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Original Research Article

Comparison of outcomes of acute kidney injury in elderly and non-elderly hospitalized patients in a tertiary care hospital in India: a prospective observational study

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ABSTRACT

Background: The prevalence of acute kidney injury (AKI) progressively increases with age. A higher rate of dialysis dependency and mortality is observed in elderly with AKI. Here we have studied the comparison of clinical features, outcomes of AKI between elderly (age ≥60 years) and non-elderly AKI patients and their risk factors for mortality.
Methods: This prospective observational study enrolled 100 patients with AKI, with elderly and non-elderly in a 1:1 ratio for comparison, from September 2021 to January 2023 at AIIMS Rishikesh in India. Detailed history, clinical examination, relevant laboratory and radiological investigations were done to evaluate for the cause of AKI. Etiological causes, complications of AKI, and in-hospital outcomes were observed. They were given standard treatment and dialysis as per standard indications. We analysed the mortality risk of these groups using the Cox proportional hazards model.
Results: The in-hospital mortality rates among these two groups were non-significant (p=0.29). A significantly higher number of patients with non-elderly AKI were HD-dependent at discharge (p=0.027). Elderly patients had significantly lesser complications like uremic encephalopathy and fluid overload compared to non-elderly. There was a significant association between mortality and female gender, intensive care unit (ICU) admissions, hospital-acquired AKI, pre-renal/renal causes, chronic obstructive pulmonary disease (COPD) as comorbidity, multiple organ dysfunction syndrome (MODS), mechanical ventilation requirement, vasopressor support requirement, need for hemodialysis and prolonged ICU stay.
Conclusions: Elderly patients with AKI do not experience worse mortality outcomes than non-elderly patients with AKI. Therefore, elderly patients should not be denied timely treatment, solely based on their age.

Keywords: Elderly, Acute kidney injury, Hospital-acquired AKI, Community-acquired AKI, Haemodialysis, ICU

INTRODUCTION

Acute kidney injury (AKI) is a clinical syndrome characterised by a sudden decline in glomerular filtration rate (GFR) causing a decrease in the elimination of nitrogenous waste products (urea and creatinine) and other uremic toxins.[1] Approximately 7–18% of hospitalized patients and 50% of ICU patients are estimated to have AKI. The 90-day mortality in both critical and non-critical

care AKI was observed to be 23% in a recent study. In critically ill patients it is estimated to be nearly 80%.[2] Hence it is a disease of major public health importance.

There is a progressive rise in the incidence of AKI with age.[3] AKI is 3.5 times more prevalent in those older than 60 years.[4] The national policy for older persons by the Government of India and United Nations world population prospects defines the elderly as 60 years of age and above.[5,6] Hence in our study, we have considered a patient to be elderly if his/her age is 60 years and above.

The increased occurrence of AKI in the elderly can primarily be attributed to two major causes. Firstly, the kidney goes through age-related changes in both its function and structure. This results in a substantial decline in renal mass, the number of functioning nephrons, and overall kidney function. Secondly, as individuals age, the incidence of chronic diseases like diabetes mellitus (DM), systemic hypertension (HTN), cardiovascular disease, and chronic kidney disease (CKD) increases. These age-related comorbidities can directly contribute to the development of AKI. Some specific conditions occurring in the elderly are obstructive prostate issues and multiple myeloma.[4,7] Nearly 60-80% of elderly patients have hypertension, 20-30% have DM and 30-35% have CKD.[8,9] Risk factors for AKI in the elderly include male gender, hospital-acquired AKI (HA-AKI), pre-existing CKD, intensive care requirement(ICU) and heart failure.[10,11]

Common aetiology of AKI in the elderly includes dehydration-induced pre-renal AKI, use of nephrotoxic drugs and obstructive uropathy.[12] According to a recent systematic review and meta-analysis of kidney function recovery following AKI in the elderly, it has been observed that individuals above the age of 60 are approximately 28% less likely to experience recovery compared to younger patients. Furthermore, it was found that elderly patients undergoing hemodialysis (HD) had a significantly higher risk of renal non-recovery compared to their younger counterparts. Additionally, the in-hospital mortality rate for AKI among the elderly was recorded at 30%, whereas it was only 6.2% for non-elderly individuals.[13]

A review of the literature showed that elderly patients with AKI had longer stays in the ICU and greater rates of hypertension, cardiovascular disease, and multiple organ dysfunction syndromes (MODS) compared to younger patients.[4] Hence it is important to know about the etiological spectrum, clinical characteristics, risk factors and renal outcomes in elderly patients. A comparative knowledge of these features with a non-elderly population will help us guide in better risk detection and appropriate management. There are very few studies that compared the clinical characteristics of AKI in the elderly versus non-elderly. Therefore, our study may help to overcome the knowledge gap in this area and help us in improving patient management.

METHODS

This was a prospective observational study of 100 AKI patients studied in the Department of Nephrology at All India Institute of Medical Sciences Rishikesh, India from September 2021 to January 2023. The aim was to compare the clinical characteristics and mortality of AKI in elderly and non-elderly hospitalized patients. The primary objective was to compare the in-hospital mortality rates among these groups. The secondary objective was to compare clinical characteristics, outcomes other than mortality, AKI-related complications and the length of hospital stay between the groups

Patients and data collection

Patients hospitalized in AIIMS Rishikesh during the period of data collection, whose consultations were sent to the Department of Nephrology and were diagnosed as AKI as per KDIGO 2012 guidelines were enrolled. Inclusion criteria was patients more than or equal to 18 years of age, diagnosed as having AKI, as per KDIGO 2012 definition and patients diagnosed with Acute on CKD.[14] Patients with CKD stage 5 at presentation, who have received kidney transplantation, pregnancy, referred cases with H/O previous hospital admission beyond the last 07 days of presentation, in the Emergency Department, for the current episode were excluded from the study.[15] After getting informed written consent, study subjects were enrolled in the study. Detailed history, clinical examination, relevant laboratory investigations, and imaging studies were done to evaluate for the cause of AKI, as part of their management per se.

The causes of AKI were classified as pre-renal/renal, and postrenal. Based on clinical history, examination and relevant investigations, the cause of AKI was elucidated and were included in the two broad etiological causes of AKI. As it was difficult to differentiate pre-renal from renal causes of AKI, it was categorized together. Further, each patient was classified as having CA-AKI or HA-AKI, according to KDIGO staging of AKI as per operational definitions.[14] Etiological causes, complications of AKI, and in-hospital outcomes were observed. In- hospital outcomes were categorized into four groups- complete recovery of AKI, partial recovery of AKI (non-HD dependent), non-recovery (HD dependent) and mortality. They were given standard treatment and dialysis as per standard indications. The date of AKI onset was defined as the earliest day that the serum creatinine met the KDIGO AKI criteria. The stage of AKI was determined using the peak serum creatinine after the date of AKI onset. Data of individual study subjects were recorded in a pre-designed case record proforma. Regular follow-up was done as long as the patient was in the hospital.

Definitions used in the study

AKI definition and staging, baseline S. Cr estimation as per KDIGO 2012 guidelines.[14] CKD was defines

according to KDIGO 2012 CKD guidelines.[15] Other operational definitions includes- community acquired AKI was defined as AKI at time of admission or within 24 hours of admission in a hospital. Hospital Acquired AKI was defined as AKI beyond 24 hours of admission, during hospital stay.

Outcomes

Primary outcome was 'in- hospital mortality' in each group. Secondary outcomes was to determine the proportion of patients requiring in-hospital renal replacement therapy in each group, the duration for initiation of renal replacement therapy (RRT) from the time of the establishment of AKI diagnosis in each group, proportion of patients having RRT dependency at discharge in each group.

Statistical analysis

The presentation of the categorical variables was done in the form of numbers and percentages (%). On the other hand, the quantitative data with normal distribution were presented as the means±SD and the data with non-normal distribution as median with 25th and 75th percentiles (interquartile range). The data normality was checked by using Kolmogorov-Smirnov test. The comparison of the variables which were quantitative and not normally distributed in nature was analysed using Mann-Whitney Test and variables which were quantitative and normally distributed in nature were analysed using independent t-test. The comparison of the variables which were qualitative in nature were analysed using Chi-square test. If any cell had an expected value of less than 5 then Fisher's exact test was used. Kaplan Meier survival analysis curve was used for assessing overall survival between the elderly and non-elderly and log-rank test was used for comparison. Univariate and multivariate Cox proportional hazard regression was used for mortality.

The data entry was done in the Microsoft excel spreadsheet and the final analysis was done with the use of statistical package for social sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 25.0. For statistical significance, a p value of less than 0.05 was considered statistically significant.

RESULTS

Patient demographics

There was a total of 100 study subjects: 50 elderly with mean age (mean±SD in days) of 65.9±5.95 and 50 non-elderly with a mean age of 36.94±10.68. The Elderly differed significantly from the non-elderly (p=0.039) with respect to gender distribution. The comparison of demographic variants and co-morbidities is given in Table 1.

Etiological spectrum

Infections were the major aetiology for AKI, occurring in 62% of the elderly and 44% of the non-elderly. Other etiological factors include causes secondary to acute organ damage like acute coronary syndrome (ACS), acute liver failure (ALF), acute pancreatitis, and rhabdomyolysis which did not significantly differ between both the groups (p=0.71).

The occurrence of AKI secondary to hypovolemia and post-surgical causes were similar (p=0.71). Drug-induced AKI were observed due to aminoglycosides, iodine contrast and chemotherapy. Other miscellaneous causes of AKI were paraquat poisoning, wasp bite and snake bite. Obstructive uropathy was observed to occur equally in both groups. The various foci of infection is depicted in Figure 1. Elderly and non-elderly patients were comparable in terms of the infection foci observed except for Puerperal sepsis (p value=0.025) which was higher in the non-elderly group.

In-hospital outcome

Out of 100 patients, 35 (35%) patients had in-hospital mortality. 40% (n=20) elderly patients and 30% (n=15) of non-elderly patients had in-hospital mortality. The comparison is given in Table 2.

Table 1: Comparison of demographic variants between elderly and non-elderly AKI patients.

Demographic and clinical characteristics	Elderly (n=50)	Non-elderly (n=50)	Total	P value
Age (years)	65.9±5.95	36.94±10.68	100	<0.0001‡
Gender (%)				
Female	14 (28)	24 (48)	38 (38)	0.039†
Male	36 (72)	26 (52)	62 (62)	
Admission setting (%)				
Medical	43 (86)	38 (76)	81 (81)	0.253*
Surgical	6 (12)	7 (14)	13 (13)	
Obstetric and gynaecology	1 (2)	5 (10)	6 (6)	
Admission type (%)				
Ward	24 (48)	26 (52)	50 (50)	0.689†
ICU	26 (52)	24 (48)	50 (50)	
Length of hospital stay(in days)	11.22±6.01	12.24±7.12	11.73±6.57	0.441‡

Continued.

Demographic and clinical characteristics	Elderly (n=50)	Non-elderly (n=50)	Total	P value
Length of ICU stay (in days)	2 (0-6.75)	3 (0-5)	3 (0-6)	0.906§
Mechanical ventilation requirement	18 (36)	20 (40)	38 (38)	0.68†
Vasopressor support requirement	26 (52)	30 (60)	56 (56)	0.42†
Baseline serum creatinine (mg/dl)	1 (0.8-1)	1 (0.825-1.1)	1 (0.8-1.1)	0.365§
Serum creatinine at admission (mg/dl)	4 (2.7-6.5)	4.5 (3.4-7.6)	4.4 (2.875-7)	0.097§
AKI stage (%)				
1	1 (2)	1 (2)	2 (2)	0.092*
2	8 (16)	2 (4)	10 (10)	
3	41 (82)	47 (94)	88 (88)	
CA-AKI	46 (92)	49 (98)	95 (95)	0.362*
HA-AKI	10 (20)	6 (12)	16 (16)	0.275†
Pre-renal/renal	45 (90)	46 (92)	91 (91)	1*
Post-renal	5 (10)	4 (8)	9 (9)	1*
Sepsis	31 (62)	23 (46)	54 (54)	0.108†
MODS	22 (44)	22 (44)	44 (44)	1†
Need for dialysis	33 (66)	41 (82)	74 (74)	0.068†
Time to initiation of RRT from AKI onset	1 (0-2)	1 (1-1.75)	1 (0-2)	0.584§
Number of HD sessions	2 (0-3)	3 (2-5)	3 (0-4)	0.015§
Co-morbidities (%)				
DM	20 (40)	6 (12)	26 (26)	0.001†
Hypertension	22 (44)	9 (18)	31 (31)	0.005†
Coronary artery disease	7 (14)	2 (4)	9 (9)	0.16*
Cerebrovascular accident	3 (6)	0 (0)	3 (3)	0.242*
CKD	22 (44)	13 (26)	35 (35)	0.059†
Chronic liver disease	5 (10)	2 (4)	7 (7)	0.436*
COPD	11 (22)	0 (0)	11 (11)	0.0005*
Malignancy	4 (8)	1 (2)	5 (5)	0.362*

‡ Independent t test, § Mann Whitney test, * Fisher's exact test, † Chi square test

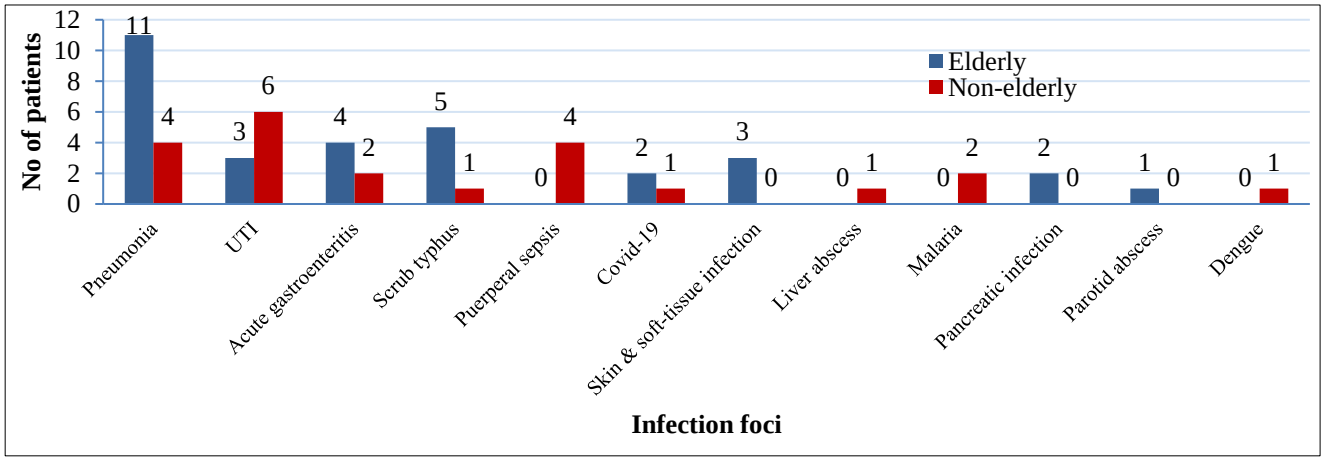

Figure 1: Comparison of infection foci between elderly and non-elderly AKI patients.

Table 2: Comparison of in-hospital outcomes between elderly and non-elderly AKI patients.

In-hospital outcome and AKI-related complications	Elderly (n=50) (%)	Non-elderly (n=50) (%)	Total	P value
Mortality	20 (40)	15 (30)	35 (35)	0.295†
Dialysis dependency at discharge	0 (0)	6 (12)	6 (6)	0.027*
Partial recovery (off HD)	19 (38)	16 (32)	35 (35)	0.529†
Complete recovery	11 (22)	13 (26)	24 (24)	0.640†
Total	50 (100)	50 (100)	100 (100)	-

* Fisher's exact test, † Chi square test

Survival analysis

The overall survival rate of the elderly was 85.15% at the end of 7 days, 67.61% at the end of 14 days, and in non-elderly was 79.95% at the end of 7 days, 72.71% at the end of 14 days. The survival rate was comparable between elderly and non-elderly (p value=0.14) (Table 3 and Figure 2).

Table 3: Comparison of overall survival between elderly and non-elderly AKI patients.

Variables	Elderly	Non-elderly
Total N	50	50
N of events	20	15
Censored		
N	30	35
Percent	60.00%	70.00%
OS at the end of 7 days	85.15%	79.95%
OS at the end of 14 days	67.61%	72.71%
Mean		
Estimate	17.584	24.7645
Standard Error	1.56207	2.26412
95% confidence interval		
Lower bound	14.5224	20.3268
Upper bound	20.6457	29.2021
Median		
Estimate	20	34
Standard error	2.61159	0
95% confidence interval		
Lower bound	14.8813	-
Upper bound	25.1187	-
P value (log rank test)	0.14	

N- number, OS- Overall survival

AKI-related complications

Elderly patients had a significantly lower proportion of AKI-related complications during hospital stay: hyperkalemia (64% versus 82% respectively; p=0.043), uremic encephalopathy (24% versus 44%; p=0.035) and oligo-anuria (48% versus 74% respectively; p=0.008) as compared to non-elderly.

The two groups were comparable in terms of occurrence of other complications like metabolic acidosis (92% elderly, 96% non-elderly) and uremic gastritis (44% elderly and 54% non-elderly).

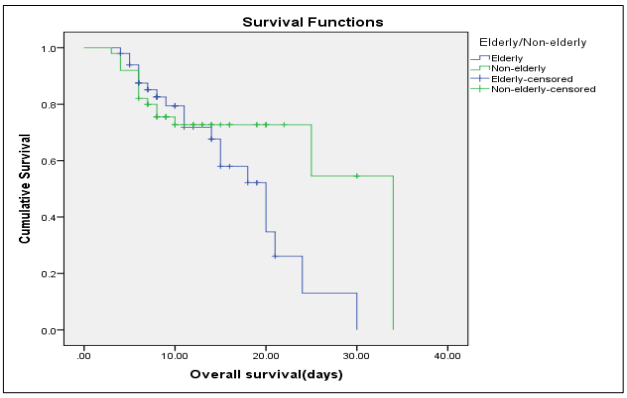

Figure 2: Kaplan Meier survival analysis curve comparing overall survival between elderly and non-elderly AKI patients.

Association of demographic and clinical characteristics with mortality

On performing univariate regression, patients with ICU admissions, higher serum creatinine at presentation, HA-AKI, MODS, mechanical ventilation requirement, vasopressor support requirement, patients with uremic gastritis and uremic encephalopathy had a significantly high risk of mortality.

On performing multivariate regression, none of the variables was independently a significant risk factor of mortality (p value >0.05) (Table 4).

Table 4: Multivariate Cox proportional hazard regression for predictors of mortality in AKI patients.

Variables	Beta coefficient	Standard error	P value	Hazards ratio	95.0% CI for hazards ratio	
					Lower	Upper
Length of hospital stay (in days)	-6.559	4.353	0.132	0.001	0.000	7.190
Serum creatinine at admission (mg/dl)	-0.192	0.168	0.252	0.825	0.594	1.147
Number of HD sessions	-0.128	0.194	0.509	0.880	0.601	1.287
Admission type						
Ward						
ICU	0.058	0.689	0.933	1.060	0.275	4.093
HA-AKI	0.131	0.657	0.842	1.140	0.315	4.131
MODS	-0.030	0.955	0.975	0.970	0.149	6.307
Mechanical ventilation requirement	2.625	1.375	.056	13.802	0.932	204.329
Vasopressor support requirement	0.700	0.799	0.381	2.014	0.421	9.640

Continued.

Variables	Beta coefficient	Standard error	P value	Hazards ratio	95.0% CI for hazards ratio	
					Lower	Upper
Uremic gastritis	0.328	0.690	0.635	1.388	0.359	5.371
Uremic encephalopathy	-0.683	0.848	0.421	0.505	0.096	2.663

DISCUSSION

Demographics and clinical characteristics

Our results showed that the elderly with AKI had significantly more male (72%) patients. This was similar to the study conducted by Liu et al and Ge et al, where males constituted 62% of the elderly AKI patients.[10,12] This may be attributed to the increase in the incidence of obstructive uropathy in males as age advances leading to AKI. Most of the AKI patients were in medical wards than surgical wards and nearly 50% in both groups were critically ill requiring ICU care. The need for ICU care in the elderly and non-elderly were less, 22% and 19.2% in another study.[10] The mean length of hospital stay in the elderly was 11±6 days and in non-elderly was 12±7 days and the duration of ICU stay were comparable. While there was a significantly prolonged hospital stay in the elderly in studies conducted by Gong et al, Pongsittisak et al and Yang et al . In our study, 82% of the elderly and 94% of the non-elderly were in the KDIGO AKI stage 3 group, while other studies had more patients in AKI stages 1 and 2.[18,19] This was observed as we included patients with AKI whose referral was sent to the Department of nephrology and many of the AKI stage 1 and stage 2 cases were managed by the primary department.

Most of the patients had CA-AKI in both groups, 92% of the elderly and 98% of the non-elderly, whereas other studies have shown significantly higher cases of HA-AKI in the elderly group.[10,12] Kohli et al also observed that elderly patients were more at risk of HA-AKI than other.[20] The most common causes of HA-AKI in the elderly in these studies were drug-induced due to Chinese traditional medication or NSAIDs.[21,22] Pre-renal/renal AKI was the major subtype of AKI in both groups as observed in other studies.[10,23,24]

A significantly higher proportion of elderly patients had co-morbidities like DM, hypertension, and COPD when compared to the non-elderly group. CKD was also higher in the elderly tending towards significance. Similar results were seen in other studies, with malignancy being another significant comorbidity in elderly AKI patients.[12]

Clinical characteristics like sepsis, MODS, mechanical ventilation requirement, and vasopressor support requirement were comparable between both groups. Similar results were observed by Pongsittisak et al, though Liu et al observed significantly more MODS cases in the elderly AKI group.[16,25]

In our study, 66% of elderly AKI and 82% of non-elderly AKI needed HD sessions. Though in another Indian epidemiological study, only 28% of the elderly AKI patients needed dialysis. The need for HD was significantly higher in the elderly population in other studies.[10,16] Whereas in our study, the need for HD and the time to initiation of HD from AKI onset were comparable between both the groups and the number of HD sessions received were significantly higher in the non-elderly group.

Aetiology of AKI

Infections were the major aetiology causing 62% of AKI in the elderly and 44% of AKI in non-elderly in our study. Amongst infections, pneumonia was the leading cause in both groups. In elderly, hypovolemia was seen in 5(10%), obstructive uropathy in 5 (10%) and drug induced AKI in 3 (8%). Similar results were observed in an Indian study by Mahesh et al where among 114 elderly patients with AKI, 70% of AKI in the elderly was due to sepsis, 8% was due to obstructive uropathy and 6% was due to drug-induced AKI.

Xiu et al also observed that sepsis was the major etiology of AKI in both groups with community-acquired pneumonia being the major etiology.[25] In a study conducted in Paris, it was observed that nearly 34% of the elderly AKI was due to obstructive uropathy.[26] The etiological spectrum changed completely in developed countries where a large retrospective multicentered study showed that the etiology of elderly AKI was hypovolemia (50%), post-surgical (33%) and sepsis (10%) being the least.[17,22] Elderly patients have decreased total body water as a fraction of body weight and hence are more prone for hypovolemia-related AKI in nearly half of hospitalized patients. This also leads to the early onset of AKI with overzealous use of diuretics in the elderly.[27] This difference in aetiology from developed countries may be attributed to increased prevalence and delayed management of infections in developing countries.

Outcome of AKI

In our study out of 100 patients, 35% of patients had in-hospital mortality with 20%in elderly and 15% in non-elderly with no significant difference in mortality between the groups. Similar results were seen in an Indian study by Mahesh et al, which showed 15% mortality in 200 elderly AKI patients.[19] A French study have shown in-hospital mortality of 20-45%.[26] Whereas a higher mortality of 66-75% was observed in critically ill elderly ICU patients in a study by Bucuvic et al and Liaino et al.[28,29] Ishani et al and Pongsittisak et al, did a retrospective study among elderly AKI patients and observed no difference in mortality in the elderly and non-elderly group.[16,30] While

significantly higher mortality was observed in elderly AKI patients than in non-elderly by others.[10,12]

In our study, 44% of the elderly patient did not have complete recovery of AKI, out of which 12% were HD dependent at discharge. Similar results were seen by Zhao et al who studied 583 elderly patients with AKI, and observed that 299 (nearly 50%) patients did not have complete renal recovery.[25] Palvesky et al also showed a significantly higher rate of renal non-recovery in elderly AKI (60%).[31] They further analysed risk factors for renal non-recovery to be age, history of DM, HTN, CKD and post-surgical causes. A better recovery rate was observed by Mahesh et al in an Indian scenario, where only 19 (9.5%) did not have complete recovery of renal function and 10 (5%) of whom were dialysis dependent at discharge. This better renal recovery may be attributed to more (87%) of patients being in KDIGO AKI stage 1 and 2. In a meta-analysis of 32 studies, 31% of elderly did not have complete renal recovery compared to 26% of non-elderly which was statistically significant (p=0.003).[13] It was also observed that both elderly and non-elderly requiring HD had similar mortality outcomes.[32]

Association with mortality

In our study, there was a significant association of mortality with female gender, ICU admissions, HA-AKI, pre-renal/renal causes, COPD as comorbidity, MODS, mechanical ventilation requirement, vasopressor support requirement, need for hemodialysis, and prolonged ICU stay. Association of mortality based on aetiology of AKI in elderly AKI patients were studied by following studies. Kevin et al showed that elderly patients with pre-renal/renal AKI had increased mortality.[27] Mortality with HA-AKI (42.8%) was higher than CA-AKI (19.6%) in elderly AKI patients and with KDIGO stage 3 AKI was more compared to other stage.[33,34] AKI due to infections had a worse mortality rate of 74% compared to no infections, 45%.[35] Other etiological factors associated with increased mortality were cardio-renal syndrome and post-surgical AKI.[19,36]

Risk factors for mortality

In this study, univariate regression analysis showed that patients with ICU admissions, HA-AKI, MODS, mechanical ventilation requirement, vasopressor support requirement, prolonged hospital stay and more HD session need, had a significantly high risk of mortality. While on multivariate analysis none of the above were statistically significant. This may be attributed to a lesser sample size being a time-bound study. Few studies showed that fluid overload, oliguric AKI, vasopressor requirement, and metabolic acidosis were significant risk factors for mortality.[24,34,37-43]

Renal recovery at discharge was also a predictor of mortality in other studies. There was no difference in in-hospital mortality in elderly and non-elderly patients requiring HD.[30]

The overall survival rate at 30 days and 1 year was significantly higher in groups with complete renal recovery than non/partial recovery in elderly AKI patients.[37]

In our study the overall survival rate of the elderly was 85.15% at the end of 7 days, 67.61% at the end of 14 days, and in non-elderly was 79.95% at the end of 7 days, 72.71% at the end of 14 days. Cheng et al studied 944 elderly patients with AKI, and on survival, function observed that 61% of patients died in 30 days and 31% died at 1 year with all-cause mortality of 20% at the end of 30 days.[37]

A notable strength of this study was its comparison of the clinical characteristics and outcomes of elderly AKI with their non-elderly counterparts. The study was conducted using a prospective and observational design, which is in contrast to the predominantly retrospective nature of existing studies.

The limitation of the study was its restricted follow-up period till the hospital stay as the study was time-bound. Hence further research is needed on the follow-up of these patients to determine the long-term outcome and risk factors for mortality.

CONCLUSION

This study was conducted to compare the outcomes of AKI in elderly and non-elderly hospitalized patients in a tertiary care hospital in Uttarakhand. The primary objective was to compare the in-hospital mortality rates among these two groups, which were found to be non-significant. It was observed that a significantly higher number of patients with non-elderly AKI were HD-dependent at discharge. There was a significant association between mortality and female gender, ICU admissions, HA-AKI, pre-renal/renal causes, COPD as comorbidity, MODS, mechanical ventilation requirement, vasopressor support requirement, need for hemodialysis and prolonged ICU stay. This study and analysis of previously published studies indicate that elderly patients with AKI do not experience worse outcomes in terms of mortality compared to non-elderly patients with AKI. Therefore, elderly patients should not be denied timely treatment, solely based on their age.

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