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ACUTE KIDNEY INJURY;
FREQUENCY IN HOSPITALIZED PATIENTS.

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ABSTRACT... Objectives: To determine the frequency of acute kidney injury in hospitalized patients at Nishtar hospital, Multan. **Study Design:** Cross sectional study. **Setting:** Medical Unit-IV, Nishtar Hospital, Multan. **Duration:** Duration of study was 6 months from 17/07/2015 to 16/01/2016. **Material and Methods:** This study involved 383 patients of either sex aged between 37-60 years admitted to medical ward for various medical conditions. **Results:** The mean age of the patients was 48.96±7.24 years. There were 198 (51.7%) male and 185 (48.3%) female patients in the study group. The most frequent underlying cause requiring hospital admission was a respiratory tract disease observed in 153 (39.9%) patients. AKI was observed in 104 (27.2%) patients. When stratified the frequency of AKI increased significantly with increasing age of the patient; 37-42 years vs. 43-48 years vs. 49-54 years vs. 55-60 years (17.3% vs. 22.7% vs. 26.2% vs. 42.0%; p=.001). It was also significantly (p=.000) higher in patients with diabetes (47.4%) and hepatobiliary disease (34.7%) at admission followed by infections (26.4%) and respiratory tract diseases (17.6%). However, there was no significant difference in the frequency of AKI across genders; male vs. female (25.8% vs. 28.6%; p=.525). **Conclusion:** Very high frequency of acute kidney injury was observed in our study. Acute kidney injury was significantly associated with increasing age particularly more than 50 years and underlying medical conditions with particular reference to the diabetes mellitus and hepatobiliary diseases. Serial renal parameters monitoring should be adopted for early diagnosis followed by timely management of acute kidney disease. It will decrease associated disease morbidities and mortalities and will also improve quality of life of these patients.

Key words: Acute Kidney Injury, Hospitalized Patients, Responsible Factors.

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INTRODUCTION

Acute kidney injury (AKI) has traditionally been characterized by sudden decrease in glomerular filtration rate, which may or may not be associated by retention of nitrogenous waste product and fluid and electrolyte imbalance.[1] The characteristic symptoms of AKI include decrease in urine output <400ml/24hrs (oliguria) or <50ml/24hrs (anuria) and assimilation of products which are normally excreted by the kidneys such as urea, creatinine, and potassium, which as the condition worsens leads to acidosis[2] When further condition deteriorates, it causes fluid accumulation, disturbance in acid- base and electrolyte balance and increased hazards of infection and death.[3]

Acute kidney injury (AKI) can broadly be divided into three categories, community acquired AKI, hospital acquired AKI and ICU-related AKI in critically ill patients admitted to the intensive-care unit (ICU). Ali et al.[4] studied in a population of 523 000 in the Grampian region and found an overall incidence of AKI in community as 183 cases per million population/year. The incidence of AKI in hospital setting is found to be 5-10 times higher than that of community-acquired cases. A study conducted in the late 1970s demonstrated incidence of hospital-acquired AKI to be 4.9%.[5]

After a period of two decades, both incidence and prevalence of hospital acquired AKI had doubled.[6] In ICU settings, AKI is found to be 30% of all ICU cases and is usually associated with multiorgan failure.[7] In 2014, Luo et al.[8] found the frequency of AKI to be 46.9% in hospital settings. On the other hand, Wang et al. in 2012 estimated the

frequency of hospital acquired AKI to be 22.7%.[9] It can be thus concluded that AKI is a frequent complication among hospitalized patients. AKI can however be prevented by optimal care and anticipant management, thus reducing morbidity and mortality.[2]

At the moment no such study has been done in Nishtar hospital, Multan. The purpose of the current study is to determine the frequency of AKI in local population at a teaching hospital. The results of this study will enable identification of patients at risk of AKI so that timely intervention and management can be undertaken to reduce morbidity and mortality due to AKI in future.

MATERIALS AND METHOD

In this descriptive cross-sectional study, 383 patients of either sex using non – probability purposive sampling aged between 37- 60 years admitted to medical unit IV for various medical conditions were registered. The duration of study was six month from July 17, 2015 to January 16, 2016. Acute kidney injury in our patients was defined as patients having urine output less than 400 ml/ day and serum creatinine levels more than 1.5 mg/dl. The information was recorded in a pre designed questionnaire. The data were analyzed through SPSS-20.

RESULTS

The age of the patients ranged from 37 years to 60 years with a mean of 48.96±7.24 years. There were 198 (51.7%) male and 185 (48.3%) female patients in the study group as shown. The most frequent underlying cause requiring hospital admission was a respiratory tract disease which was observed in 153 (39.9%) patients followed by hepatobiliary diseases (26.4%), infections (23.8%) and diabetes (9.9%) as shown in Table-I.

AKI was observed in 104 (27.2%) patients as shown in Table-II. When stratified the frequency of AKI increased significantly with increasing age of the patient; 37-42 years vs. 43-48 years vs. 49-54 years vs. 55-60 years (17.3% vs. 22.7% vs. 26.2% vs. 42.0%; p=.001) as shown in Table-III. It was also significantly (p=.000) higher in patients with diabetes (47.4%) and hepatobiliary disease (34.7%) at admission followed by infections (26.4%) and respiratory tract diseases (17.6%) as shown in Table-IV. However, there was no significant difference in the frequency of AKI across genders; male vs. female (25.8% vs. 28.6%; p=.525) as shown in Table-V.

Underlying Medical Condition Requiring Admission	Frequency	Percent
Hepatobiliary Diseases	101	26.4
Respiratory Tract Diseases	153	39.9
Infections	91	23.8
Diabetes	38	9.9
Total	383	100.0

Table-I. Frequency table for underlying medical condition requiring admission

Acute Kidney Injury	Frequency	Percent
Yes	104	27.2
No	279	72.8
Total	383	100.0

Table-II. Frequency table for acute kidney injury

Acute Kidney Injury	Age Groups				Total	P value
	37-42 Years (n=110)	43-48 Years (n=66)	49-54 Years (n=107)	55-60 Years (n=100)		
Yes	19	15	28	42	104	0.001
No	91	51	79	58	279	
Total	383					

Table-III. Comparison of frequency of acute kidney injury across various age groups

Acute Kidney Injury	Underlying Medical Condition Requiring Admission				Total	P value
	Hepatobiliary Diseases (n=101)	Respiratory Tract Diseases (153)	Infections (n=91)	Diabetes (n=38)		
Yes	35	27	24	18	104	.000
No	66	126	67	20	279	
Total	383					

Table-IV. Comparison of frequency of acute kidney injury across various underlying medical conditions at admission

Acute Kidney Injury	Gender		P-value
	Male (n=198)	Female (n=185)	
Yes (n=104)	51	53	.525
No (n=279)	147	132	
Total	383		

Table-V. Comparison of frequency of acute kidney injury across genders

Author	Population	n	Single/multicenter	AKI Frequency (%)
Lin et al.[11]	USA	46	Single	78
Hoste et al. [12]	Belgium	5383	Single	67.2
Mandelbaum et al. [13]	USA	14,524	Single	57.0
Chua et al. [14]	Australia	105	Single	51.7
Luo et al. [8]	China	3107	Multi	46.9%
Piccinni et al. [15]	Italy	576	Multi	42.7

Table-VI. Summary of existing literature on frequency of aki

DISCUSSION

Acute kidney injury (AKI) is putting an enormous burden on health care providing services. AKI is less frequent in the community than in hospitalized patients. In hospitals, AKI becomes an important complication when associated with the number and severity of co morbidities experienced by the patients, occurring in a rate around 20% to 40%.[10] Several studies show an increase in its incidence over the last decade. A summary of exiting studies is given in Table-VI which shows gross variation among existing studies depending upon population under study.

In our settings, the mean age of the patients was 48.96±7.24 years. Schissler et al. observed a mean age of 69.5±11.1 among American population with hospital acquired AKI.[16] This may be due to an overall more life expectancy in Americans as compared to our population. There were 198 (51.7%) male and 185 (48.3%) female patients in the study group. It corresponds to Wang et al. who also observed a slight male predominance (51.9% vs. 48.1%) among American Population.[9]

In our study, the most frequent underlying cause requiring hospital admission was a respiratory tract disease observed in 153 (39.9%) patients followed by hepatobiliary diseases (26.4%), infections (23.8%) and diabetes (9.9%). Our observation match with that of Schissler et al. who observed respiratory disease in 39.6% of admitted patients.[16] Singh et al. in India observed similar frequency of hepatobiliary diseases (25.49%), infections (21.57%) and diabetes (3.92%).[17] AKI was observed in 104 (27.2%) patients in our settings. Our results match with those of Coca et al.[18] (26.6%) in American and Medve and Gondos[19] (24.4%) in Hungarian population. A much lower frequency of 10.8% has been reported by Cruz et al.[20] among American population. While Lin et al.[11] reported extremely high frequency of 78% among same population. This variation can be attributable to population differences and selection bias among authors. When stratified the frequency of AKI increased significantly with increasing age of the patient; 37-42 years vs. 43-48 years vs. 49-54 years vs. 55-60 years (17.3% vs. 22.7% vs. 26.2% vs. 42.0%;

p=.001). Wang et al.[9] (2012) also observed a similar association with patients age (p<0.001). It was also significantly (p=.000) higher in patients with diabetes (47.4%) and hepatobiliary disease (34.7%) at admission followed by infections (26.4%) and respiratory tract diseases (17.6%). However, there was insignificant difference in the frequency of AKI across genders; male vs. female (25.8% vs. 28.6%; p=.525). A similar insignificant difference (p=0.78) in the frequency of AKI across genders has been shown previously by Medve et al. in Hungarian Population.[19] Our study is first of its kind in local population and provides baseline local statistical data about the frequency of AKI. We have also noted higher frequency of AKI and some factors in some particular disease at admission and some others in a different underlying medical condition which may help in identification of high risk patients and measures to reduce the risk of AKI in such patients by avoiding that particular factor in future practice.

CONCLUSION

Very high frequency of acute kidney injury was observed in our study. Acute kidney injury was significantly associated with increasing age particularly more than 50 years and underlying medical conditions with particular reference to the diabetes mellitus and hepatobiliary diseases. Serial renal parameters monitoring should be adopted for early diagnosis followed by timely management of acute kidney disease. It will decrease associated disease morbidities and mortalities and will also improve quality of life of these patients.

REFERENCES

1. Zhou J, Yang L, Zhang K, Liu Y, Fu P. **Risk factors for the prognosis of acute kidney injury under the Acute Kidney Injury Network definition: a retrospective, multicenter study in critically ill patients.** Nephrology (Carlton) 2012; 17(4):330-7.

2. Yang F, Zhang L, Wu H, Zou H, Du Y. **Clinical Analysis of Cause, Treatment and Prognosis in Acute Kidney Injury Patients.** PLoS ONE 2014; 9(2):e85214.

3. Lewington AJ, Cerdá J, Mehta RL. **Raising Awareness of Acute Kidney Injury: A Global Perspective of a Silent Killer.** Kidney Int 2013; 84(3):457–67.

4. Ali T, Khan I, Simpson W. **Incidence and outcomes in acute kidney injury: a comprehensive population-based study.** J Am Soc Nephrol 2007; 18:1292-8.

5. Lombardi R, Yu L, Younes-Ibrahim M, Schor N, Burdmann EA. **Epidemiology of acute kidney injury in Latin America.** Semin Nephrol 2008; 28:320-9.

6. Nash K, Hafeez A, Hou S. **Hospital-acquired renal insufficiency.** Am J Kidney Dis 2002; 39:930-6.

7. Joannidis M, Metnitz PG. **Epidemiology and natural history of acute renal failure in the ICU.** Crit Care Clin 2005; 21:239-49.

8. Luo X, Jiang L, Du B, Wen Y, Wang M, Xi X. **Acute Kidney Injury Trial (BAKIT) workgroup. A comparison of different diagnostic criteria of acute kidney injury in critically ill patients.** Crit Care 2014; 18(4):R144.

9. Wang HE, Muntner P, Chertow GM, Warnock DG. **Acute kidney injury and mortality in hospitalized patients.** Am J Nephrol 2012; 35(4):349-55.

10. Prakash J, Singh TB, Ghosh B, Malhotra V, Rathore SS, Vohra R, et al. **Changing epidemiology of community-acquired acute kidney injury in developing countries: analysis of 2405 cases in 26 years from eastern India.** Clin Kidney J 2013; 6(2):150-5.

11. Lin CY, Chang CH, Fan PC, Tian YC, Chang MY, Jenq CC, et al. **Serum interleukin-18 at commencement of renal replacement therapy predicts short-term prognosis in critically ill patients with acute kidney injury.** PLoS One 2013; 8:e66028.

12. Hoste EA, Clermont G, Kersten A, Venkataraman R, Angus DC, De Bacquer D, et al. **RIFLE criteria for acute kidney injury are associated with hospital mortality in critically ill patients: a cohort analysis.** Crit Care 2006; 10:R73.

13. Mandelbaum T, Scott DJ, Lee J, Mark RG, Malhotra A, Waikar SS, et al. **Outcome of critically ill patients with acute kidney injury using the Acute Kidney Injury Network criteria.** Crit Care Med 2011; 39:2659-64.

14. Chua HR, Glassford N, Bellomo R. **Acute kidney injury after cardiac arrest.** Resuscitation 2012; 83:721-7.

15. Piccinni P, Cruz DN, Gramaticopolo S, Garzotto F, Dal Santo M, Aneloni G, et al. **Prospective multicenter study on epidemiology of acute kidney injury in the ICU: a critical care nephrology Italian collaborative effort (NEFROINT).** Minerva Anestesiol 2011; 77:1072-83.

16. Schissler MM, Zaidi S, Kumar H, Deo D, Brier ME, McLeish KR. **Characteristics and outcomes in community-acquired versus hospital-acquired acute**

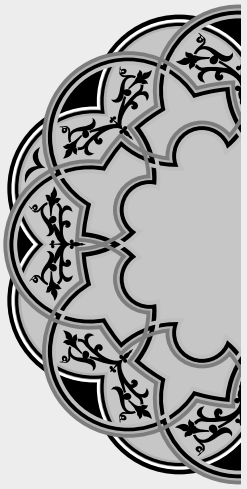
kidney injury. Nephrology (Carlton) 2013; 18(3):183-7.

17. Singh TB, Rathore SS, Choudhury TA, Shukla VK, Singh DK, Prakash J. **Hospital-acquired acute kidney injury in medical, surgical, and intensive care unit: A comparative study.** Indian J Nephrol 2013; 23(1):24-9.

18. Coca SG, Yalavarthy R, Concato J, Parikh CR. **Biomarkers for the diagnosis and risk stratification of acute kidney injury: a systematic review.** Kidney Int 2008; 73:1008-16.

19. Medve L, Antek C, Paloczi B, Kocsi S, Gartner B, Marjanek Z, et al. **Epidemiology of acute kidney injury in Hungarian intensive care units: a multicenter, prospective, observational study.** BMC Nephrol 2011;12:43.

20. Cruz DN, Bolgan I, Perazella MA, Bonello M, de Cal M, Corradi V, et al. **North East Italian Prospective Hospital Renal Outcome Survey on Acute Kidney Injury I. North East Italian Prospective Hospital Renal Outcome Survey on Acute Kidney Injury (NEiPHROS-AKI): targeting the problem with the RIFLE Criteria**. Clin J Am Soc Nephrol 2007; 2:418-25.



"The worst men often give the best advice."

Francis Bacon

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	Shahnawaz Hassan	Study planning, designing, manuscript writing and editing.	
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