

COMPARATIVE ANALYSIS OF PEDIATRIC AND ADULT PATIENTS WITH LEPTOSPIROSIS AND ACUTE KIDNEY INJURY

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OBJECTIVES

Leptospirosis is a zoonosis caused by the pathogenic spirochetes *Leptospira interrogans*, which is endemic in tropical countries. The severe form is characterized by jaundice, acute kidney injury (AKI) and hemorrhage. The aim of this study is to compare clinical presentation, laboratory data, morbidity and mortality between adults and children with leptospirosis-associated AKI.

METHODS

A retrospective cohort study was conducted with 374 consecutive patients with a confirmed diagnosis of leptospirosis admitted to tertiary hospitals in Fortaleza, Northeast of Brazil, from May 1985 to August 2010. Demographic characteristics such as age, gender, the mean time between symptom onset and hospital admission was analyzed, as well as duration of hospital stay, clinical manifestations, laboratory data, treatment and mortality. AKI was defined according to the RIFLE criteria. Patients were divided in two groups according to the age (age ≤ 21 years vs. age >21 years). A comparison of clinical and laboratory characteristics was done to investigate the differences between the two groups.

RESULTS

The adult group represented 81.5% of the study population, with mean age of 41.03 ± 13.8 years. The pediatric population comprised 18.5% of the total, with mean age of 16.7 ± 3.06 years. Gender, duration of disease and the most frequent signs and symptoms were similar in both groups. AKI was observed in 300 patients (80.4%), and it was significantly more common in adults (83.2 vs. 70.6% $p < 0.005$) than children. The distribution according to the RIFLE was as follows: Risk (19.1% vs. 31.2%), Injury (21.8% vs. 29.2%), Failure (59.1% vs. 39.6%) in adults and children, respectively. Adults required renal replacement therapy more frequently than children (37.8% vs. 11.6%, $p < 0.0001$). Mortality was significantly higher in adults (14.8% vs. 2.8%, $p = 0.005$). Mortality was higher in adults with AKI than non-AKI (93.3% vs 6.7%, $p < 0.05$), and it was associated with severe AKI (*Risk* - 6.7%, *Injury* - 11.1% and *Failure* 37 - 82.2%, $p = 0.002$), dialysis requirement (64.4% vs 35.6%, $p < 0.0001$), oliguria (54.5% vs. 45.5%, $p < 0.0001$) and crackles (33.3% vs. 66.7%, $p = 0.005$). No significant difference was observed in children.

Table 1. Comparison of demographic and clinical manifestations between adults and children with leptospirosis.

	Patients >21 years N = 304	Patients ≤ 21 years N = 69	P
Age, years	41.03 \pm 13.8	16.7 \pm 3.06	<0.0001
Gender			
Male	250 (82.2%)	61 (88.4%)	0.282
Female	54 (17.8%)	8 (11.6%)	
Hospital Stay, day	10.1 \pm 6.9	8.8 \pm 4.86	0.149
Clinical Data at admission			
PA _{SIS} admission (mmHg)	113.4 \pm 22	(106.8 \pm 13.6)	0.039
PA _{DIST} admission (mmHg)	70.6 \pm 15.1	(66.8 \pm 10.8)	0.039
FC admission	(97.3 \pm 17.36)	(97.9 \pm 16.2)	0.839
FR admission	(25.2 \pm 7.96)	(26.4 \pm 7.03)	0.273
Signs and Symptoms at admission			
Anorexia	120 (53.6%)	25 (41.0%)	0.085
Arrhythmia	23 (16.0%)	0 (0%)	0.046
Metabolic Acidosis	44 (14.5%)	7 (10.1%)	0.439
Dyspnea	35 (11.6%)	4 (5.8%)	0.194
Hemoptysis	38 (12.5%)	6 (8.7%)	0.535
Crackles	56 (17.2%)	4 (8.3%)	0.142
Dehydration	140 (46.2%)	26 (35.4%)	0.228
Fever	290 (95.3%)	69 (100%)	0.08
Vomiting	199 (65.5%)	55 (79.7%)	0.022
Hypotension	18 (9.3%)	9 (15.8%)	0.221
Jaundice	242 (79.6%)	52 (75.4%)	0.420
Myalgia	275 (90.5%)	54 (78.3%)	0.007
Oliguria	69 (22.8%)	9 (13%)	0.100
Thrombocytopenia	155 (50.9%)	68 (98.5%)	0.0001
Secondary infection	25 (8.2%)	3 (4.3%)	0.446
Treatment			
Penicillin G use	114 (59.7%)	38 (67.9%)	0.349
Acute kidney injury			
AKI	252 (83.2%)	48 (70.6%)	0.026
Risk	49 (19.1%)	15 (31.2%)	0.037
Injury	56 (21.8%)	14 (29.2%)	
Failure	152 (59.1%)	19 (39.6%)	
Need of dialysis	115 (37.8%)	8 (11.6%)	<0.0001
Mortality	45 (14.8%)	2 (2.9%)	0.005

Table 2. Comparison of laboratory data between adults and children with leptospirosis at admission.

Parameters	Patients >21 years N = 304	Patients ≤ 21 years N = 69	P
Hb admission (g/dL)	10.97 \pm 1.9	10.7 \pm 2.1	0.480
Hct admission (%)	32.961 \pm 5.8	32.3 \pm 6.86	0.463
WBC admission (mm ³)	11806 \pm 5214	10203.9 \pm 4465.6	0.034
Platelets admission (mm ³)	9657.7 \pm 86701.5	91385.4 \pm 97193	0.139
AST admission (UI/L)	79.015 \pm 89	78.495 \pm 85.7	0.871
ALT admission (UI/L)	116.5 \pm 140.62	234.8 \pm 651.9	0.819
TB (mg/dL)	9.133 \pm 9.7	12.1 \pm 11	0.286
DB (mg/dL)	11.021 \pm 9.47	9.04 \pm 7.87	0.287
S _{Cr} admission (mg/dl)	4.329 \pm 2.95	3.05 \pm 2.4	0.007
S _{Ur} admission (mg/dl)	137.1 \pm 91.8	97.98 \pm 76.8	0.002
S _{Cr} max (mg/dl)	4.822 \pm 3.16	3.32 \pm 2.42	0.001
S _{Na} admission (mEq/L)	133.43 \pm 6.81	132.5 \pm 5.7	0.511
S _K admission (mEq/L)	3.3 \pm 0.62	3.4 \pm 0.611	0.316
pH admission	7.37 \pm 0.09	7.4 \pm 0.11	0.548
HCO ₃ ⁻ admission (mEq/L)	19.2 \pm 4.9	18.5 \pm 5.1	0.571
PO ₂ admission (mmHg)	84.8 \pm 31.1	87.14 \pm 23.4	0.812
PCO ₂ admission (mmHg)	31.4 \pm 7.98	32.88 \pm 8.5	0.745

CONCLUSION

Differences in clinical presentation, mortality and severity of disease between pediatric and adult population have been observed. Most signs and symptoms were similar between the two groups. Mortality was higher in adults, as well as severe AKI.

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