04 patients were deteriorated and put on renal replacement therapy. Patients who had their renal functions in normal range were discharged from hospital and follow up of all these patients were continued for 6 months. It was observed that those patients which presented late had more chances of renal involvement. **Conclusions:** Early referral and timely management with fluids and antimicrobials may reduce risk of renal failure in patients with acute gastroenteritis.

Key words: Gastroenteritis, renal failure, fluid replacement

INTRODUCTION

Acute gastroenteritis is a common problem in developing countries. Sometimes it presents as an endemic in our population. Among all common causes, non-availability of clean water,[1] adulteration of food and beverages sold by street hawkers in hot season are primary factors. Acute gastroenteritis is one of the common cause of morbidity and mortality worldwide[2]. The most common complication of acute diarrhea is dehydration leading to hypovolemia and further complications like acute kidney injury. Acute renal failure is usually due to volume depletion in hot environment due to profuse sweating and also due to acute gastroenteritis. Pakistan being a developing country and is facing problems of poverty, over-crowding and lack of facility of clean water and also poor sanitation,[3] due to these reasons acute gastroenteritis is quite prevalent in our country.

Infectious gastroenteritis occurs as outbreaks in some areas. These out breaks usually occur in summer and rainy seasons,[4] we have a quite long rainy season, so we conducted this study in that season.

Acute gastroenteritis leads to hypovolemia and then may cause acute kidney injury. Acute renal failure secondary to acute gastroenteritis is still a common problem in our country, if not treated properly and timely, may lead to acute renal failure. So early referral and adequate replacement of fluid and electrolytes and antimicrobials can improve outcome in these patients[5]. As acute gastroenteritis through volume depletion causes pre-renal failure, failure to correct hypovolemia in time in acute gastroenteritis leads to acute tubular necrosis and renal failure. If volume depletion is corrected before development of tubular injury chances of acute renal failure can be minimized. If hypovolemia persists, it results in tubular injury and irreversible damage leading to the need of renal replacement therapy[6].

The purpose of this study was to find whether early referral to a tertiary care hospital and timely replacement of fluids can decrease incidence of renal failure and also renal replacement therapy.

MATERIAL AND METHOD

A number of patients use to come in Emergency department of both public and private hospitals with acute gastroenteritis in summer and rainy season. That is why we conducted this observational study from May, 2009 to September, 2009 in three tertiary care hospitals. All patients who presented with acute gastroenteritis, meeting our inclusion criteria, were included in this study. Those patients who had deranged renal functions due to acute gastroenteritis were our primary focus. Patients having history of diabetes mellitus, hypertension, nephrolithiasis, and already shrunken kidneys on ultrasound, were excluded from study. All patients were assessed properly on their clinical examination and their laboratory investigations were done. These patients were treated with fluids and electrolyte replacement and also antimicrobial therapy. Early referral to hospital was considered within 24 hours after onset of loose stools. 130 patients presented or referred to these hospitals within 24 hours and 70 patients came after 24 hours of the onset of acute diarrhea. It was noted that those patients which presented late developed severe dehydration and involvement of kidneys more as compared to those patients which presented early. All patients were assessed for their vitals, urine output, hydration status and laboratory investigations done to see functional status of kidneys. Patients with abnormal renal functions were monitored daily for their clinical examination and laboratory investigations, evaluated and recorded on already developed performa. Patients who had creatinine above 8.0mg/dL, hyperkalemia, and/or acidosis were referred to nephrology department for further treatment of these patients but proper follow up of these patients were also kept for 6 months.

RESULTS

A total of 200 patients were included in our study. Among them 160 were males and 40 were females with age range from 18 to 64 years.

At presentation

32 (16%) patients had renal function derangements as follows:

18 (09%) had urea in the range of ----------
50-100mg/dL
Creatinine in the range of ----------
- 1.4—2.0mg/dL

10 (05%) patients had—urea ----------
- 101—150mg/dL
Creatinine in the range of ----------
2.1—3.5mg/dL

04 (02%) patients had—urea in the range of----------
151—200mg/dL
Creatinine in the range of----------
- 3.6—7.0mg/dL

Follow up after one week

Among 32 patients who had renal function impairment laboratory investigations were repeated. During that period, treatment was continued to these patients with fluids, electrolytes and antibiotics. Following were the results of laboratory investigations after one week

24 (12%) patients had –urea in the range of ----------
40—80mg/dL
Creatinine in the range of ----------
- 1.2—1.5mg/dL

04 (02%) patients had-- urea in the range of ----------
81—120mg/dL
Creatinine in the range of ----------
- 1.6—3.5mg/dL

04 (02%) patients had – urea in the range of ----------
121—250mg/dL
Creatinine in the range of ----------
- 3.6—12mg/dL

All these patients were investigated on daily basis and patients who had normal renal functions were discharged from hospital and repeat renal functions were advised and follow up were done after one week. Those patients who had urea more than 80 mg/dL and creatinine more than 1.5mg/dL were kept in the hospital for further observation and evaluation.

Follow up at 6months

Even with adequate fluid, electrolytes replacement and antibiotics treatment, 04 patients developed renal failure

upto a level where dialysis were done, having creatinine gradually worsened and developed metabolic acidosis and one patient developed uremic encephalopathy and later on died on 14th day of admission. Remaining 28 patients were treated conservatively and followed up for 6 months. 22 patients had normal renal functions upto 6 months and 6 patients developed chronic kidney injury and out of these 6 patients, 2 patients were managed conservatively while 4 patients were on dialysis as a long term therapy.

DISCUSSION

In the developing countries acute diarrheal illness are still prevalent. As our country Pakistan has many issues regarding lack of education of patients about cleaniness. Lack of facility of clean water is one of our common community problem causing acute gastroenteritis[7]. It is one of leading cause of acute kidney injury among these patients. Various studies on acute renal failure showed that gastroenteritis is one of the common cause of acute renal failure. Similarly in Nepal and India various studies reported acute gastroenteritis is a cause of acute renal failure in 22—44.5% of cases in old age and untreated cases[8,9] as in our study an old patients died even with full treatment protocol. Thus gastroenteritis is a common risk factor for acute renal failure all over world especially in Asia.

A number of studies were done on the etiology of renal failure[10]. But we conducted this study to see complications of acute gastroenteritis and to observe the prevalence of renal impairment in acute gastroenteritis and its outcome with follow up for 6 months.

Blow and his colleagues found that detection of hypovolemia and hypoperfusion within 24 hours in major trauma improves outcome[11]. Esson and Schrier found delayed referral and delayed replacement of fluid and electrolytes leads to adverse outcome for kidneys[12]. As in our study those patients which were referred late had more chances of renal impairment. Thus early referral and proper replacement of fluids may reduce risk for kidney damage.

A study in children showed full recovery in all cases of post diarrheal acute renal failure with no mortality at all[13]. Young patients below the age of 20 years usually develop full recovery with intravenous fluids and antibiotic therapy[14]. But renal involvement in old age patients is comparatively greater than young patients, as our study is quite comparable to these studies as most of our young patients develop full recovery, our 2 patients died even with adequate replacement of fluids and renal replacement therapy, both of these patients were above 60 years of age[15,16,17].

CONCLUSIONS

Early referral to the tertiary care hospital and timely management with parenteral or/and oral rehydration solution can reduce risk of development of acute renal failure in patients with acute gastroenteritis.

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"A consensus means that everyone agrees to say collectively what no one believes individually."

Abba Eban (1915-2002)