ORIGINAL ARTICLE

To Study the Outcome of Acute Renal failure in patients who are known case of Diabetes Mellitus at a Tertiary Care Hospital in Karachi

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ABSTRACT

Aim: To find out the outcomes of acute renal failure indiabetic patients, at a tertiary care hospital in Karachi.

Methods: The study was conducted from May 2013 to December 2013. The inclusion criteria, was all adult patients who are diagnosed with type II diabetes mellitus and who presented with suspected ARF. Patients were either managed on a conservative basis or through dialysis, patients were assessed for a total period of 6 weeks and outcome was determined as either complete recovery, need for dialysis or mortality.

Results: We conducted our study on a total of 100 patients 56 were males and 44 were females. Sepsis was the single most important factor for causing ARF in 69% of the patients, while UTI being the most important focus of infection in 71.2% of patients. Other factors of ARF were included hypovolemia (20%), cardio renal in (13.7%), acute glomerulonephritis in (3.15%) and contrast exposure in (2.1%) patients. Among the study population75 patients required dialysis, while 25 were managed conservatively. Eventually (67.39%) patients recovered, (15.21%) became dialysis dependent, and (17.39%) died. Among those who expired, all underwent dialysis and sepsis was the leading cause of death in (81.25%) of patients.

Conclusion: It is a well-documented fact that diabetics are prone to developing ARF, and UTI being the common case. With appropriate antibiotic regimen the patients show improvement. Patients who require dialysis as an intervention show high levels of morbidity and mortality. It is necessary to take the necessary measures to screen the diabetic patients to avoid any preventable causes of ARF, as this measure may result in fewer incidences in dialysis dependency and mortality.

Keywords: ARF, Acute renal failure, Diabetes Mellitus, outcome of disease

INTRODUCTION

ARF (Acute renal failure) is associated with a high incidence of long term morbidity and death, reaching levels of more than 30%, it ranks as one of the most prevalentdisease that is encountered by the nephrologists. The mortality and morbidity rate becomes higher when the disease is so progressed that dialysis is required[1,2]. Lengthy stay at the hospital, increased costs, and increased rate of morbidity and mortality are seen when even a minor decline in kidney function ensues[2,4]. Contrast induced nephropathy and acute renal failure have been associated with Diabetes Mellitus[5], Diabetic Nephropathy may induce an episode of ARF when combined with sepsis, nephrotoxic substances, cardiovascular diseases which may lead to renal insufficiency due to atherosclerosis or ischemic heart disease and a decrease in blood pressure. It isassumed in diabetics that nephropathy is advanced on presentation. We conducted the study to determine and recognize the factors that may lead to diabetics developing ARF and their outcomes.

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MATERIAL AND METHODS

The study was conducted from May 2013 to December 2013. The inclusion criteria was all adult patients who presented to us with a probable ARF and diagnosed case of diabetes mellitus. ARF was defined as 1) Whencreatinine was observed to be greater than 50% from known baseline reading, thus requiring admission to the hospital. 2) On the chance that baseline readings were unavailable it was considered when after six weeks the patient who previously required dialysis did not need it, or becomes dialysis free, or there is reduction is serum creatinine level greater than 50% as compared to the level at admission. Acute Renal Failure was considered aprobability when, Renal failure was found in diabetics with a known causative modality, in whom serum creatinine baseline readings were no known, and in whom recovery from disease did not occur and or died whilst in the hospital receiving treatment before recovery during the first six weeks of admission. The exclusion criteria was 1) Patients

with diagnosed diabetes with known and documented decline in renal function eventually requiring dialysis. 2) Diabetic patients, admitted with renal failure without any previous known history of renal function testing or preceding any acute insult or injury to the kidneys. 3) Diabetics with renal transplant.

History was taken from all patients which included but was not limited to the patients bio data, co morbid (diabetes, hypertension, CAD, drug history, or any history of intervention performed). Serum creatinine levels if available were noted and also tested for at the time of admission, along with blood and urine cultures, and a renal ultrasound was performed on all patients. Patients were either treated conservatively or dialysis was performed. Duration of dialysis was also recorded, and renal biopsy was also performed when warranted (as in the case of failure to recognize cause of renal failure). Patients were observed for six week and outcome of all patients were recorded as 1) Complete recovery, that is renal functions revert back to normal, with a greater than 50% reduction in serum creatinine value from originally recorded value, or those patients requiring dialysis do not require it any longer due to return of normal function of kidneys. 2) Patients become dialysis dependent 3) Mortality. Data was analyzed using SPSS version 20.

RESULTS

We conducted our study on a total of 100 patients 56 were males and 44 were females. In all the patients enrolled as probable cases of ARF 81 patients had ARF while 19 patients had a probability for ARF. Characteristics of patients is described in Table 1:

In 47 patients baseline characteristics of renal function test was known, and the average creatinine value was 3.04 +/- 1.4 mg/dl. In about 52% this information was not known.For various other factors refer to table 2.

In 5 out of 20 patients whose cause of ARF was hypovolemia the administration of excess diuretics was the cause, 3 patients were diagnosed as having gastroenteritis, and the remaining 12 patientshypovolemia was due to other factors. In the patients who had acute renal failure due to cardiac diseases, 7 had an acute cardiac disease manifestation and the other 7 had CCF, dilated cardiomyopathy or both. Out of these 10 patients recovered, 2 died and 2 became dialysis dependent. The pathogens cultured from the blood and/or urine of septic patients were gram negative bacilli 35(53%), staphylococcus aureus 5(7.57%) and enterococcus 2(3%). E coli was responsible for about 82.8% cases of gram negative sepsis, majority of the isolated strains were resistant and of urinary tract origin, whereas, methicillin resistant staphylococcus aureus was responsible for soft tissue infection.

Table 1: Characteristics of Patients

Characteristics	**N (%)**
Mean age in years	56.3 +/- 11.2
Gender	
Male	56(56%)
Female	44(44%)
Mean duration of diabetes	10.1 +/- 7.5
Hypertention	70(70.5%)
Antihypertensive medication	43(62.6%)
ACE / ARB	22(51.16%)
Others	21(48.84%)
IHD	27(27.4%)
Smokers	22(22.1%)
Baseline renal function	
Mean serum creatinine mg/dl	3.04 +/- 1.44
Admission renal function	
Mean serum creatinine mg/dl	8.3 +/- 3.79
Kidney ultrasound	
Normal size	49(49.5%)
Asymmetrical	17(16.8%)
Borderline size	12(12.6%)
Kidney Stones	7(7.36%)
Dilated pelvic	15(14.7%)

Table 3: Outcome of Renal Failure

Outcome	**Dialysed n=75**	**Not dialysed n=25**
Deaths	17(17.4%)	
Dialysis dependent	15(15.21%)	
Serum Cr value reach baseline	14(19.3%)	3(12.9%)
? 50% reduction in Serum Cr	19(25.8%)	5(20.9%)
<50% reduction in serum Cr	16(20.9%)	0
Follow up mean Cr in recovered Patients after 6weeks	2.47 +/- 1.23 mg/dl	3.65+/- 1.65mg/dl

Table 2: Factors leading to acute renal failure.

Sepsis n=69	Urinary Tract	49(71.2%)
	Skin / soft tissue	14(19.6%)
	Respiratory tract	7(10.6%)
	Gastrointestinal/ liver	3(4.5%)
	Malaria	2(3.03%)
Volume depletion		20(20%)
Cardio renal		14(13.7%)
Glomerulonephritis		3(3.15%)
Contrast Exposure		2(2.1%)
Multiple factors		39(38.9%)

Patients were divided in two groups: dialysis and conservative treatment: 75(75%) patients required dialysis, while remaining 25(25%) were managed conservatively. 48(65.3%) patients remained on dialysis for < 2 weeks, and 26(34.7%) remained

dialysis dependent for >2 weeks (2-6 weeks). Outcome of study is mentioned in Table3.Among those who expired, all underwent dialysis and sepsis was the leading cause of death in 14 (81.25%) patients.

DISCUSSION

We studied a total of 100 patients with probable acute renal failure for a period of 8 months, according to our study out of the various reasons diabetics can develop ARF,sepsis was the most prevalent cause. It is a widely accepted that diabetes predisposes to infections but data supporting this is scarce[8]. According to a study by Muller et al diabetics are more prone to develop respiratory tract infections, urinary tract infections and skin infections as compared to control group[7]. Two other studies by Briver et al and Uchino et also claimed sepsis to be a common factor for acute renal failure (48%) in ICU patients[8,9]. In our study most common origin for sepsis was UTI and skin infections. It is well known that diabetics have a complicated course for UTI, and they suffer from complicated infections in general[10,11]. Carton et al in his study found that in patients who have bacteremia 2/3rd are diabetic and site of pathogenesis is UTI for the bacteremia[12]. Bacterial adhesion to the uro epithelium and a decrease in the secretion of urinary cytokines have been implemented as causes of UTI, it was also suggested that peripheral neuropathy and cystopathy are associated in the pathogenesis as well[13,14]. As for skin infections it is reported that wound infections with gram negative organisms are three times more common in diabetics, and in our study skin infection was the second common cause for sepsis[15].

According to our study the second leading cause of Acute renal failure was hypovolemia either as because of a single factor, or multifactorial. According to the study by Rashid et al, gastroenteritis (32%) was the main factor and sepsis (21.3%) was the second for ARF[16]. According to a study conducted in the neighboring nation of India the results for factors of ARF were sepsis (52.9%) UTI (50%) NSAIDS (40%) gastroenteritis (12.9%) which are similar to our study[17].According to a study conducted by Vakrani et al diffuse proliferative Glomerulonephritis was seen in 2.8% of diabetics with ARF of the 70 patients studied, in a different study conducted by Parakash et al out of 260 Diabetics renal diseases besides diabetic nephropathies was found in 32 patients [18]. According to our study diabetics with ARF are at a higher risk for requiring dialysis (75.8%) Dialysis requiring ARF has a high risk of mortality and morbidity, and risk is increased when combined with other co morbid conditions like hypertension[19], a high number of deaths in the hospital and chronic kidney disease and end stage renal disease is found in the 5-20% of survivors of ARF requiring dialysis[20]. In our study there were no deaths in patients who were treated as conservative management while there were significant number of mortalities among the dialysis requiring group. According to a study by Vakrani et al 64.3% patients showed full recovery, and the results are similar to our study[17]. In different studies mortality rate is reported as 14-70% [21], A variety of different factors are associated with outcome of ARF likewise age, health status prior to diagnosis and the course during hospital stay.

Limitations to the study: Our study had some legitimate limitations, one being that since the study was done at a tertiary medical care centre, it is probable that majority of patients who required dialysis presented to us. Baseline serum creatinine levels were not knows for 51% of the patients, who were suspected as ARF, and those who dependent on dialysis and who died might be placed in the category by error.

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CONCLUSION

It is a well-documented fact that diabetics are prone to developing ARF, and UTI being the common case. With appropriate antibiotic regimen the patients show improvement. Patients who require dialysis as an intervention show high levels of morbidity and mortality. It is necessary to take the necessary measures to screen the diabetic patients to avoid any preventable causes of ARF, as this measure may result in less incidence in dialysis dependency and mortality.

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