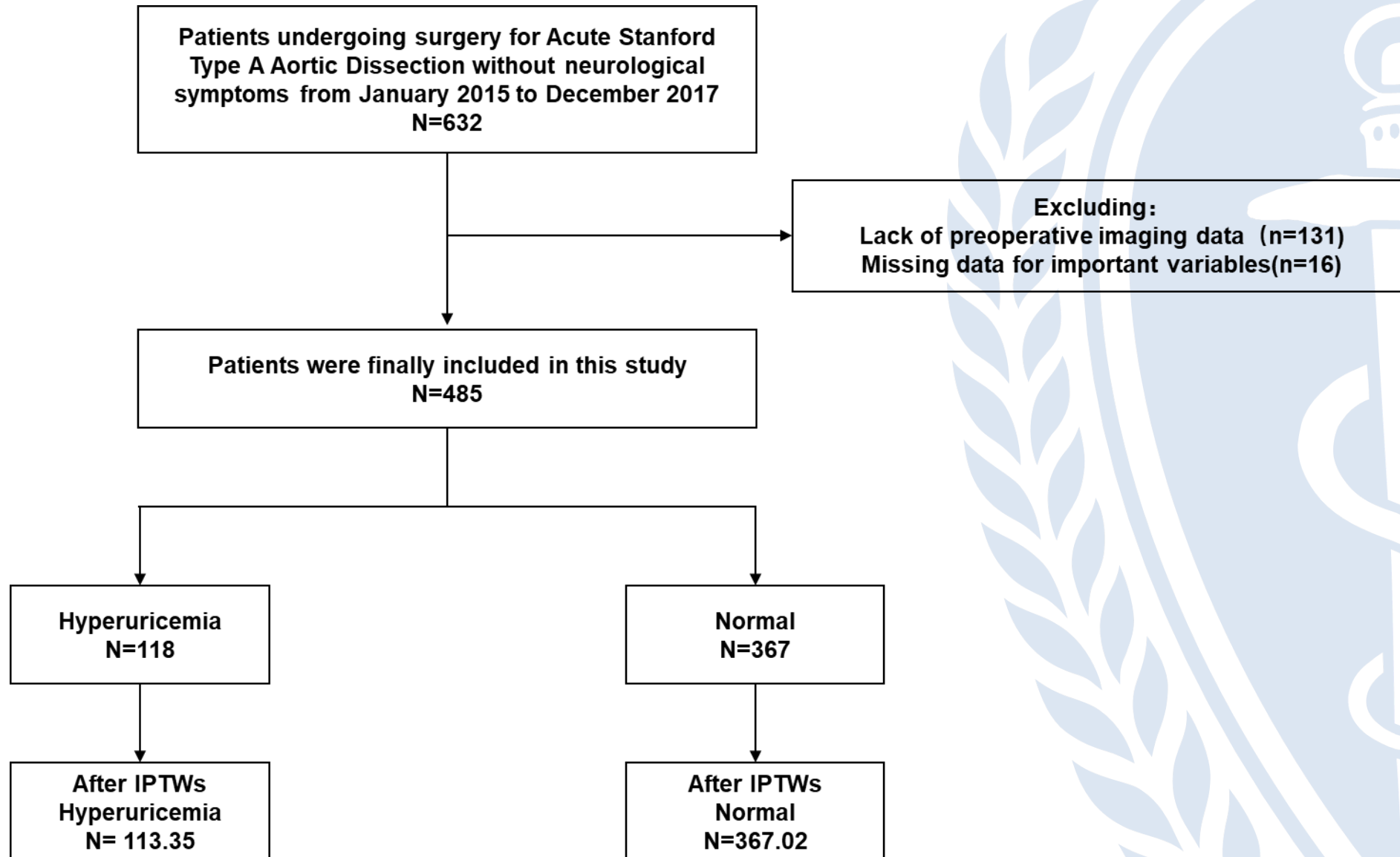


Impact of preoperative hyperuricemia on the prognosis of patients with acute type A aortic dissection

Songhao Jia, Wenjian Jiang, Hongjia Zhang

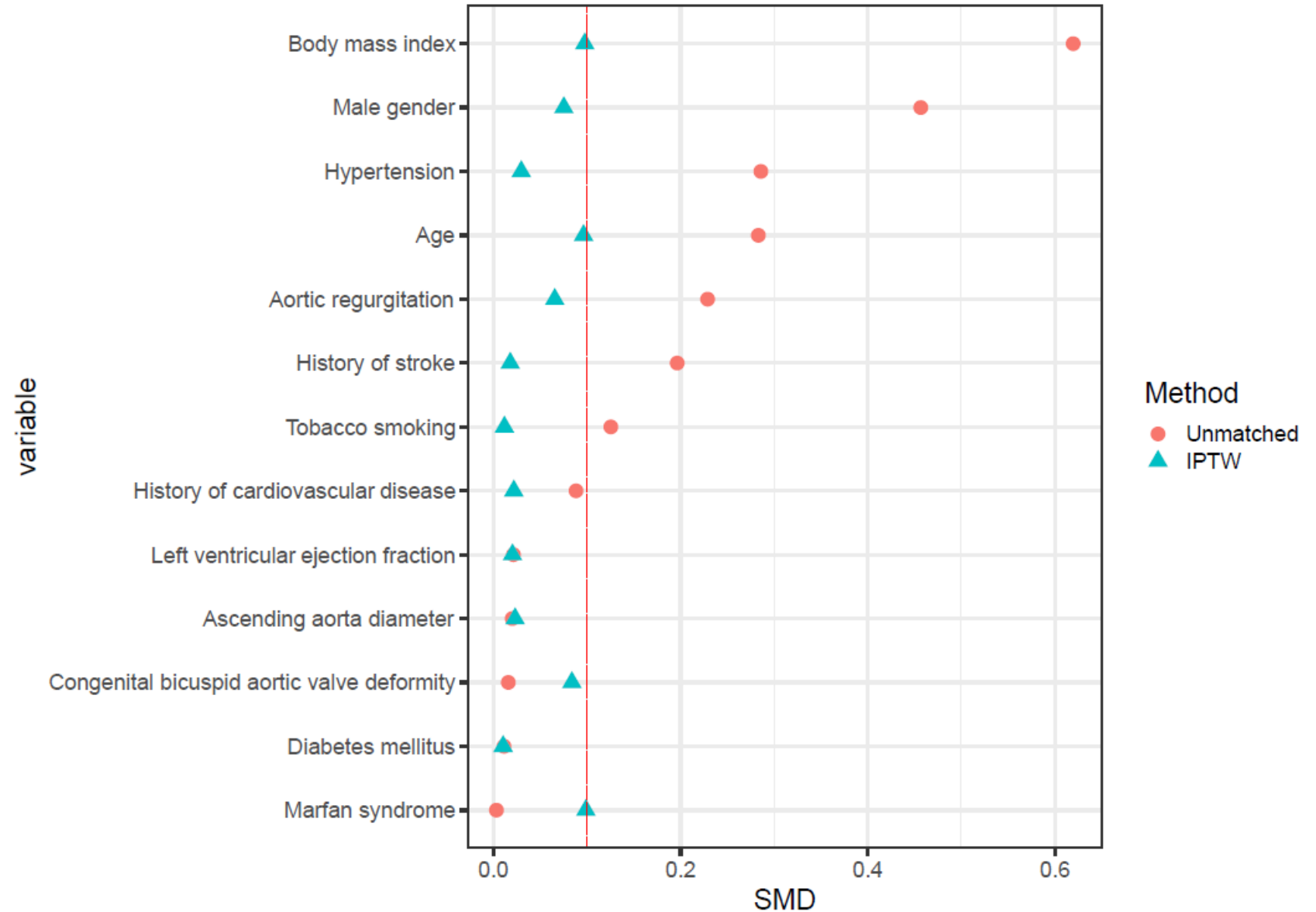
Department of Cardiac Surgery, Beijing Anzhen Hospital, Capital Medical University, Beijing, China

Study design



Adjusting the covariate balance

Multivariable adjustment and stabilized inverse probability of treatment weighting (IPTWs) were used to adjust for confounders



Baseline Characteristics

Variables	Before IPTW			After IPTW		
	Hyperuricemia(n=118)	Normal(n=367)	P value	Hyperuricemia(n=113.35)	Normal(n=367.02)	P value
Age, y	46.00(37.25-53.75)	49.00(42.00-57.00)	0.011	47.88(39.00-56.58)	47.02(42.00-55.00)	0.693
Male gender,n(%)	104(88.1)	257(70.0)	0.001	88.1 (77.7)	273.4 (74.5)	0.075
Body mass index, kg/m2	27.02 (25.11-29.84)	25.39 (23.01-27.68)	0.619	25.65(24.49-27.73)	25.95(23.44-27.78)	0.521
Marfan syndrome, n (%)	1(0.8)	3(0.8)	1.000	2.0 (1.8)	2.5 (0.7)	0.391
Hypertension, n (%)	71 (60.2)	169 (46.0)	0.010	57.8 (51.0)	181.6 (49.5)	0.805
Diabetes mellitus, n (%)	3 (2.5)	10 (2.7)	0.990	3.1 (2.8)	9.5 (2.6)	0.928
Tobacco smoking, n (%)	46 (39.0)	121 (33.0)	0.278	39.8 (35.1)	126.7 (34.5)	0.918
History of cardiovascular disease, n (%)	4 (3.4)	19 (5.2)	0.585	5.3 (4.7)	18.8 (5.1)	0.870
History of stroke, n (%)	5 (4.2)	4 (1.1)	0.070	2.8 (2.5)	8.2 (2.2)	0.872
Ascending aorta diameter, mm	46.00(42.00-48.00)	46.00(42.00-50.00)	0.849	46.00(41.00-48.00)	46.00(42.00-49.00)	0.690
Congenital bicuspid aortic valve deformity, n (%)	2 (1.7)	7 (1.9)	0.992	1.3 (1.1)	8.2 (2.2)	0.450
Left ventricular ejection fraction, %	62.00(60.00-65.00)	62.00(60.00-65.00)	0.718	62.00(60.00-65.00)	62.00(60.00-65.00)	0.588
Aortic regurgitation, n (%)			0.254			0.960
None	50 (42.4)	146 (39.8)		46.0 (40.6)	148.7 (40.5)	
Mild	38 (32.2)	111 (30.2)		37.7 (33.3)	113.2 (30.8)	
Moderate	21 (17.8)	56 (15.3)		16.1 (14.2)	57.7 (15.7)	
Severe	9 (7.6)	54 (14.7)		13.5 (11.9)	47.5 (12.9)	

After IPTWs, there was no significant difference in all baseline data

Operative details

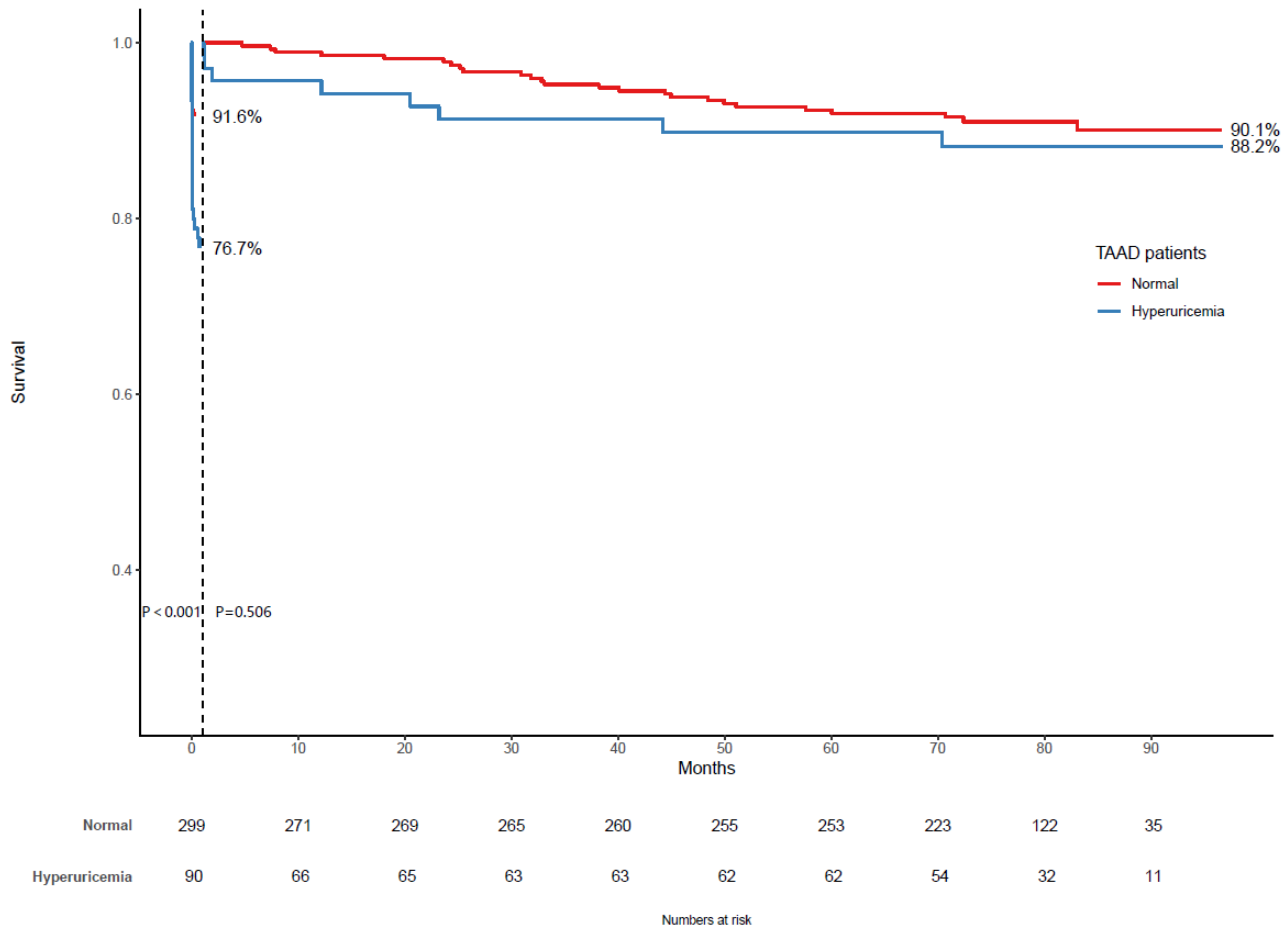
Variables	Before IPTWs			After IPTWs		
	Hyperuricemia(n=118)	Normal(n=367)	P value	Hyperuricemia(n=113.35)	Normal(n=367.02)	P value
Surgery time, h	7.58(7.00-8.65)	7.58(7.00-8.00)	0.167	7.58(7.00-8.50)	7.58(7.00-8.17)	0.642
Cardiopulmonary bypass time, min	215.50(177.00-244.75)	199.00(171.00, 227.50)	0.009	210.16(175.00-245.00)	199.00(172.00-230.00)	0.082
Cross-clamp time, min	114.50(95.25-138.75)	112.00(90.50, 135.00)	0.214	113.00(94.57-136.12)	112.00(91.00-135.00)	0.411
Minimum operating temperature, °C	23.90(23.72-24.00)	23.90(23.65-24.00)	0.382	23.90(23.60-24.00)	23.90(23.60-24.00)	0.956
Root replacement, n (%)	50 (42.4)	162 (44.1)	0.036	51.7 (45.6)	156.4 (42.6)	0.617
Total arch replacement, n (%)	79 (66.9)	236 (64.3)	0.680	68.8 (60.7)	243.0 (66.2)	0.348
Combined CABG, n (%)	10 (8.5)	11 (3.0)	0.022	12.1 (10.6)	10.8 (2.9)	0.003
ASA anesthesia score	3.00 (3.00-4.00)	3.00 (3.00-4.00)	0.110	3.00(3.00-4.00)	3.00(3.00-4.00)	0.941

Outcome characteristics

Variables	Before IPTWs			After IPTWs		
	Hyperuricemia(n=118)	Normal(n=367)	P value	Hyperuricemia(n=113.35)	Normal(n=367.02)	P value
30 day mortality, n (%)	19 (16.1)	24 (6.5)	0.003	22.0 (19.4)	22.6 (6.2)	<0.001
Hemorrhagic stroke, n (%)	2 (1.7)	5 (1.4)	0.99	1.1 (1.0)	4.4 (1.2)	0.781
Ischemic stroke, n (%)	10 (8.5)	16 (4.4)	0.136	8.5 (7.5)	18.4 (5.0)	0.352
In hospital stay,d	13.00(9.00-17.00)	12.00(9.00, 16.00)	0.486	12.00(9.00-17.00)	12.00(9.00-16.00)	0.914
In ICU stay,d	2.33(1.18, 5.31)	1.88(1.01, 3.42)	0.022	2.46 (1.18-6.10)	1.90(1.01-3.42)	0.024
Ventilator time,h	75.00(28.00-220.00)	42.00 (24.00-87.75)	0.002	76.00(29.67-232.45)	42.00(24.00-90.00)	0.004
Dialysis, n (%)	16 (13.6)	35 (9.5)	0.286	16.4 (14.5)	33.8 (9.2)	0.140
Pneumonia, n (%)	5 (4.2)	11 (3.0)	0.719	4.1 (3.6)	12.8 (3.5)	0.956
Tracheotomy, n (%)	4 (3.4)	7 (1.9)	0.558	2.6 (2.3)	8.4 (2.3)	0.976
sepsis, n (%)	4 (3.4)	6 (1.6)	0.427	3.3 (2.9)	7.7 (2.1)	0.632

The 30-day mortality (19.4% vs 6.2%, P<0.001), ICU time (2.5d vs 1.9d, P=0.024), and ventilator time (76.0h vs 42.0h, P=0.004) in the hyperuricemia group were significantly higher than those in the normal uric acid group

Study design



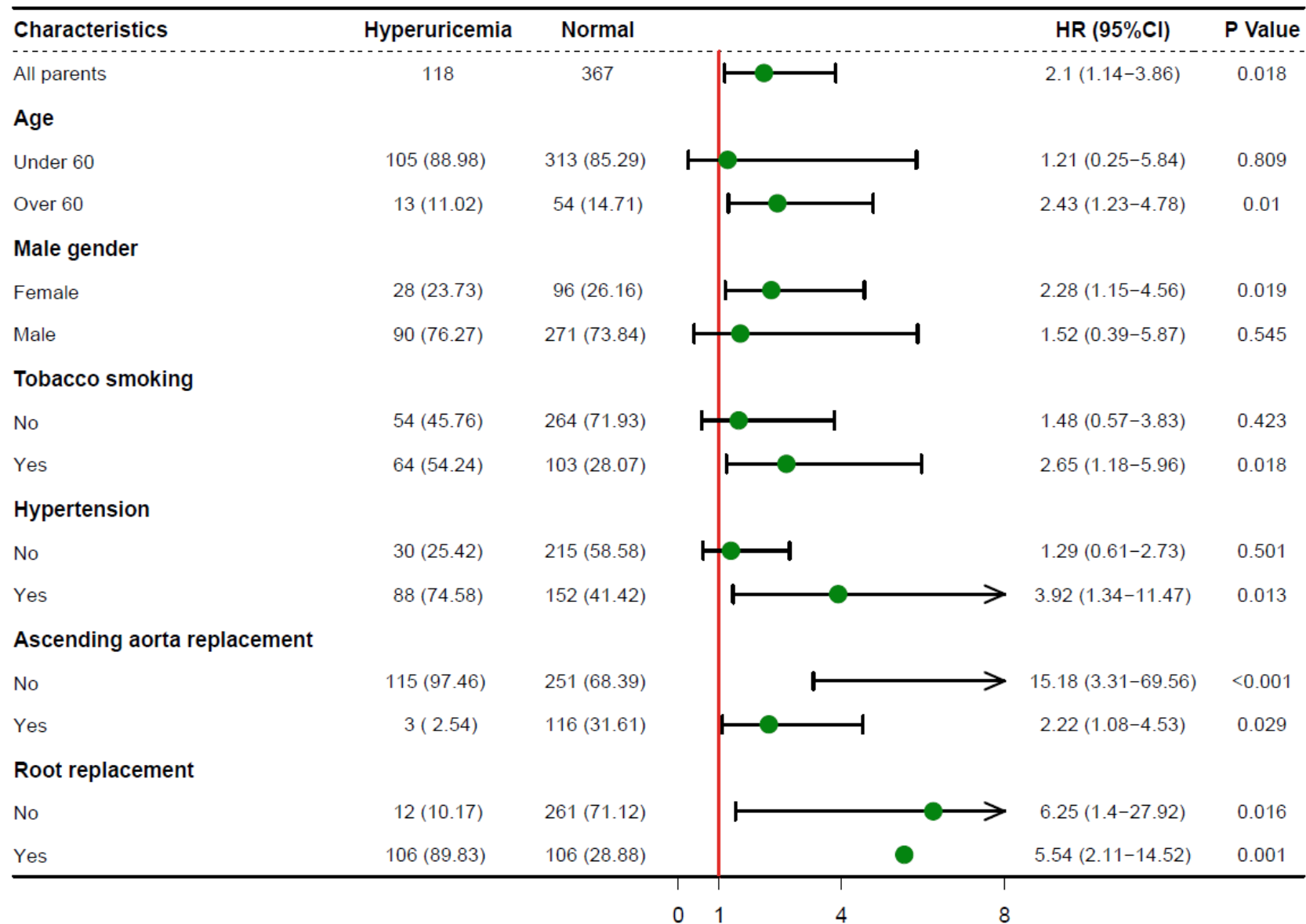
In a median follow-up time of 6.2 years (IQR, 5.6-6.9 years), Landmark analysis using postoperative 1 month as the threshold showed that the mortality of the hyperuricemia group mainly increased significantly within 1 month after surgery (Log rank $P < 0.001$), and there was no significant difference in survival between the two groups after 1 month (Log rank $P = 0.506$)

Univariable and Multivariable Risk Factors

Variables	Univariable			Multivariable		
	HR	95% CI	P value	HR	95% CI	P value
Age	1.02	1.00-1.05	0.097			
Male gender	1.13	0.56-2.30	0.730			
Body mass index	0.98	0.91-1.06	0.686			
Hypertension	1.93	1.03-3.61	0.041	1.04	0.52 - 2.09	0.901
Diabetes mellitus	1.81	0.44-7.50	0.411			
Tobacco smoking	1.26	0.68-2.32	0.459			
Hyperuricemia	2.57	1.41-4.70	0.002	2.16	1.15 - 4.05	0.016
History of cardiovascular disease	1.60	0.49-5.16	0.434			
Ascending aorta diameter	1.00	0.96-1.05	0.892			
Congenital bicuspid aortic valve deformity	2.72	0.66-11.24	0.167			
Left ventricular ejection fraction	0.99	0.94-1.05	0.761			
Aortic regurgitation						
None						
Mild	1.16	0.56-2.37	0.691			
Moderate	1.31	0.56-3.06	0.533			
Severe	0.97	0.36-2.65	0.955			
Surgery time	1.36	1.13-1.64	0.001	1.12	0.91 - 1.38	0.295
Cardiopulmonary bypass time	1.00	1.00-1.00	0.136			
Cross-clamp time	1.01	1.00-1.01	0.080			
Minimum operating temperature	0.82	0.66-1.01	0.066			
Root replacement	0.60	0.32-1.14	0.122			
Total arch replacement	3.44	1.45-8.16	0.005	2.82	1.09 - 7.33	0.033
Combined CABG	4.93	2.19-11.07	0.000	2.68	1.03 - 6.97	0.043
ASA anesthesia score	1.51	0.94-2.43	0.087			

Univariate and multivariate COX regression revealed that preoperative hyperuricemia was an independent risk factor for 30-day mortality in patients

Subgroup analysis



Conclusion

- **Preoperative hyperuricemia was an independent risk factor for early mortality in patients with acute type A aortic dissection, but it did not affect the mid-term survival in patients who survived the early postoperative period**