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Evaluation Of Clinical Profile Of The Cases Of Acute Renal Failure In Adults At A Tertiary Level Hospital In Western Maharashtra, India.

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ABSTRACT

Acute renal failure (ARF) is characterized by an abrupt deterioration of renal function. The pattern of acute renal failure in third-world countries is changing albeit at a slower pace compared to that in developed countries. We conducted this study to evaluate the clinical profile of the cases of acute renal failure in adults at a tertiary level hospital. The patients who were admitted to a tertiary level hospital in western Maharashtra between 2019 – 2021 were included in the study. Detailed history, clinical and lab examination was taken. We got 200 cases satisfying our study inclusion criteria. A total number of 200 cases of acute renal failure patients, admitted to our tertiary level hospital, who met the study inclusion criteria were studied. There were 110 males (55%) and 90 females (45%) in the study. Majority of the participants (51%) were of the ages more than 60 years. Followed by 50 to 60 years (23%) and 40 to 50 years (14%). The most common sign was vomiting (68.5%), followed by Oliguria (54.5%), Fever (52%), Dyspnoea (49.5%), Fatigue (46%) and others. The commonest cause of ARF in our study was septicemia seen in 38% of the patients followed by Covid-19 (24.5%) and AGE (10.5%). Encephalopathy (24%) was the commonest complication. The mortality observed in our study was 17.5%. In the patients with ARF had most common causes of Septicaemia and Covid-19. Hence early diagnosis of ARF and prompt intervention in these cases will be responsible for a good survival rate.

Keywords: Acute Renal Failure, Symptoms, Etiology, Complications.

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INTRODUCTION

Acute renal failure (ARF) is characterized by an abrupt deterioration of renal function over a period of hours to days, resulting in the failure of the kidney to excrete nitrogenous waste products and maintain the fluid and electrolyte homeostasis [1]. The acute deterioration of renal function remains a common complication of many non-renal medical problems and therapies requiring hospital admission. [2].

Acute renal failure is divided in three categories for purpose of diagnosis and management into renal ARF, pre-renal ARF and post-renal ARF. [3] In pre-renal ARF, renal tubular and glomerular function is intact but clearance is limited by factors compromising renal perfusion, also termed prerenal azotaemia. Ex. Hypovolemia in burns or diarrhoea, Low cardiac output, Renal Vasoconstriction, drugs like Amphotericin B infections like Leptospirosis, Malaria, Snake Bite, Sepsis [4-6]. In the Renal ARF, it is acute renal failure due to a primary intrarenal (involving renal parenchyma) cause is called as intrinsic renal failure, or renal azotaemia. Ex. Renovascular obstruction, Glomerulonephritis, Acute tubular necrosis. In post-renal ARF, if the renal dysfunction is related to obstruction of the urinary outflow tract, it is termed as postrenal failure, or postrenal azotaemia. Ex. Ureteric calculi, blood clot, neurogenic bladder, BPH etc. Prerenal failure and intrinsic renal failure due to ischemia and nephrotoxins are responsible for most episodes of acute renal failure [7-9].

The most important risk factors for development of ARF are age more than 65 years, presence of infection and acute respiratory or circulatory failure. Multiorgan failure seen earlier in patients with ARF and also 3 times higher ICU mortality in these patients [6, 7]. In a study done by Gurucharan Avathi et al [7], it was found that incidence of acute renal failure was highest in medical ICU followed by burns ICU and surgical ICU. Among the medical causes of ARF, drugs and sepsis were the predominant causes [7]. Use of nephrotoxic drugs is the commonest precipitating factor in hospital acquired ARF [8]. The incidence of ARF is increasing as a consequence of advanced medical therapy and more complicated surgical intervention in older patients with presence of co-morbidities like hypertension, diabetes mellitus, chronic renal failure, IHD and liver diseases [9, 10].

The pattern of acute renal failure in third-world countries is changing albeit at a slower pace compared to that in developed countries. Of the 1862 patients with acute renal failure requiring dialysis between 1965 and 1986 in a north Indian centre, 60, 15 and 25 per cent were related to medical, obstetrical and surgical condition respectively. Among the medical patients, diarrhoea1 diseases which caused 23 per cent of the total number of cases of acute renal failure in the period 1965 to 1974 caused only 10 per cent in 1981 to 1986. In the same period, acute renal failure due to sepsis and drugs increased while that due to copper sulphate poisoning and intravascular haemolysis showed a downward trend. Obstetrical acute renal failure declined from 22 per cent in 1965 to 1974 to 9 per cent during the period 1981 to 1986. This decline was chiefly due to a fall in cases of septic abortion, puerperal sepsis a d postpartum haemorrhage. Surgical acute renal failure increased from 11 per cent during the period 1965 to 1974 to 31 per cent in the 1980s, predominantly due to an increase in patients with obstructive uropathy [11, 12].

METHODOLOGY

The patients who were admitted to a tertiary level hospital in western Maharashtra between 2019 - 2021 and having serum creatinine level more than 0.5mg/dl than baseline levels without having any history of chronic kidney disease or obstructive uropathy (calculi, tumors) or systemic diseases like hypertension, diabetes, congenital renal anomalies or on any known nephrotoxic drugs were included in the study.

Study Design

Cross sectional study

Study Site

A tertiary level hospital in western Maharashtra.

Sample size

200 patients.

Inclusion criteria

- Patients who were admitted with ARF in our hospitals and with serum creatinine level more than 0.5mg/dl than baseline level.
- 50 % increase in serum creatinine level above baseline.
- 50 % decrease in glomerular filtration rate (GFR).
- Urinary output of less than 400 ml in 24 hrs in a patient without any premorbid conditions.

Exclusion criteria

Patients with following diseases were excluded

- Chronic kidney disease (CKD), renal malignancies, Renal calculi, tumours or any other renal disease.
- Diabetes mellitus type II.
- Hypertension.
- Patients on known nephrotoxic drugs.

Ethical Approval

Patients were included after taking their written informed consent. Ethical clearance was obtained from the institutional ethics committee.

Methodology

Detail history of the concerned subject is taken either from the patient or nearby relative. The complete procedure is explained, all doubts if any are cleared. Subject is then completely examined and all the inclusion criteria are carefully watched. Patient is then evaluated after laboratory investigations and all the deranged parameters if any are carefully monitored. Patient serum creatinine levels are then look for on the day of admission, which is measured by modified “Jaffe method” in our institution, which is equivalent to criteria met by international standards, while serum urea is measured by modified G-LDH method in an automated analyser as per the international standards.

RESULTS

A total number of 200 cases of acute renal failure patients, admitted to our tertiary level hospital, who met the study inclusion criteria were studied.

There were 110 males (55%) and 90 females (45%) in the study.

Figure 1: Gender distribution in ARF

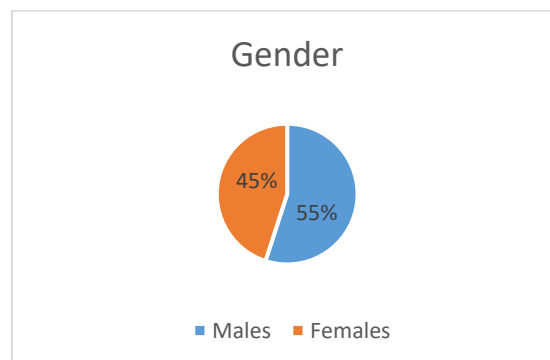


Table 1: Age Incidence

Age group	No. of patients	Percentage
<20	2	1%
20-30	8	4%
30-40	14	7%
40-50	28	14%
50-60	46	23%
>60	102	51%
Total	200	100%

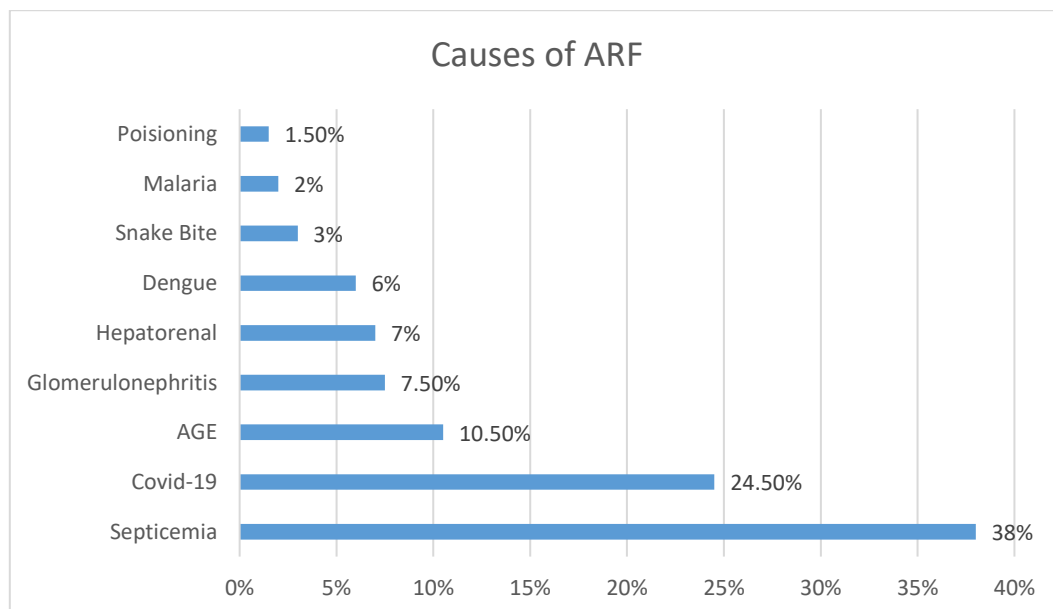
Majority of the participants (51%) were of the ages more than 60 years. Followed by 50 to 60 years (23%) and 40 to 50 years (14%).

Table 2: Clinical presentation of ARF patients

Symptoms and signs	Number of cases	Percentage
Vomiting	137	68.5%
Oliguria	109	54.5%
Fever	104	52%
Dyspnea	99	49.5%
Fatigue	92	46%
Loose stools	51	25.5%
Jaundice	59	29.5%
Polyuria	14	7%

The most common sign was vomiting (68.5%), followed by Oliguria (54.5%), Fever (52%), Dyspnoea (49.5%), Fatigue (46%) and others.

Figure 2: Causes of ARF in our study



The commonest cause of ARF in our study was septicemia seen in 38% of the patients followed by Covid-19 (24.5%) Acute gastro enteritis - AGE (10.5%), Glomerulonephritis (7.5%), Hepatorenal causes (7%), Dengue (6%), snake bite and poisoning (5% each) and dengue or leptospirosis (1%).

Table 3: Complications in patients with acute renal failure

Associated Complications	No. of patients	Percent %
Encephalopathy	48	24%
Hypotension	41	20.5%
Multi Organ Dysfunction	32	16%
Pulmonary Edema	30	15%
Hyperkalemia	27	13.5%
Metabolic Acidosis	22	11%

Encephalopathy (24%) was the commonest complication encountered in our study followed by Hypotension (20.5%) and Pulmonary Edema (30%), Multi Organ Dysfunction (24%), Metabolic Acidosis (22%) & Hyperkalemia (20%) were amongst the other complications.

Outcome in our study was found with 165 patients which survived while rest 35 patients expired. So mortality observed in our study was 17.5%. Out of the 35 cases which expired 15 cases (43%) were in septicaemia and 19 had Covid-19 (54%). Thus in our study 54% of the mortality was due to Covid-19 and 43% of mortality was due to septicaemia.

DISCUSSION

Out of 200 cases studied, 110 (55%) patients were males and 90 (45%) were females. This sex ratio is similar to %. Mindell JA et al [13] in their study on pattern of acute renal failure, found that 58% were males and 42% were females. Baslov and Jorgensen et al [14] study showed a prevalence of ARF in males to be 53%. Bernich B et al. [15], in their study had 41% females and 59% males. Mean age of our study patients was 52.6 years. Age ranged from 20 to 90 years with mean age of 52.6 & maximum patients were >60 age group with 51% cases.

In a similar review with 499 cases, Baslov and Jorgensen [14], have observed that maximum number of cases that is 60% were above age of 60 years. Even in the study conducted by Swann and Merill et al [16] have observed that most of the cases were above 65 years of age. Out of 200 patients in our study we observed 68.5% had vomiting, 54.5% were oliguric, fever was seen in 52% of cases, dyspnoea was one of the common symptoms observed in 49.5% of patients and 46% patients give history of fatigue. Findings are comparable other studies done by Singhal AS et al [17] which also showed that oliguria was seen in 85.2% of patients and that 60% patients had vomiting. J. Prakash et al [18] has 65.2% patients who were oliguric.

Septicaemia was the most dominant cause of ARF in our study (38%). Out of 200 cases 76 cases were diagnosed to be in septicaemia. Goplani et al [19] in their study shows in 61.42% patients sepsis was the most common etiological factor leading to ARF, while 32.85% of patients had DIC. Out of the 200 patients 4 were diagnosed to be suffering from malaria. Singhal AS et al [17] in their study had found 16% patients of mixed malaria 4% had P.falciparum. Vasculotoxic snake bite: Snake bite is a common cause of hospital admissions in our hospital. Out of the many cases admitted 5 of them were observed to be in renal failure. In a comparative study with Goplani et al [19], 121 patients were admitted with snake bite out of which 15 were found to be in ARF, 8 were treated with dialysis and 7 were treated conservatively.

Table 4: Complications of acute renal failure

Complications	Present study	Singhal AS et al [17]	Goplani et al [19]
Encephalopathy	24%	65.2%	56%
Hypotension	20.5%	28%	33%
Multi Organ Dysfunction	16%	-	-
Pulmonary Edema	15%	32%	29%
Hyperkalemia	13.5%	-	-
Metabolic Acidosis	11%	26%	18%

Mortality in our patients was seen in 35 cases (17.5%).

A Raza et al [20] reported the mortality of 19% in ARF patients. Out of the 35 cases which expired, 15 cases (43%) were in septicaemia and 19 had Covid-19 (54%). Thus, in our study 54% of the mortality was due to Covid-19 and 43% of mortality was due to septicemia. Adapa S et al [21] reported that ARF was seen in 27% of the cases with Covid-19. Kennedy et al [22] also observed sepsis related mortality to be 30%. J Prakash et al [18] also reported evidence of septicaemia to be as high as 69.2%. S Sundaram et al [23] reported that ARF was seen in 23% cases of Covid-19.

CONCLUSION

We found a significant number of ARF cases in our study, the most common presentation were oliguria and vomiting. We observed that the mortality in ARF cases was 17.5%. Thus from our study we can conclude that patients with ARF had most common causes of Septicaemia and Covid-19. Hence early diagnosis of ARF and prompt intervention in these cases will be responsible for a good survival rate.

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