



STUDY OF SPECTRUM OF ETIOLOGY OF ACUTE KIDNEY INJURY IN PATIENTS PRESENTING AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Acute kidney injury is a syndrome characterized by the rapid loss of the kidney's excretory function and is typically diagnosed by the accumulation of end products of nitrogen metabolism (urea and creatinine) or decreased urine output, or both. A total of 150 patients of acute kidney injury admitted in tertiary care hospital were studied and various etiological factors resulting in acute kidney injury in these patients were found out and ischaemic ATN was most common etiology followed by septic ATN.

Materials and methods: This study was conducted in the Post Graduate Department of Medicine in GMC Jammu over a period of one year (Nov. 2016 to Oct. 2017). We included adult patients admitted to the tertiary care hospital. All patients aged 18 years and above with AKI and those who will develop AKI after admission during the period of study. Patients with acute kidney injury were classified on the basis of RIFLE classification proposed by acute dialysis quality initiative in 2004.

Results: Out of 150 patients, septic ATN was present in 34 patients, 6(29.4%) patients were in class injury and 24(70.6%) patients were in class failure. Ischemic ATN was present in 48 patients, out of which 8(16.7%) patients were in class risk, 19(39.6%) patients were in class injury and 21(43.7%) were in class failure.

KEYWORDS : Acute kidney injury, etiology, tertiary care hospital .

INTRODUCTION

Acute kidney injury (AKI) has now replaced the term acute renal failure and a universal definition and staging system has been proposed to allow earlier detection and management of AKI. The new terminology enables health care professionals to consider the disease as a spectrum of injury. This spectrum extends from less severe forms of injury to more advanced injury when acute kidney failure requires renal replacement therapy (RRT). There have previously been many definitions of AKI used in the literature which has made it difficult to determine the epidemiology and outcomes of AKI. Over recent years there has been increasing recognition that relatively small rises in serum creatinine in a variety of clinical settings are associated with worse outcomes **Praught ML, Shlipak MG, 2005(1)**. Acute kidney injury is common among hospitalised patients. It affects some 3-7% of patients admitted to the hospital and approximately 25-30% of patients in the intensive care units (**Brenner and Rector's the kidney, 2007(2)**). **Oysterman M et al (3)** found an incidence of 35.8% of acute kidney injury in intensive care unit. The mechanisms involved in the etiology of AKI are endothelial injury from vascular perturbations, direct effect of nephrotoxins, abolishment of renal autoregulation and formation of inflammatory mediators **Michael R et al., 2009(4)**. Postoperative acute tubular necrosis (ATN) secondary to pre existing volume depletion, intraoperative losses and /or third spacing associated with anaesthesia and surgery are frequently seen especially after aortic aneurysmectomy, hepatobiliary surgery and cardiac surgery **Bhat JG et al., 1976(5)**. In addition, sepsis continues to play a leading role in pathogenesis of acquired AKI. Endotoxemia by causing systemic hypotension, direct renal vasoconstriction or through cytokine release may also play role **Badr KF et al., 1986(6)**. Nephrotoxins may be either antibiotics like aminoglycosides, vasopressors such as norepinephrine and epinephrine or radiocontrast employed in the imaging or NSAIDS.

OBJECTIVES

To Study Spectrum Of Etiology Of Acute Kidney Injury In Patients Presenting at a Tertiary Care Hospital

MATERIALS AND METHODS

INCLUSION CRITERIA:

All patients aged 18 years and above with AKI and those who will develop AKI after admission during the period of study. Patients

with acute kidney injury were classified on the basis of RIFLE classification proposed by acute dialysis quality initiative in 2004. We studied 150 patients of acute kidney injury in tertiary care hospital during the study period.

EXCLUSION CRITERIA:

- Patient aged below 18 years.
- Patients with preexisting renal disease.
- Patients with ESRD or on chronic dialysis.
- Those who received renal transplantation.

Patients with acute kidney injury were classified on the bases of RIFLE criteria proposed by acute dialysis quality initiative in 2004. The RIFLE criteria is shown in the table below:

Stage	GFR criteria	Urine output criteria
Risk	Increase creatinine x 1.5 or GFR decrease >25%	Urine output <0.5ml/kg/hr x 6 hr.
Injury	Increase creatinine x 2 or GFR decrease >25%	Urine output <0.5ml/kg/hr x 12 hr.
Failure	Increase creatinine x 3 or GFR decrease >25%	Urine output <0.3ml/kg/hr x 24 hr. or Anuria x 12 hr.
Loss	Persistent ARF = complete loss of kidney function >4 weeks	
ESRD	End stage kidney disease (>3 months)	

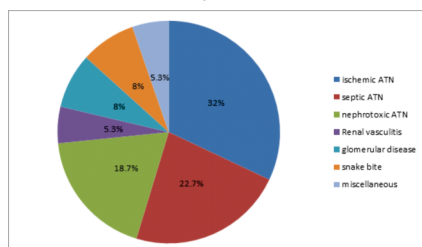
RESULTS

Out of 150 patients of acute kidney injury in our study, 62(41.3%) were females and 88(58.7%) were males. The age range was 18-80 years, with a mean of 50.6±16.24 years. The etiology of acute kidney injury were: septic ATN in 34(22.7%) patients, ischemic ATN in 48(32%) patients, nephrotoxic ATN in 28(18.7%) patients glomerular disease in 12(8%) patients, renal vasculitis in 8(5.3%) patients, snake bite in 12(8%) and miscellaneous causes in 8(5.3%) patients.

Etiology	Frequency	Percent
Ischemic ATN	48	32.0%
Septic ATN	34	22.7%
Nephrotoxic ATN	28	18.7%
Renal vasculitis	8	5.3%
Glomerular disease	12	8.0%

Snake bite	12	8.0%
miscellaneous	8	5.3%
Total	150	100%

The etiology of acute kidney injury were: septic ATN in 34(22.7%) patients, ischemic ATN in 48(32%) patients, nephrotoxic ATN in 28(18.7%) patients glomerular disease in 12(8%) patients, renal vasculitis in 8(5.3%) patients, snake bite in 12(8%) and miscellaneous causes in 8(5.3%) patients.



Pie chart showing etiology of acute kidney injury.

RIFLE class of acute kidney injury.

RIFLE class	Frequency	Percent
Risk	35	23.3%
Injury	50	33.4%
Failure	65	43.3%
Total	150	100.0%

According to RIFLE classification of acute kidney injury, out of 150 patients, 35(23.3%) patients were in class risk (R), 50(33.4%) patients in class injury (I) and 65(43.3%) patients in class failure (F).

Etiology of AKI in relation with RIFLE class.

Etiology	Risk	Injury	Failure	Total
Ischemic ATN	8	19	21	48
count				
Percent	16.7%	39.6%	43.7%	100.0%
Septic ATN	0	10	24	34
count				
percent	0%	29.4%	70.6%	100.0%
Nephrotoxic ATN	14	9	5	28
count				
percent	50%	32.2%	17.8%	100.0%
Renal vasculitis	0	2	6	8
count				
percent	0%	25.0%	75.0%	100.0%
Glomerular disease	8	2	2	12
count				
percent	66.8%	16.6%	16.6%	100.0%
Snake bite	4	6	2	12
count				
percent	33.3%	50.0%	16.7%	100.0%
Miscellaneous	1	2	5	8
count				
percent	12.5%	25.0%	62.5%	100.0%
Total	35	50	65	150
count				
Percent	23.3%	33.4%	44.3%	100.0%

Out of 150 patients, septic ATN was present in 34 patients, 6(29.4%) patients were in class injury and 24(70.6%) patients were in class failure. Ischemic ATN was present in 48 patients, out of which 8(16.7%) patients were in class risk, 19(39.6%) patients were in class injury and 21(43.7%) were in class failure. Nephrotoxic ATN was present in 28 patients, out of which 14(50%) were in class risk, 9(32.2%) patients in class injury and 5(17.8%) patients were in class failure. Glomerular disease was present in 12 patients, out of which 8(66.8%) patients were in class risk, 2(16.6%) patients in class injury and 2(16.6%) patients were in class failure. Renal vasculitis was present in 8 patients, out of which 2(25%) were in class injury and

6(75%) were in class failure. Snake bite was present in 12 patients, out of which 4(33.3%) were in class risk, 6(50%) were in class injury and 2(16.7%) were in class failure. Miscellaneous causes were found in 8 patients, out of which 1(12.5%) were in class risk, 2(25%) were in class injury and 5(62.5%) were in class failure.

DISCUSSION

In our study, etiology were ischemic ATN (32%), septic ATN (22.7%), nephrotoxic ATN (18.7%), renal vasculitis (5.3%), glomerular disease (8%), snake bite (8%) and miscellaneous causes (5.3%). Ischemic ATN is the most common cause of AKI (32%) which is in contrast to **J. parkash et al** (7) and **Eswarappa M et al** (8) and who found sepsis as a leading cause of acute kidney injury in 69.5% patients. The reason for this disparity is that **J. Parkash et al** and **Eswarappa M et al** found sepsis as a leading cause of AKI in ICU patients.

CONCLUSION

Acute kidney injury is a common and serious complication in critically ill patients. The mortality rate in AKI patients remains high despite significant advances in medical care. The etiology of AKI was – sepsis ATN, ischemic ATN, nephrotoxic ATN, renal vasculitis, glomerular disease, snake bite and miscellaneous causes.

LIMITATIONS:

- The number of studied patients is small in this study, considering high incidence of AKI in hospitalized patients.
- The need for a baseline serum creatinine, which was not always available.

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