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Clinical Profile and Treatment Outcome of Acute Kidney Injury in a Tertiary Care Hospital

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Abstract:
Background*: Acute Kidney Injury(AKI) is one of the major cause of in hospital mortality rates globally .The current study was conducted to study the etiological profile ,severity and management of acute kidney injury .*
Materials and Methods*: The study was a prospective observational study , conducted in the department of general medicine ,viswabharathi medical college ,penchikalapadu ,Kurnool district ,Andhra Pradesh .The study population included all the patients admitted to Intensive Care Unit (ICU) with Acute Kidney Injury(AKI) between January 2021 to January 2022 .All the study participants were recruited to study by convenient sampling .Descriptive analysis was carried out by frequency and proportion for categorical variables .*
Results*: A total of 100 subjects were included .Participants were almost uniformly distributed in each of a decadal age group till above 60 years .Males (57%)were slightly higher than females (43%).Oliguria was present in 88% of the study population .The most common etiology was acute diarrhoeal disease (44%),followed by multiple infections in 12% and sepsis in 10% of the subjects . As per RIFLE criteria 46% participants were at risk ,26.0% had injury,28% had failure .All at risk people were treated conservatively ,among injury category,38.5% were treated by haemodialysis and 3.84% by peritoneal dialysis .In failure group ,60.71% and 3.57%were treated by haemodialysis and peritoneal dialysis respectively.*
Conclusion:*Acute Kidney Injury (AKI) can be a consequence of varied aetiologies and all the age groups and both the genders at risk of developing it. RIFLE criteria may be useful tool in guiding the management .*
Key Word*: AKI,Acute Kidney Injury ,RIFLE criteria.*

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I. Introduction

Acute Kidney Injury (AKI) has a constant role inincreased ICU admissions and in-hospital mortality rates.Globally, the incidence of AKI in hospitalized patients isridging and it occurs at a rate of 21.6% among adults and33.7% in children, in addition to its association withcusping of in-hospital mortality rates among adults andchildren (23.9% and 13.8% respectively).1 The tendencyof the disease to manifest at a later stage added to thepoor recognition of the same and inadequacy of resourcesin developing countries makes AKI a greatest challengeto the health system of this set-up.Of all the organ dysfunctions, the rank held by that ofkidneys is unique with evidences from Acute Physiologyand Chronic Health Evaluation (APACHE) scoringsystem and the Sequential Organ Failure Assessment(SOFA) system where increased credentials to renaldysfunction (20% and 16.6% respectively) has beenallotted.2,3There is heterogeneity in the pattern of AKI across distinct geographical regions with wide variability in the contributing factors like infections, sepsis, poisoning, drug related and other conditions. In addition to this, the availability of data related to this morbidity in the developing countries are dehiscent. Despite the disparity of explicitness in the definitions for AKI, this hospital based study was undertaken by applying the RIFLE criteria, for identification of the disease prognosis, in addition to the hunt for various etiological factors.4In this reign of scientific research, our study might help bridge the gaps in knowledge about AKI especially in a resource limited setting.Present study was undertaken to investigate about the etiological profile of acute kidney injury presenting to a tertiary care teaching hospital, to apply the RIFLE criteria in acute kidney injury patients admitted to the medical wards and to the significance and to study about the prognosis and outcomes of acute kidney injury.

II. Material And Methods

The study was a prospective observational study. The study was conducted in the department general medicine, viswabharathi Medical college and Hospital, which is a tertiary care teaching hospital,penchikalapadukurnool district, Andhra Pradesh in South India. The study population included all the patients admitted to Intensive Care Unit (ICU) with acute Kidney injury (AKI) between January 2021tojanuary 2022. All the study participants were recruited to the study by convenient sampling. All the study participants were evaluated by thorough clinical examination and appropriate laboratory investigations. The AKI was diagnosed if the patients had satisfied the either increase in creatinine value or decline in the urine output or both as per second International Consensus Conference of the Acute Dialysis QualityInitiative (ADQI) Group criteria.5 RIFLE criteria 4 wereused to classify the patients into Risk, Injury and Failurecategories.The study was approved by Institutional ethicscommittee. Informed written consent was sought andobtained from all the participants and only thoseparticipants willing to provide written consent wereincluded in the study. Descriptive analysis was carriedout by frequency and proportion for categorical variables.
IBM SPSS version 22 was used for statistical analysis.6.
Study Design: Prospective observational study
Study Location: This was a tertiary care teaching hospital based study done in Department of General Medicine, at viswabharathi medical college and general Hospital, penchikalapadu, Kurnool district , Andhra Pradesh.

Study Duration: January 2021 to January 2022.
Sample size: 100 patients.
Statistical analysis
IBM SPSS version 22 was used for statistical analysis

III. Result

The study had included a total of 100 patients diagnosedwith AKI.Among the study population, 17 (17.0%) participantswere aged 13 to 20 years, 20 (20.0%) were aged 21 to 30years, 12 (12.0%) were aged 31 to 40 years, 20 (20%)were aged 41to 50 years, 17 (17.0%) were aged 51 to 60,14 (14.0%) were aged 60 and above. Among the study
population male participants were 57 (57%) remaining 43(43%) were female participants. Among the studypopulation, 88 (88%) were oliguric remaining 12 (12%)were Non oliguric (Table 1).

Table no 1 :: Descriptive analysis of age group in study population (N=100).

Age	Frequency	percentage
13-20	17	17
21-30	20	20
31-40	12	12
41-50	20	20
51-60	17	17
>60	14	14
Males females	57 43	57 43
Urine output Oliguric Non oliguric	 88 12	 88 12

Among the study population Acute diarrhoealdisease(ADD) was the most common cause in 44% of the cases,followed by multiple infections (leptospirosis+ malaria+enteric fever) in 12% of the subjects and Sepsis in 10% ofthe subjects. When gender wise etiological profile wasassessed, in male participants 23 (41.8%) were in ADD, 6(10.90%) were in sepsis, 5 (9.09%) were Malaria, 2(3.63%) were leptospirosis, 8 (14.50%) were LEPTO+
malaria+ enteric fever, 6 (10.90%) were Poisoning, 0%were glomerulonephritis, 2 (3.64%) were Snake bite, 1 (1.82%) were drug induced and 2 (3.64%) Post renal(BPH, Calculus). In female participants 21 (46.67%)were ADD, 4 (8.89%) were sepsis, 3 (6.67%) wereMalaria, 2 (4.44%) were leptospirosis, 4 (8.89%)LEPTO+ malaria+ enteric fever, 2 (4.44%) werePoisoning, 5 (11.11%) were glomerulonephritis, 3(6.67%) were snake bite, 1 (2.22%) were drug induced,0% were post renal (BPH, Calculus) (Table 2).

Table 2: Etiology of acute kidney injury in study population (N=100).

ETIOLOGY	MALES(N=55)	FEMALES(N=45)	TOTAL (N=100)
ADD	23(41.8%)	21(46.67%)	44(44%)
SEPSIS	6(10.9%)	4(8.89%)	10(10%)
MALARIA	5(9.09%)	3(6.67%)	8(8%)
LEPTOSPIROSIS	2(3.63%)	2(4.44%)	4(4%)
LEPTOSPIROSIS+MALARIA+ENTERIC FEVER	8(14.50%)	4(8.89%)	12(12%)
POISONING	6(10.9%)	2(4.44%)	8(8%)
GLOMERULONEPHRITIS	0(0%)	5(11.11%)	5(5%)
SNAKE BITE	2(3.64%)	3(6.67%)	5(5%)
DRUG INDUCED	1(1.82%)	1(2.22%)	2(2%)
POST RENAL(BPH,CALCULUS)	2(3.64%)	0(0%)	2(2%)

Among the study population, 46 (46%) participants wereat risk, 26 (26.0%) had injury, 28 (28%) had failure (Table 3).

AKI RISK AS PER RIFLE SCORE	FREQUENCY	PERCENTAGE
RISK	46	46
INJURY	26	26
FAILURE	28	28

Out of 46 people with in risk category, all the 46 (100%)were treated conservatively. Out of 26 people in injury category AKI, 15 (57.7%) were treated by conservative,treatment 10 (38.5%) were treated by Haemodialysis andremaining 1 (3.84%) was treated by peritonealdialysis. Out of 28 people in failure group, 10 (35.7%) had conservative treatment, 17 (60.71%) underwenthaemodialysis and another 1 (3.57%) subject underwent peritoneal dialysis (Table 4)

AKI OUTCOME	CONSERVATIVE	HAEMODIALYSIS	PERITONEAL DIALYSIS
RISK(N=46)	46(100%)	0	0
INJURY(N=26)	15(57.7%)	10(38.5%)	1(3.84%)
FAILURE(N=28)	10(35.7%)	17(60.71%)	1(3.57%)

IV. Discussion

The age groups above and below forty years has beenequally involved in contracting the disease though males

are slightly at a higher risk as compared to females.Contrastingly one study have included patients with equal

sex distribution with about more than four-fifths of themaged above forty years.Oliguria endured as a classical sign in these patients asabout nine of every ten patients diagnosed with AKIexhibited reduced urinary output (<0.5 ml/kg/hour).Though its predictability of AKI is poor as only one tenthof the cases develop abnormal serum creatinine levelspreceding renal injury.8 Based on RIFLE classification,almost half of the patients in our study remained in classR and one-fourth persevered in class I and class F each.This indicates the progression of the disease outcome.

Contrastingly, one study had AKI patients of whom 19%,35% and 46% were categorized to class R, class I and

class F respectively.9 Bagshaw SM et al, havedemonstrated the independent association of variousRIFLE categories with in-hospital mortality and theyfound 33.2%, 27.7%, 17.9% of class F, class I, class

Rare respectively associated with hospital mortality.10Of the diverse etiologies leading to AKI, the ADD toppedthe list by having 44% of patients and was followed bysepsis (10%). The results of Osman M et al, was also notdissimilar with our study as they found volume depletion,other than being common cause was also a significantpredictor of mortality in AKI patients.11 Sepsis pertainedto be the commonest of causes for AKI (44.3%) and anindependent predictor of mortality in AKI patients. Onestudy have supported this finding and the results were notdissimilar.12 In present study 8% of AKI were due topoisoning. Organophosphorus (OP) compounds being thecommonest of poisoning cases induce oxidative stress,thereby damaging renal tubules and kidney dysfunction.Lee FY et al, have demonstrated six fold increased risk ofAKI in patients with OP poisoning.13In this study, 8% and 4% of AKI was associated withmalaria and leptospirosis respectively. Increasedparasitaemia have led to AKI in falciparum malariacases.14 The proximal convoluted tubule is the primarysite of injury in leptospirosis that might explain thedevelopment of AKI in these patients.15The contribution by snakebite cases andglomerulonephritis were comparable (5% each) in ourstudy. There will be usual association of polymicrobialinfections of skin and soft tissue (SSTI) post animal bitesthat may harvest pathogens which amplifies the sepsispathway. Tigecycline have proven efficacy in these casesand can be advised.16 One study has also the documentedthe efficacy of tigecycline use in SSTIs following animalbites.17The risk posed by drug induced and post-renal causes(2% each) was also found to be comparable. The renalinjury in drug users might be due to increasedsympathomimetic activity leading to vasoconstriction andthereby ischemia related renal impairment. The HIV andHCV co-infection has also to be ruled out in the drugusers as these conditions induce rhabdomyolysis. Thereare many more studies which supports the role of druginduced nephropathy and AKI.18-20

V. Conclusion

Timely diagnosis and management of this diseasecondition confer a favourable prognosis to the patient.
The progression of AKI lead to increased hospitalmortality rates and increased length of stays that mightprove a wastage of limited resources in a setting likeIndia. Hence more number of studies has to be done toefficiently pinpoint the predictors of AKI and preventingits occurrence in the near future.

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