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PREDICTORS OF ACUTE KIDNEY INJURY AND MORTALITY IN SEVERE LEPTOSPIROSIS (WEIL'S DISEASE)

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Introduction and Aims

The incidence of acute kidney injury (AKI) in leptospirosis varies depending on the criteria used to diagnose and can occur in up to 84%. The mortality rate ranges from 5 to 20%. The aim of this study is to analyze predictors of AKI and mortality in leptospirosis.

Methods

This is a retrospective study of clinical, biochemical and treatment related data of 501 consecutive Brazilian patients with severe leptospirosis (Weil's disease). AKI was defined according to RIFLE criteria. A logistic regression model was built to detect factors associated with AKI and mortality. Statistical analysis was done through SPSS program, v.20, and significance level was set in 5% (p<0.05).

Results

Table 1. Demographic data and vital signs of AKI and non-AKI severe leptospirosis patients.

	AKI (N = 387)	Non-AKI (N = 114)	p
Age (years)	39.2 ± 15.9	30.8 ± 14.2	< 0.001
Gender - *Male(%)*	82.4	82.5	1.000
Hospitalization time (days)	11.0 ± 8.0	8.0 ± 5.5	< 0.001
Systolic BP (mmHg)	111 ± 21	116 ± 20	0.063
Dyastolic BP (mmHg)	68 ± 15	72 ± 14	0.043
Temperature (ºC)	37.2 ± 1,0	37.5 ± 0.9	0.011
Heart frequency (/min)	98 ± 19	91 ± 21	0.008
Respiratory rate (/min)	25 ± 9	25 ± 12	0.148
Diuresis (ml/24h)	906.5 ± 867.7	1302.7 ± 946.2	0.002
Deaths (%)	17.6	2.6	< 0.001

Table 2. Laboratorial characteristics of AKI and non-AKI severe leptospirosis patients.

	AKI (N = 387)	Non-AKI (N = 114)	p
Potassium (mEq/L)	3.9 ± 1.0	3.7 ± 0.8	0.563
HCO3 (mEq/L)	18.1 ± 4.6	22.3 ± 4.5	< 0.001
pH	7.36 ± 0.09	7.41 ± 0.06	< 0.001
PO2 (mmHg)	92.0 ± 62.0	78.5 ± 23.5	0.220
Amilase (mg/dL)	322 ± 527	83 ± 35	0.028
CPK (U/L)	1273 ± 3546	1400 ± 3081	0.851
Direct bilirubin (mg/dL)	10.2 ± 9.0	5.4 ± 6.9	< 0.001
Indirect bilirubin (mg/dL)	4.3 ± 4.9	2.9 ± 3.7	0.013
Albumin (g/dL)	3.12 ± 0.63	3.19 ± 0.56	0.587
AST (U/L)	136 ± 190	175 ± 258	0.500
ALT (U/L)	90 ± 128	137 ± 234	0.233
Hemoglobin (g/dL)	10.8 ± 2.1	11.8 ± 2.0	< 0.001
Leukocytes (10³/mm³)	14.8 ± 12.7	10.5 ± 6.4	< 0.001
Platelets (10³/mm³)	99.05 ± 85.87	155.54 ± 144.88	< 0.001
CRP (mg/L)	162.2 ± 157.6	115.6 ± 42.8	0.639

Data are presented as the mean ±standard deviation.

Table 3. Demographic data and vital signs of AKI and non-AKI severe leptospirosis patients.

	Survivors (N = 430)	Non-Survivors (N = 71)	p
Age (years)	35.5 ± 15.1	48.1 ± 16.4	< 0.001
Gender - *Male(%)*	84.1	71.9	0.018
Systolic BP (mmHg)	112 ± 20	110 ± 22	0.653
Dyastolic BP (mmHg)	70 ± 15	62 ± 12	< 0.001
Heart frequency (/min)	94 ± 20	107 ± 14	< 0.001
Respiratory rate (/min)	25 ± 10	30 ± 9	0.004
Diuresis (ml/24h)	1065.5 ± 890.7	521.5 ± 841.5	< 0.001
AKI	74.1	95.8	< 0.001

Table 4. Laboratorial characteristics of survivors and non--survivors severe leptospirosis patients.

	Survivors (N = 430)	Non-Survivors (N = 71)	*P* value
Urea (mg/ dL)	123.2 ± 88.8	144.8 ± 74.7	0.006
Creatinine (mg/dL)	3.7 ± 2.8	4.4 ± 2.6	0.008
Potassium (mEq/L)	3.8 ± 1.8	3.9 ± 1.0	0.311
HCO3 (mEq/L)	19.2 ± 4.7	16.1 ± 4.4	< 0.001
pH	7.38 ± 0.07	7.31 ± 0.12	< 0.001
PO2 (mmHg)	91.5 ± 61	84.5 ± 41.7	0.174
CPK (U/L)	1320 ± 3636	1151 ± 1990	0.536
Direct bilirubin (mg/dL)	8.7 ± 8.6	13.4 ± 9.4	0.001
Indirect bilirubin (mg/dL)	3.8 ± 4.7	5.1 ± 4.6	0.010
Albumin (g/dL)	3.1 ± 0.6	3.0 ± 0.9	0.664
AST (U/L)	136 ± 196	204 ± 264	0.003
ALT (U/L)	99 ± 161	111 ± 139	0.294
Hemoglobin (g/ dL)	11.2 ± 2.1	9.9 ± 2.1	< 0.001
Leukocytes (10³/mm³)	9.65 ± 7.42	21.3 ± 15.9	< 0.001
Platelets (10³/mm³)	120.22 ± 110.84	69.76 ± 59.38	0.001
CRP (mg/L)	131.0 ± 136.7	141.5 ± 118.5	0.864

Table 5. Independent risk factors for AKI among patients with leptospirosis.

Multivariate analysis	P	OR / 95% CI
Albumin	0,024	5,7 (1,26-26)
Hemoglobin	0,005	5,8 (1,70-19,7)
Platelets	0,024	3,36 (1,17-9,64)
Direct Bilirubin > 2.0 mg/dL	0,011	2.50 (1.23 – 5.08)

Table 6. Independent risk factors for death among patients with leptospirosis.

Multivariate analysis	P	OR / 95% CI
Platelets	0,002	11,59 (2,39-56,12)
Leukocytes	0,019	5,29 (1,31-21,32)
Direct Bilirubin > 10 mg/dL	0,04	3.94 (1.06 - 14.60)

Conclusions

There was significant association between albumin, hemoglobin, platelets and direct bilirubin with AKI in patients with leptospirosis. AKI is an important risk factor for death. The laboratory variables that were predictors for mortality were platelets, WBC and direct bilirubin .

References

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