ACUTE KIDNEY INJURY IN ADULT ONSET MINIMAL CHANGE DISEASE

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BACKGROUND

Acute kidney injury (AKI) is a common but less studied complication of adult onset minimal change disease (MCD)[1,2]. Thus, we evaluated the incidence of AKI in adult MCD and analyzed the influence of AKI on different outcomes: patient survival, kidney survival and disease remission.

METHODS

We retrospectively examined the outcomes at January 1, 2017 of 79 adult patients who had biopsy proven MCD between 2010 and 2015. We used the KDIGO Clinical Practice Guidelines based on serum creatinine (sCr) for AKI diagnosis and staging.

The outcomes were: patient survival; kidney survival defined as doubling of sCr or end-stage renal disease (ESRD); partial (proteinuria 0.3 to 3.5g/24h) or complete remission (proteinuria <0.3g/24h) - whichever came first.

RESULTS

AKI patients were older, had lower serum hemoglobin, higher serum triglycerides, more severe nephrotic syndrome and more often had dysmorphic hematuria.

In a binary logistic regression model in which the dependent variable was AKI, and the independent variables were the studied parameteres at baseline, only higher age, higher 24h proteinuria and dysmorphic hematuria were significantly and independently related to the presence of AKI.

In the univariate and CPH analyses there were no clinical features at presentation that predicted remission.

Seventeen percent of the patients reached the composite endpoint of kidney survival; mean kidney survival time was 5.7 (5.2, 6.3) years. In the CPH analysis the only independent predictors of decreased renal survival were higher age, low serum albumin and absence of initial immunosuppressive treatment.

Seven (9%) patients died during the follow up period, cardiovascular and infectious diseases were the main causes of death. In univariate time-dependent analysis, AKI was associated with a shorter survival time. However, in the CPH analysis, higher age and lower hemoglobin, but not AKI, were the independent predictors of decreased survival.

CONCLUSIONS

In our study, almost half of the studied patients with adult onset MCD had AKI at presentation. AKI seems to be associated with advanced age, severe nephrotic syndrome and dysmorphic hematuria. In the univariate time dependent analysis, AKI was associated with a shorter survival time. However, in the multivariate analyses AKI was not associated with patient survival, kidney survival or disease remission.

	All N=79	AKI N=33	No AKI N=46	p
Age (years)	50.3 (46.3, 54.3)	59.9 (54.6, 65.2)	43.3 (38.5, 48.2)	<0.01
Male gender (%)	57	58	57	0.9
Hypertension (%)	41	52	33	0.09
Nephrotic synd (%)	68	79	61	0.09
Hemoglobin (g/dL)	13.7 (12.6, 14.1)	12.4 (11.6, 13.9)	14.0 (13.2, 14.9)	0.01
ESR (mm/h)	56.0 (48.0, 64.0)	70 (58, 75)	44 (25, 56)	<0.01
Cholesterol (mg/dL)	295 (258, 320)	322.5 (225, 389)	278 (226, 313)	0.2
Triglycerides (mg/dL)	187 (157, 235)	257.5 (222, 327)	144.5 (123, 164)	<0.01
Serum albumin (g/dL)	3.2 (2.9, 3.5)	3.0 (2.5, 3.6)	3.4 (3.1, 3.8)	0.04
eGFR (mL/min)	54.7 (44.2, 63.5)	29.8 (21.2, 36.3)	70.6 (63.6, 82.1)	<0.01
Proteinuria (g/24h)	4.2 (2.0, 5.8)	6.4 (2.9, 7.9)	2.4 (1.6, 4.6)	0.05
Hematuria (RBC/mm^3)	6.0 (5.0, 30.0)	35 (5, 180)	5 (5, 24)	0.01
Endpoint (%)				
Patient survival	9	18	2	0.01
Kidney survival	16	24	11	0.1
Remission	78	85	74	0.2
Treatment (%)				
RASI	43	30	52	0.05
Corticosteroids	77	85	70	0.1

Risk factors for AKI

Binary logistic regression model: AKI dependent variable

Variables	B	S.E.	Exp(B)(95% CI)	p
Age (years)	0.07	0.02	1.07 (1.02, 1.11)	0.001
Proteinuria (g/24h)	0.13	0.06	1.14 (1.00, 1.30)	0.04
Dysmorphic hematuria	1.15	0.60	3.18 (1.00, 10.4)	0.05
Constant	-5.26	1.38	0.005	<0.001

Variables entered at step 1: age, hemoglobin, serum albumin, dysmorphic hematuria, 24h proteinuria , hypertension; Cox & Snell R^2 0.30; Chi-square 25.13, p<0.001

Renal survival analysis

Cox regression analysis for endpoint doubling of sCr or ESRD

Variables	HR (95% CI)	p
Age (per 1 year of age)	1.06 (1.02, 1.10)	0.003
Serum albumin (g/dL)	0.34 (0.14, 0.78)	0.01
Initial CS treatment (yes vs. no)	0.29 (0.08, 1.00)	0.05

Variables entered at step 1: AKI (yes vs. no), age, hemoglobin, serum albumin, 24h proteinuria, erythrocyte sedimentation rate,initial CS treatment (yes vs. no)

Patient survival analysis

Cox regression analysis for endpoint patient survival

Variables	HR (95% CI)	p
Age (per 1 year of age)	1.06 (1.00, 1.12)	0.04
Hemoglobin(g/dL)	0.65 (0.43, 0.97)	0.03

Variables entered at step 1: AKI (yes vs. no), age, hemoglobin, serum albumin, 24h proteinuria, hypertension, erythrocyte sedimentation rate, dysmorphic hematuria

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