



“RISK FACTORS FOR INPATIENT ACUTE KIDNEY INJURY AT HOSPITAL CIVIL DE GUADALAJARA, MEXICO: 2 YEARS FOLLOW UP”



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Background and objectives

It is well known that inpatient Acute Kidney Injury (AKI) represents a real epidemiological concern. Its incidence has increased up to 10% over the last decade, it is reported in 4 to 20% of hospitalized patients, and in 30 to 60% of critical ill patients.

AKI appears to be one of the leading causes of admission and mortality in the Intensive Care Units (ICU) in the nephrology units in Mexico, affecting 1% to 25 % of inpatients. There are 18 publications on AKI in Mexican patients between 1985 and 2006, and only in two mortality was described. *Pinon et al* reported a mortality of 52% in critical ill patients; however, mortality related to AKI as a single cause was not specified.

The Hospital Civil de Guadalajara (HCG) is a large tertiary-care facility located in the west of Mexico, that provides medical care to the uninsured population.

The aim of this study was to perform an epidemiological analysis to diagnose AKI's etiology, frequency, and mortality among uninsured patients and to evaluate the need for dialysis and the impact of interventions carried out by the nephrologists.

Methods

Descriptive, prospective and longitudinal epidemiological study of patients with AKI at HCG from March 2013 to October 2015. AKI was diagnosed according the KDIGO 2012 guidelines. Patients age ≥ 18 were included. Pregnant and CKD patients were excluded. Socio-demographic, clinical, and laboratory values were recorded.

Results

448 patients were included. 99 (22.1%) patients required dialysis. Overall mortality was 30.6%. 39 patients (28%) that required RRT died; average sCr at death was 2.94 mg/dl (range 0.38-14.5).

Hypertension (HTN) (RR 0.58, CI 1.26-4.04), neurological impairment (RR 2.46, CI 1.56-3.8), urinary tract obstruction (UTO) (RR 2.1, CI 1.22-3.86) and nephrologist evaluation were risk factors for RRT initiation (RR 2.9, CI 1.34- 6.26).

Table 1: Baseline evaluation

	n= 448
Age years (range)	58 (15-94)
Male, n(%)	279 (62.3)
Average sCreatinine at evaluation (range)	74.9 (35-150)
Comorbidities	
Hypertension, n(%)	222 (49.6)
Diabetes mellitus 2, n(%)	186 (41.5)
Cancer, n(%)	81 (18.1)
Etiology of AKI	
Drug induced, n(%)	89 (19.9)
Septic shock, n(%)	133 (29.8)
Neurological deficit, n(%)	154 (34)
Acute abdomen, n(%)	61 (13.6)
Concomitant medications	
Use of NSAID, n(%)	19 (13.9)
Use of ACEI or ARB, n(%)	45 (32.8)
Use of Beta Blocker, n(%)	10 (7.3)
Use of calcium antagonist, n(%)	9 (6.6)
Use of furosemida, n(%)	33 (24.1)
Use statin, n(%)	11 (8)
Nephrologist intervention request for:	
sCreatinine increase, n(%)	432 (96.4)
Hypervolemia, n(%)	106 (23.7)
Oligoanuria, n(%)	198 (44.2)
Previous CKD, n(%)	55 (12.3)
Drugs setting to kidney function, n(%)	53 (11.8)
Use of contrast media, n(%)	26 (5.8)
Acid-base disorder, n(%)	137 (30.6)
Electrolyte disorders, n(%)	208 (46.4)
Nephrologist interventions	
Renal replacement therapy, n(%)	99 (22.)
Use of diuretics, n(%)	121 (27)
Withdrawal nephrotoxic, n(%)	212 (47.3)
Bicarbonate correction, n(%)	38 (8.5)
Setting liquid, n(%)	385 (85.8)

Table 2: Patient outcomes

N=448	(%) median (min-max)
Mortality, (%)	137 (30.6)
Mortality AKI-RRT, (%)	39 (28)
sCreatinine, (%)	2.94 (0.38-14.5)

Table 3: Multivariable model for RRT initiation

Multivariate model	Univariate		Model 1		Model 2		Model 3		Model 4	
	OR (IC 95)	P	OR (IC 95)	P	OR (IC 95)	P	OR (IC 95)	P	OR (IC 95)	P
Hypertension	0.58 (0.37-0.92)	0.021	0.6 (0.38-0.97)	0.037	0.66 (0.41-1.08)	0.1	0.68 (0.41-1.11)	0.13	0.67 (0.41-1.11)	0.12
Acute abdominal pain	2.26 (1.26-4.04)	0.005	1.82 (1-3.33)	0.05	1.67 (0.91-3.09)	0.097	1.81 (0.97-3.39)	0.06	1.74 (0.93-3.27)	0.082
Neurological impairment	2.46 (1.56-3.8)	<0.01	2.31 (1.45-3.6)	<0.01	1.91 (1.17-3.11)	0.09	2.04 (1.24-3.37)	0.005	1.97 (1.19-3.26)	0.008
Beta blocker	0.29 (0.01-0.83)	0.01	0.39 (0.13-1.17)	0.095	0.35 (0.11-1.07)	0.06	0.37 (0.12-1.12)	0.062	0.38 (0.12-1.15)	0.087
Calcium antagonist	0.33 (0.11-0.96)	0.03	0.49 (1.66-1.45)	0.2	0.45 (0.15-1.38)	0.16	0.46 (0.15-1.4)	0.17	0.45 (0.14-1.38)	0.167
Alpha agonist	3.63 (0.89-14.7)	0.05	3.2 (0.73-13.9)	0.12	3.8 (0.75-19.1)	0.1	3.7 (0.75-18.3)	0.1	3.37 (0.68-16.59)	0.135
Urinary tract obstruction	2.17 (1.22-3.86)	0.007	2.54 (1.38-4.66)	0.002	2.65 (1.42-4.93)	0.002	2.65 (1.42-4.93)	0.002	2.54(1.36-4.74)	0.03

Hosmer and Lemeshow test. Model 1: hypertension, acute abdominal pain; Model 2: model 1 + neurological deficit; Model 3: model 2 + calcium antagonist, beta blocker, alpha agonist, use of insulin; Model 4: model 3 + urinary tract obstruction + nephrologist evaluation OE:odds ratio

Table 4: Multivariable model of mortality

	Univariate		Model 1		Model 2		Model 3	
	OR (IC.95)	P	OR (IC.95)	P	OR (IC.95)	P	OR (IC.95)	P
Female	0.58 (0.37-0.89)	0.013	1.8 (1.16-2.8)	0.008	1.6 (1.08-2.6)	0.02	1.75 (1.1-2.7)	0.017
Need for RRT	0.61 (0.37-0.95)	0.031	0.5 (0.35-0.9)	0.01	0.54 (0.33-0.9)	0.018	0.56 (0.34-0.93)	0.026
Drug induced AKI	1.95 (1.11-3.45)	0.018	1.84 (1.04-3.25)	0.035	1.67 (0.93-2.99)	0.084	1.84 (1.01-3.36)	0.04
Septic shock	0.4 (0.26-0.6)	<0.01	0.41 (0.27-0.63)	<0.01	0.5 (0.32-0.77)	0.002	0.6 (0.38-0.94)	0.029
Liver disease	0.4 (0.94-18.2)	0.041	3.99 (0.9-17.6)	0.067	3.61 (0.81-16.1)	0.092	4.12 (0.9-18.92)	0.068
Urinary tract obstruction	2.6 (1.28-5.29)	0.006	2.9 (1.4-6)	0.004	2.52 (1.2-5.29)	0.014	2.65 (1.25-5.64)	0.011
Acid-base disorders	0.48 (0.31-0.74)	0.001	0.51 (0.33-0.78)	0.002	0.55 (0.35-0.87)	0.011	0.64 (0.38-1.01)	0.059
Electrolyte disorders	0.61 (0.41-0.92)	0.019	0.62 (0.41-0.94)	0.024	0.74 (0.48-1.14)	0.17	0.87 (0.54-1.39)	0.57
Oligoanuria	0.69 (0.44-1)	0.005	0.62 (0.41-0.94)	0.027	0.62 (0.43-0.96)	0.033	0.66 (0.42-1.03)	0.073

Hosmer and Lemeshow test. Model 1: gender and need for RRT; Model 2: model 1+ drug induced AKI, Septic shock, liver disease and urinary tract obstruction; Model 3: model 2 + oligoanuria, acid-base, and electrolyte disorders. OR: odds ratio.

Conclusions

- Septic shock, UTO and drug induced AKI were the most frequent etiologies of AKI.
- HTN, DM2, and male gender were identified as risk factors to develop AKI.
- 1 out of 5 patient's required RRT, and it was more frequent in patients with neurological impairment and UTO.
- Mortality was high among patients with drug induced AKI, UTO and electrolyte disorders.
- Overall mortality related to AKI remains high among our population.
- Further studies are needed to implement protocols to improve patient's survival.

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