

Preoperative Cardiac Troponin I Predicts Early Outcomes in Surgery for Acute Type A Aortic Dissection

Sangyu Zhou, PhD

Fuwai Hospital, National Center for Cardiovascular Diseases, China.

Background

TABLE 26 Clinical Evidence of Malperfusion ("Malperfusion Syndrome")

End Organ	Clinical Findings
Cardiac	Electrocardiographic changes of ischemia or infarction, troponin elevation, myocardial dysfunction
Cerebral	Stroke and neurologic deficits, coma and altered mental status
Spinal	Paraplegia
Mesenteric	Abdominal pain, bowel ischemia, lactic acidosis, elevation of liver function test results
Renal	Acute kidney injury, oliguria
Extremity	Loss of pulses in ≥ 1 extremity, sensory or motor dysfunction

- **Malperfusion syndrome in ATAAD**
 - Electrocardiographic changes of ischemia
 - Troponin elevation
 - Myocardial dysfunction
- **In our center, ATAAD patients with cardiac malperfusion especially high cardiac troponin I (cTnI) were postponed for surgery, which guaranteed a better outcome.**
- **No exact value of cTnI elevation was determined.**

Methods

- **Single-center retrospective cohort study**
- **A total of 535 patients with ATAAD were enrolled in this study.**
- **Primary endpoint: in-hospital mortality after surgery**
- **Second endpoint: stroke, paraplegia, cardiac dysfunction, acute kidney injury, intensive care unit stay, and in-hospital stay.**

Intraoperative data

Variable [↵]	cTnl<0.02 ng/mL (n=372) [↵]	cTnl≥0.02 ng/mL (n=163) [↵]	P-value [↵]
Main surgery[↵]	[↵]	[↵]	[↵]
TAR with FET [↵]	312 (83.9%) [↵]	135 (82.8%) [↵]	0.763 [↵]
Partial aortic arch replacement [↵]	12 (3.2%) [↵]	4 (2.5%) [↵]	0.836 [↵]
Hybrid aortic repair [↵]	44 (11.8%) [↵]	20 (12.3%) [↵]	0.885 [↵]
Concomitant surgery[↵]	[↵]	[↵]	[↵]
Bentall procedure [↵]	82 (22.0%) [↵]	48 (29.4%) [↵]	0.066 [↵]
David procedure [↵]	7 (1.9%) [↵]	5 (3.1%) [↵]	0.592 [↵]
CABG [↵]	79 (21.2%) [↵]	55 (33.7%) [↵]	0.002 [↵]
CPB time (min) [↵]	190.6±69.86 [↵]	211.1±85.18 [↵]	0.004 [↵]
Aortic cross-clamp time (min) [↵]	114.6±39.89 [↵]	132.2±79.41 [↵]	0.008 [↵]

Early outcomes

Variable	cTnl<0.02 ng/mL (n=372)	cTnl≥0.02 ng/mL (n=163)	P-value
ICU stay (h)	96.0 (70.4, 144.0)	120.0 (84.0, 192.0)	0.001
In-hospital stay (d)	13.0 (9.3, 17.0)	13.0 (10.0, 17.0)	0.831
In-hospital mortality	5 (1.3%)	6 (3.7%)	0.155
Stroke	14 (3.8%)	7 (4.3%)	0.771
Paraplegia	14 (3.8%)	5 (3.1%)	0.689
cardiac dysfunction	4 (1.1%)	4 (2.5%)	0.411
AKI	279 (75.0%)	128 (78.5%)	0.379
Grade I	209 (56.2%)	101 (62.0%)	0.213
Grade II	58 (15.6%)	31 (19.0%)	0.327
Grade III	44 (11.8%)	32 (19.6%)	0.017

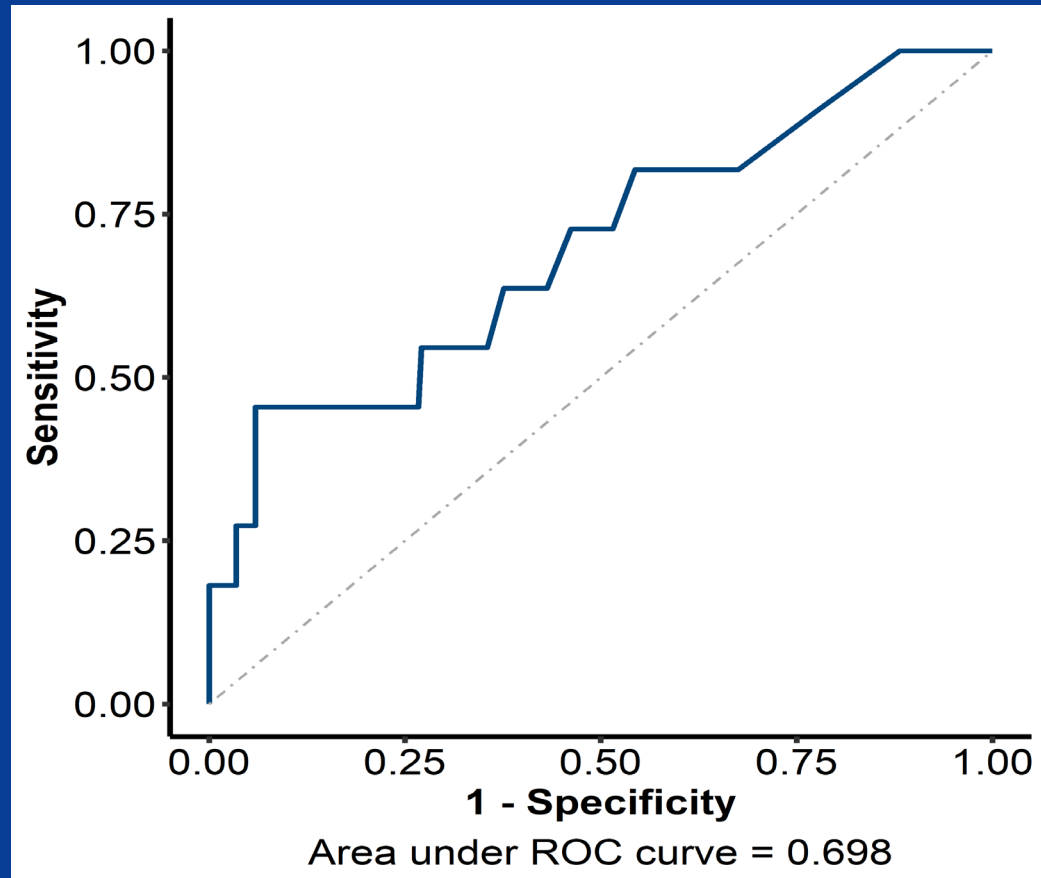
Multivariable analysis

- Preoperative cTnI level was an independent risk factor of in-hospital mortality and longer ICU stay.

Variable	OR	95% CI	P-value
In-hospital mortality			
cTnI	4.025	1.780-9.100	0.001
Sex (male as reference)	5.695	1.060-30.607	0.043
Age	1.034	0.961-1.113	0.366
COPD	2.796	0.041-192.349	0.634
Hybrid aortic repair	5.776	0.951-35.081	0.057
CPB time	1.012	1.006-1.018	<0.001

Variable	Coefficient	95% CI	P-value
cTnI	36.133	10.951 - 61.315	0.005
Age	1.439	0.410 - 2.469	0.006
Diabetes	44.807	-16.169 - 105.784	0.149
Marfan syndrome	-40.214	-108.973 - 28.544	0.251
History of cerebrovascular accident	18.026	-26.978 - 63.030	0.432
Left ventricular ejection fraction	-2.795	-5.466 - -0.125	0.040
Coronary artery involvement on CTA	73.202	23.901 - 122.502	0.004
NT-proBNP	0.002	-0.002 - 0.007	0.345
sCr	0.388	0.064 - 0.007	0.019
CABG	15.832	-14.092 - 45.755	0.299
CPB time	0.236	0.047 - 0.424	0.015
Aortic cross-clamp time	0.017	-0.271 - 0.237	0.895

Receiver-operating characteristic curve analysis



Cut-off value: 0.28 ng/mL

Take home message

- Preoperative cTnI was an independent risk factor of in-hospital mortality and the cut-off value was 0.28 ng/ml.
- Preoperative cTnI was independently associated with longer ICU stay.
- Preoperative cTnI helped identify patients with high risk and provided information about prognosis.