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The impact of acute kidney injury on prognosis in patients with urological sepsis

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Background:

Acute kidney injury (AKI) has negative impact on length of hospital stay and mortality in patients with sepsis. Although urinary tract infections have higher risk to develop AKI, little is known about the influence of AKI on mortality in patients with urological sepsis. We prospectively observed the impact of AKI on prognosis in patients with urological sepsis.

Methods:

We collected the data from 137 patients with urological sepsis in Mutsu general hospital between September 2016 and December 2017. AKI diagnosis was defined according to KDIGO criteria. Patients were divided into two groups between the patients with stage 0-1 AKI and stage 2-3 AKI. The primary end-point is overall survival during 28-days. The secondary end-points are hospital mortality, intensive care unit (ICU) admission rate and length of hospital stay. Multivariate cox proportional hazards regression analysis was performed to identify significant risk factors of 28-days mortality.

Results:

Median age was 79 years old in this cohort. Of 137 patients, 90 patients (66%) were diagnosed as AKI (any stage). The number of patients with stage 0-1 and stage 2-3 AKI were 97 and 40, respectively. The number of deceased patients within 28-days in the stage 0-1 and stage 2-3 AKI were 2 (2.1%) and 7 (17.5%), respectively. Although length of hospital stay was not significantly different between the two groups (11 vs. 14 days, P=0.064), ICU admission rate (0% vs. 7.5%, P=0.023), hospital mortality (1.0% vs. 17.5%, P=0.001), and 28-days mortality (2.1% vs. 17.5%, P=0.003) were significantly higher in patients with stage 2-3 AKI than that of stage 0-1 AKI. In addition, overall survival rate during 28-days was significantly lower in patients with stage 2-3 AKI than that of stage 0-1 AKI (P < 0.001). Univariate analysis showed that AKI and disseminated intravascular coagulation (DIC) status were significant risk factors for 28-days mortality. In multivariate analysis, AKI status was selected as significant independent risk factor of 28-days mortality in patients with urological sepsis.

Conclusions:

Significant poor clinical outcomes were observed in patients with stage 2-3 AKI. Development of stage 2-3 AKI is potential prognostic factor in patients with urological sepsis.

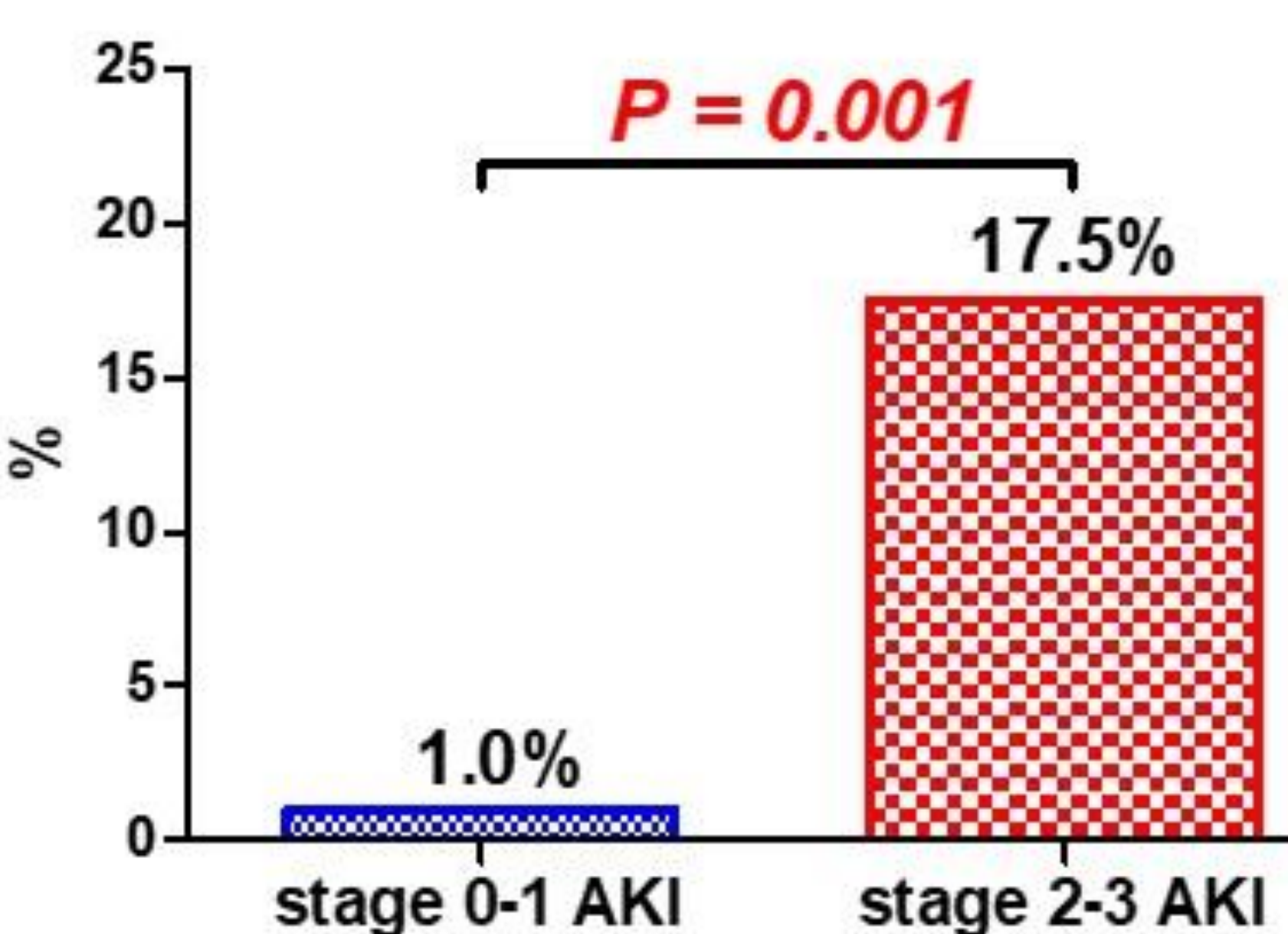
AKI Staging criteria

Stage	Serum creatinine	Urine output
1	1.5-1.9 times baseline or >0.3 mg/dL increase	<0.5 ml/kg/h for 6-12h
2	2.0-2.9 times baseline	<0.5 ml/kg/h for >12h
3	3.0 times baseline or Increase to >4.0mg/dL or Initiation of renal replacement therapy	<0.3 ml/kg/h for >24h or Anuria for >12h

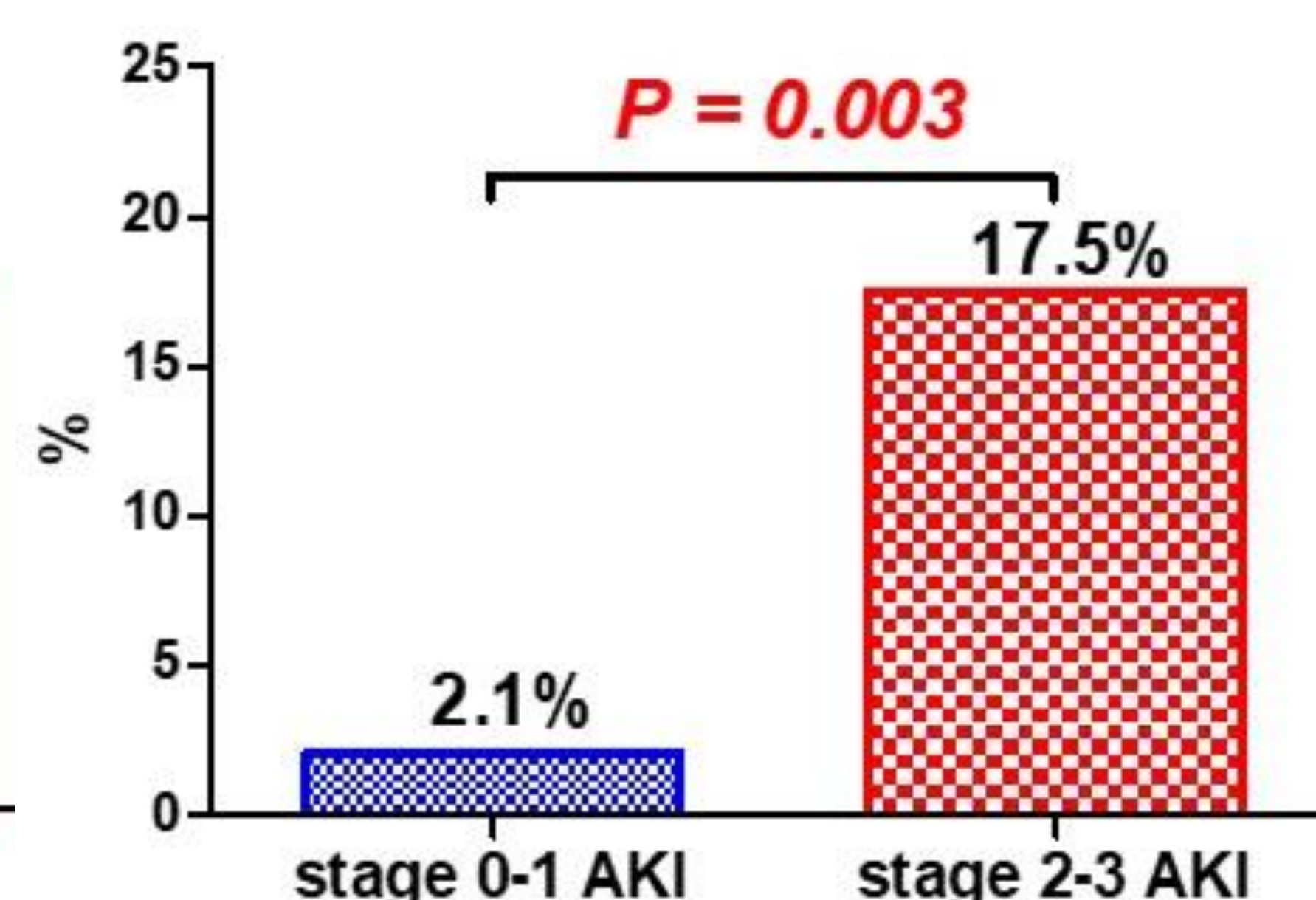
Patients' Background

	All (n=137)	Stage 0-1 AKI (n=97)	Stage 2-3 AKI (n=40)	P value
Age, years	79 (68, 86)	78 (66, 86)	83 (74, 89)	0.018
Sex, male	41%	46%	30%	0.077
Body mass index, kg/m ²	22 (19, 25)	22 (19, 25)	22 (20, 24)	0.811
Performance status, ≥1	52%	49%	60%	0.262
Hypertension	70%	66%	80%	0.103
Diabetes mellitus	25%	28%	18%	0.203
Cardiovascular disease	34%	30%	45%	0.090
Chronic kidney disease	38%	34%	48%	0.139
Urolithiasis	23%	20%	33%	0.104
Disseminated intravascular coagulation (DIC)	22%	9%	53%	0.000

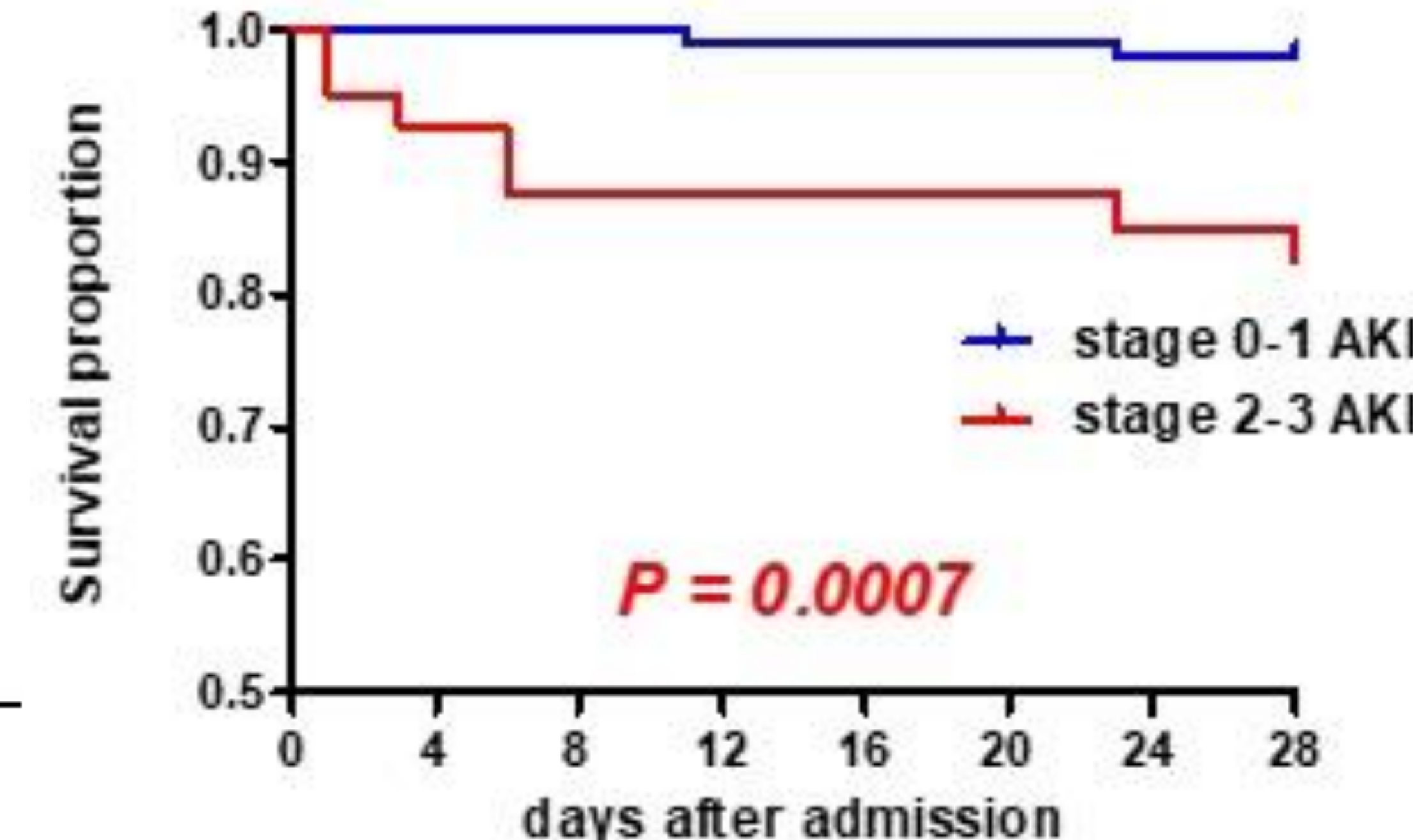
Hospital mortality



28-days mortality



Overall survival



Cox proportional hazards regression analysis for 28-days mortality

Univariate	Risk factors	P value	HR	95%CI
Age	continuous	0.224	1.04	0.98-1.10
Sex	male	0.587	0.68	0.17-2.72
Body mass index	continuous	0.814	0.98	0.82-1.17
Performance status	1 or greater	0.068	6.93	0.87-55.4
Diabetes mellitus	positive	0.842	0.85	0.18-4.10
Cardiovascular disease	positive	0.534	1.52	0.41-5.65
Chronic kidney disease	positive	0.773	0.82	0.20-3.26
Urolithiasis	positive	0.382	0.40	0.05-3.16
Acute kidney injury	stage 2 or 3	0.006	9.21	1.91-44.4
Disseminated intravascular coagulation	positive	0.022	4.66	1.25-17.4
Multivariate				
Acute kidney injury	stage 2 or 3	0.029	6.89	1.21-39.2
Disseminated intravascular coagulation	positive	0.408	1.85	0.43-7.90