Acute Kidney Injury: Analysis of 175 Cases in Al-Mukalla, Hadhramout

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Abstract

This was a retrospective descriptive study of acute kidney injury patients admitted at Al-Mukalla Central Hospitals, Hadhramout, between January 2017 and April 2019. All cases were 175; divided to two groups, patients with age less than 40 years (Group I) 44.6%, and patients of age more than 40 years (Group II) were 55.4%. Age of male patients ranged between 18-39 years and age of female patients ranged between 18-38 years. Group I included 28 males (31.1%) and 50 females (58.8%), Group II included 62 males (68.9%) and 35 females (41.2%). Risk factors in relation to age groups were: diabetes mellitus was (34.6%) in Group I, and (33%) of Group II (P > 0.05). Hypertension was (12.8%) in Group I, and (25.8%) of Group II (P < 0.05). Hypotension was (26.9%) in Group I, and (55.7%) of Group II (P < 0.05). Septicemia was (14.1%) in Group I, and (32%) of Group II (P < 0.05). Heart failure was (3.8%) in Group I, and (14.4%) of Group II (P < 0.05). Stroke was (2.6%) in Group I, and (11.3%) of Group II (P < 0.05). The outcome of acute kidney injury in this study was 66.3% alive and death rate 33.7%. The incidence rate of acute kidney injury is more in elderly patients, and associated with an increased death and chronic kidney disease.

Keywords: Acute kidney injury, adult patients, Al-Mukalla, Hadramout.

Introduction:

Acute kidney injury (AKI) is a common clinical problem. The 2012 Kidney Disease: Improving Global Outcomes (KDIGO) Clinical Practice Guidelines for Acute Kidney Injury defined AKI as one or more of three criteria. The first two were a rise in serum creatinine of at least 0.3 mg/dL (26.5 micromol/L) over a 48-hour period and/or ≥1.5 times the baseline value within the seven previous days [20].

The third criterion was a urine volume ≤0.5 mL/kg per hour for six hours, which is not accurate to diagnose AKI based solely upon the urine volume according to Erdbruegger [12].

Acute kidney injury is characterized by the deterioration of renal functions over a period of hours to weeks, causing failure of the kidneys to excrete nitrogenous waste products as well as to maintain fluid and electrolyte homeostasis. In spite of the progress achieved in the understanding of all aspects of AKI, its morbidity and mortality still remains high [14].

In Hadramout there are insufficient published data about AKI. The aim of our work: was to study and evaluate the acute kidney injury among hospitalized adult patients, in Al-Mukalla, Hadramout, Yemen.

Materials and methods:

This was a retrospective descriptive study of patients with AKI admitted in Al-Mukalla Central Hospitals, Hadramout, Yemen, during the period between 1st January 2017 and 30th may 2019.

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Data were collected from patients admitted and followed at that period. The data collected involved age, sex, hypertension, diabetes mellitus, hyperlipidemia, smoking, previous attacks and family history, type of AKI, time of hospital seeking, onset and consciousness level at presentation, and outcome. All cases were divided into two groups according to age: group I (young patients) ≤ 40 years, group II > 40 years.

Data processing and statistical analysis:

All data collected were entered into a personal computer, using **S**tatistical **P**ackage for **S**ocial **S**ciences (SPSS) Program version 20 software for entering data and analysis purposes. Descriptive statistics such as frequencies and percentages as well as means, standard deviation, chi square test and p-value of < 0.05 was considered to be statistically significant at the 95% confidence level. The study results were presented in tables and graphs using Excel and Word program.

Results:

Table 1 clarifies that patients with AKI admitted to the central hospitals in AL –Mukalla city1stJanuary 2017 and 30th April 2019 were (175) cases with ages range 18 – 39 years, and median 26 years in Group I. and ages range 42-92 years, and median 65 years in Group II. Affected males were more than females (51.4 % *versus* 48.6 %).

(55.4%) of patients were aged >40 years (Group II), and 44.6 % less than 40 years, (Group I). Young females were more affected among all female patients 50 (58.8 %).

Table 1: Distribution of age groups related to sex

Age groups	Males n_1= 90 (51.4%)		Females n_2= 85 (48.6%)		Total N= 175	
	No. %	Range Median	No. %	Range Median	No. %	Range Median
Group I (< 40)	28 (31.1%)	18 – 39 (27.5)	50 (58.8%)	18 - 38 (25)	78 (44.6%)	18 – 39 (26)
Group II (> 40)	62 (68.9%)	45 -87 (67)	35 (41.2%)	42 -92 (63)	97 (55.4%)	42 -92 (65)

Table 2 shows the frequency of risk factors in each age group. Diabetes was found in (Group I), 27 (34.6%), compared with (Group II), 32 (33%); with no significant difference (P= 0.473). Hypertension was more in old-aged patients (Group II), 25 (25.8%) compared with young patients (Group I), 10 (12.8%); with significant difference (P= 0.025). Hypotension was more in Group II, 54 (55.7%) while only 21 (26.9%) in Group I; with significant difference (P= 0.000). Septicemia was more in Group II, 31 (32%) which was more than group I, 11(14.1%); with a significant difference (P= 0.005). Heart failure was more in group II, 14(14.4%), which was more than in group I, 3(3.8%); with significant difference (P= 0.016). Stroke was more in group II, 11 (11.3%), which was more than in group I , 2(2.6%); with significant difference(P= 0.024).

Table 2: Risk factors of acute kidney injury in relation to age groups

Risk factor		GI (n_1= 78)	GII (n_2 = 97)	Total (N 175)	P value
Diabetes mellitus	Yes	27 (34.6%)	32(33%)	59 (33.7%)	0.473
	No	51 (65.4%)	65 (67%)	116 (66.3%)	
Hypertension	Yes	10 (12.8%)	25 (25.8%)	35 (20%)	0.025
	No	68 (87.2%)	72 (74.2%)	140 (80%)	
Hypotension	Yes	21 (26.9%)	54 (55.7%)	75 (42.9%)	0.000
	No	57 (73.1%)	43 (44.3%)	100 (57.1%)	
Septicemia	Yes	11 (14.1%)	31 (32%)	42 (24%)	0.005
	No	67 (85.9%)	66 (68%)	133 (76%)	

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Heart failure	Yes	3 (3.8%)	14 (14.4%)	17 (9.7%)	0.016
	No	75 (96.2%)	83 (85.6%)	158 (90.3%)	
Stroke	Yes	2 (2.6%)	11 (11.3%)	13 (7.4%)	0.024
	No	76 (97.4%)	86 (88.7%)	162 (92.6%)	

Table 3, shows outcome of AKI in this study, alive was 116 (66.3%); of which: full recovery 105 (60%), Partial recovery 6 (3.4%), Dialysis-dependent 5 (2.9%). The death was 59 (33.7%) of which: Septicemia 26 (14.9%), Cardiac 16 (9.1%), Hepatic failure 3 (1.7%), Stroke 9 (5.1%), and Bleeding 5 (2.9%).

**Table 3: Outcome of acute kidney injury (n = 175)**

Outcome	No	%
Alive	*116*	*66.3*
Full recovery	105	60
Partial recovery	6	3.4
Dialysis-dependent	5	2.9
Death	*59*	*33.7*
Septicemia	26	14.9
Cardiac	16	9.1
Hepatic failure	3	1.7
Stroke	9	5.1
Bleeding	5	2.9

Figure1 shows the distribution of the patients according to the age groups in this study which was 78(44.6%) in group I, and 97(55.4%) in group II.
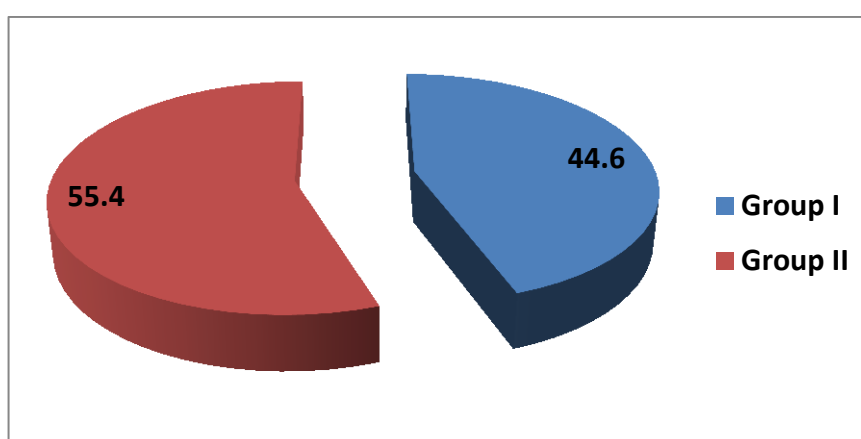
Figure 1: Illustration of the study patients related to age groups

Figure 2 shows the outcome of the patients in this study, which were 116 (66.3%) alive, and 59(33.7%) were died.
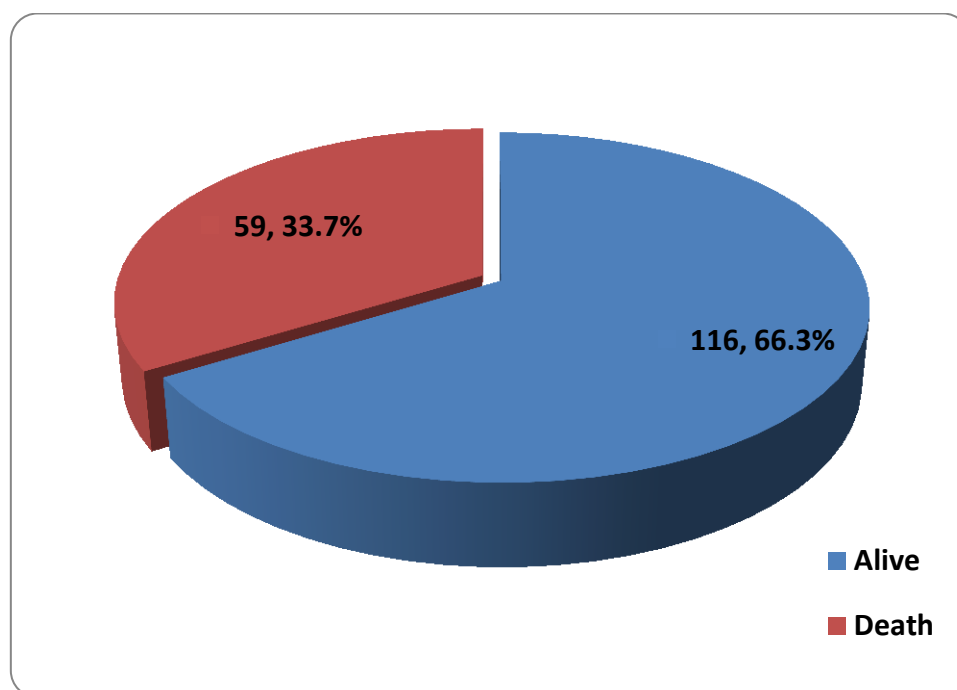
Figure2: Illustration of the outcome of the study patients

Discussion:

In recent years, improvements in socioeconomic conditions, rapid industrialization, expanding medical facilities and developments in prevention have led to a near eradication of AKI due to infection and obstetric accident. AKI in industrialized societies is now largely a consequence of road traffic and industrial accidents, cardiovascular surgery, drugs, multi-organ failure and renal transplant rejection [29]. The patterns of AKI encountered in the tropics have shown changes similar to those in the industrialized countries, although at a slower pace [8] .Despite significant advances in health care technology during the past several years, the incidence of AKI appears to be increasing over time. This may be related to more aggressive medical and surgical therapies that result in stress to the kidney, the increasing number of comorbid conditions in the population that accumulates during an increasing life span, and the older age of the population at large. In the developed world, the increase in life expectancy has resulted in a continuous growth of the population older than 70 years [21].

In the current study we found that AKI was more frequent in males 90 (51.4%) which reported and agree with other studies [2,13,14,23,24].

The greater frequency of AKI among the elderly in our study is explained by both the structural and functional changes in the kidney associated with aging and the impact of many chronic diseases whose incidence increases with age such as diabetes, hypertension and obstructive urinary tract diseases on the kidney, without forgetting the increasing role of iatrogenicity in the geriatric population, which agree with different studies [11,26,31,32,33]. The segment of the population in which the incidence of AKI has been increasing the most rapidly is those with advanced age. Thus, it is likely that the aged population will yield the greatest potential for successful studies of possible interventions for AKI [9].

Hypertension was frequent comorbid factor for AKI represent 35%, in this study, which lead to AKI because its treatment or coexisting conditions as dehydration, heart failure, and this was reported in different studies [3,6,24,26]. Diabetes was known comorbid risk factor for AKI, because its structural effect on the kidney and was reported in different studies [1,5,16], which was in contrast to our finding in this study, this difference in our result may be due to small sample of patient in our study.

Congestive heart failure was known risk factor of

AKI, which when present in patients with AKI, may be associated with acute changes in renal function, due to ischemic changes in the kidney due to decrease cardiac output, and these changes observed clinically in this study with more frequency in old ages. The severity of acute kidney injury has been associated with hospitalization for heart failure [6,18,27].

Acute kidney injury AKI; is increasingly common in the population at large and is associated with significant morbidity, mortality, and health care costs. In hospitalized patients, the risk of death associated with AKI is increased 3to 6-fold compared with those without AKI [7]. Despite the developments in diagnostic techniques and the availability of dialysis in most referral hospitals, the mortality associated with AKI remains high, in this study the mortality rate was 33.7%,which agree with different studies [2,4,15,17,22,30].

Uchinoclaimed that Septic shock was the most common contributing factor to AKI. The frequency in which it was a contributing factor to the development of AKI was around 50% in all centers [30]. Acute kidney injury is a common complication of sepsis and septic shock. Patients who have sepsis related acute kidney injury have much higher mortality than patients with acute kidney injury who do not have sepsis[25,30]. These observations were seen in our study which reach 24% but with significant difference and P value (0.005).

In this study we observe that stroke is frequently associated with AKI which agree with other studies and increased hospital mortality [10,19,28].

Conclusion:

Acute kidney injury is common health problem in Al-Mukalla city, although there is no accurate statistical data about this problem. So reporting and studying a large sample to determine the incidence, prevalence, and complication of this problem accurately are needed.

References:

1- Akram AR, Singanayagam A, Choudhury G, Mandal P, Chalmers JD, Hill AT. 2010. Incidence and prognostic implications of acute kidney injury on admission in patients with community-acquired pneumonia. Chest. 138(4):825-32.

2- Al-Homrany M. 2003. Epidemiology of acute renal failure in hospitalized patients: experience from southern Saudi Arabia. East Mediterr Health J. 9: 1061-7.

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

4- Amin AP, Salisbury AC, McCullough PA. et al. 2012. Trends in the incidence of acute kidney injury in patients hospitalized with acute myocardial infarction. Arch Intern Med. 172: 246-253.

5- Bradshaw C, Zheng Y, Silver SA.et al. 2018. Acute Kidney Injury Due to Diarrheal Illness Requiring Hospitalization: Data from the National Inpatient Sample. J Gen Intern Med. 33: 1520-1527.

6- Chawla LS, Eggers PW, Star RA, et al. 2014. Acute kidney injury and chronic kidney disease as interconnected syndromes. N Engl J Med. 371: 58-66.

7- Chertow GM, Burdick E, Honour M, et al. 2005. Acute kidney injury, mortality, length of stay, and costs in hospitalized patients. J Am Soc Nephrol. 16: 3365-70.

8- Chugh K, Sakhuja V, Malhotra H, et al. 1989. Changing trends in acute renal failure in third-world countries—Chandigarh study. Q J Med. 73(272):1117-23.

9- Coca SG. 2010. Acute kidney injury in elderly persons. Am J Kidney Dis. 56: 122-31.

10- Covic A, Schiller A, Mardare NG, et al. 2008. The impact of acute kidney injury on short-term survival in an Eastern European population with stroke.Nephrol Dial Transplant. 23(7): 2228-34.

11- Del Giudice A, Aucella F. 2012. Acute renal failure in the elderly: epidemiology and clinical features. J Nephrol. 25 Suppl 19: S48-57.

12- Erdbruegger U, Palevsky P, Sheridan AJU.2014. Etiology and diagnosis of prerenal disease and acute tubular necrosis in acute kidney injury (acute renal failure). Uptodate.com. Available at: https://www.uptodate.com/contents/etiology-and-diagnosis-of-prerenal-disease-and-acute-tubular-necrosis-in-acute-kidney-injury-in-adults?

13- Gasim GI, Musa IR, Yassin T, et al. 2016. Sepsis in Buraidah Central Hospital, Qassim, Kingdom of Saudi Arabia.IntJHealth Sci (Qassim). 10(2): 175-181

14- Ghacha R, Sinha AK, Al-Khursani IA. 2000. Clinical spectrum of acute renal failure in Dammam Central Hospital, Dammam, Saudi Arabia. Saudi J Kidney Dis Transpl. 11: 605-9.

15- Goswami S, Pahwa N, Vohra R, et al. 2018. Clinical spectrum of hospital acquired acute kidney injury: A prospective study from Central India. Saudi J Kidney Dis Transpl. 29: 946-955.

16- Hsiao CY, Yang HY, Hsiao MC, et al. 2015. Risk Factors for Development of Acute Kidney Injury in Patients with Urinary Tract Infection. PLoS One, 10(7): e0133835.

17- Hsu RK, McCullochCE, Dudley RA, et al. 2013. Temporal changes in incidence of dialysis-requiring AKI. J Am Soc Nephrol. 24(1):37-42.

18- James MT, Ghali WA, Knudtson ML, et al. 2011. Associations between acute kidney injury and cardiovascular and renal outcomes after coronary angiography.Circulation. 123(4): 409-16

19- Khatri M, Himmelfarb J, Adams D, et al. 2014. Acute kidney injury is associated with increased hospital mortality after stroke. J Stroke Cerebrovasc Dis. 23(1):25-30

20- Khwaja, A. 2012. KDIGO clinical practice guidelines for acute kidney injury. Nephron Clin Pract. 120(4): c179-84.

21- Manton KG, Vaupel JW. 1995. Survival after the age of 80 in the United States, Sweden, France, England, and Japan. N Engl J Med. 333: 1232-1235.

22- Pereira M, Rodrigues N, Godinho I, et al. 2017. Acute kidney injury in patients with severe sepsis or septic shock: a comparison between the 'Risk, Injury, Failure, Loss of kidney function, End-stage kidney disease' (RIFLE), Acute Kidney Injury Network (AKIN) and Kidney Disease: Improving Global Outcomes (KDIGO) classifications. Clin Kidney J.10(3):332-340

23- Plataki, M., Kashani, K., Cabello-Garza, J., et al. 2011. Predictors of acute kidney injury in septic shock patients: an observational cohort study. ClinJAmSocNephrol. 6(7):1744-51

24- Safari S, Hashemi B, Forouzanfar MM, et al. 2018. Epidemiology and Outcome of Patients with Acute Kidney Injury in Emergency Department; a Cross-Sectional Study. Emerg-(Tehran). 6(1): e30.

25- Schrier RW, Wang W. 2004. Acute renal failure and sepsis.N Eng J Med. 351(2): 159-69

26- Selmi Y, Ariba YB, Labidi J. 2019. Epidemiology, diagnosis, and etiology of acute kidney injury in the elderly: A retrospective analysis. Saudi J Kidney Dis Transpl. 30(3): 678-685.

27- Tsagalis G, Akrivos T, Alevizaki M, et al. 2008. Renal dysfunction in acute stroke: an independent predictor of long-term all combined vascular events and overall mortality. Nephrol Dial Transplant 24(1): 194-200.

28- Tsagalis G, Akrivos T, Alevizaki M, et al. 2009. Long-term prognosis of acute kidney injury after first acute stroke. Clin J Am Soc Nephrol. 4(3): 616-622.

29- Turney JH, Marshall DH, Brownjohn AM, Ellis CM, Parsons FM. 1990 ; The evolution of acute renal failure, 1956-1988. Q J Med. 74: 83-104.

30- Uchino S, Kellum JA, Bellomo R, et al. 2005. Acute renal failure in critically ill patients: a multinational, multicenter study. JAMA, 294(7): 813-8.

31- Vikrant S, Gupta D, Singh M. 2018. Epidemiology and outcome of acute kidney injury from a tertiary care hospital in India Saudi J Kidney Dis Transpl. 29: 956-966.

32- Waikar SS, Curhan GC, Wald R, et al. 2006. Declining mortality in patients with acute renal failure, 1988 to 2002. JAmSocNephrol. 17(4): 1143-1150.

33- Xue JL, Daniels F, Star RA, et al. 2006. Incidence and mortality of acute renal failure in Medicare beneficiaries, 1992 to 2001. JAmSocNephrol. 17(4): 1135-1142.

الفشل الكلوي الحاد: تحليل 175 حالة في المكلا ، حضرموت

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عبدالرحيم عبدالله باحشوان   محمد رشيد بامخلاه

الملخص

هذه دراسة وصفية إسترجاعية لمرضى إصابات الكلى الحادة الذين تم قبولهم في مستشفيات مركزية في مدينة المكلا ، حضرموت ، في الفترة ما بين يناير 2017 وأبريل 2019 . جميع الحالات كانت 175. مقسمة إلى مجموعتين. المرضى الذين تقل أعمارهم عن 40 سنة (المجموعة الأولى) 44.6 % . والمرضى الذين تزيد أعمارهم عن 40 عامًا (المجموعة الثانية) كانوا 55.4%. تراوحت أعمار المرضى الذكور بين 18–39 سنة وتراوحت أعمار المرضى الإناث بين 18–38 سنة. شملت المجموعة الأولى 28 ذكور (31.1%) و 50 إناث (58.8%) ، وشملت المجموعة الثانية 62 ذكور (68.9%) و 35 إناث (41.2%). وكانت عوامل الخطر فيما يتعلق بالفئات العمرية: داء السكري كان (34.6 %) في المجموعة الأولى ، و (33 %) من المجموعة الثانية (0.05 <P). وكان ارتفاع ضغط الدم (12.8 %) في المجموعة الأولى ، و (25.8 %) في المجموعة الثانية (0.05> P). كما كان انخفاض ضغط الدم (26.9 %) في المجموعة الأولى ، و (55.7 %) في المجموعة الثانية (0.05> P). وكان تسمم الدم (14.1 %) في المجموعة الأولى ، و(32 %) في المجموعة الثانية (0.05> P). كما كان قصور القلب (3.8 %) في المجموعة الأولى ، و (14.4 %) في المجموعة الثانية (0.05> P). وكانت السكتة الدماغية (2.6 %) في المجموعة الأولى ، و (11.3 %) في المجموعة الثانية (0.05> P).كانت نتيجة الإصابة الكلوية الحادة في هذه الدراسة 66.3 % على قيد الحياة ومعدل الوفيات 33.7 %. إن معدل حدوث إصابة الكلى الحادة هو أكثر في المرضى المسنين ، ويرتبط بزيادة الوفاة وأمراض الكلى المزمنة.

الكلمات المفتاحية: فشل كلوي حاد، مرضى بالغين، المكلا، حضرموت