Editorial

The presence of left ventricular hypertrophy in patients with acute type A aortic dissection: weight on the postoperative clinical outcomes

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Three decades ago, Crawford *et al.* reported 21% of mortality rate after acute type A aortic dissection (AD) (1). Regretfully, current large registry data still show dismal improvement in the mortality outcome (≈18%), despite a recent remarkable advance in other cardiovascular surgery (2,3). Reports from experienced centers, however, have given us optimistic results reporting 5–8% of mortality rates (4-8). Although a substantial investment would be required to lessen the mortality gap, the closing the gap may start with the rigorous evaluation. Knowing which patient will have a greater or lesser hazard to operate acute type A AD is undoubtedly an important issue.

In the journal, Zuo and his colleagues reviewed 193 patients who underwent AD repair from 2018 to 2021 in their institute (9). Scope of the study was to evaluate impacts of left ventricular hypertrophy (LVH) on clinical outcomes (55 versus 138 patients with/without LVH). The primary endpoint was a composite major outcome (CMO) including operative mortality, strokes, paraplegia, continuous renal replacement therapy (CRRT) and cardiac events. Cardiac events are indicated as low cardiac output syndrome (LCOS) plus ventricular arrhythmias. Authors performed logistic regression analyses to evaluate the influences of the presence of LVH or left ventricular mass index (LVMI) on the CMO outcome. Nomogram models were generated based on the results of multivariable risk analyses. There were significantly higher incidence of CMO (P=0.017) and mortality rate in the LVH patients. Based on multivariable risk analyses, LVH, LVMI, Penn classification, hyperlipidemia, emergency surgery and cardiopulmonary bypass (CPB) duration were applied in the nomogram models.

Although there have been previous publications reporting associations between the LVH and acute type B AD, a potential risk of LVH on the clinical outcomes after acute type A AD repair has not been adequately evaluated (10,11). Therefore, authors are to be congratulated for their interest to estimate the influence of LVH on the adverse clinical outcomes in patients who underwent acute type A AD repair. The association between LVH and AD is surely an important issue to understand the physiology of AD. Given limitation from the retrospective observational study, however, inconvenience in the evaluation of the present study exists (9). First, too many factors were included in the multivariable risk analyses for only 38 of primary outcomes. In addition, setting mortality, neurologic outcomes, CRRT, LCOS and arrhythmia altogether as one clinical endpoint seems to be too heterogenous. Second, it is regretful that there is a lack of detailed explanation on the generation of “Nomogram models”. Depending on their system, an emergent surgery has same score with a hyperlipidemia or 24 minutes of

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Table 1 Baseline variables and risks for in-hospital death

Characteristics	Acute type A aortic dissection (n=330)			
	Values	Odd ratio	95% confidential interval	P value
Age, years (mean ± SD)	59.1±13.2	1.01	0.98–1.05	0.43
Female gender, n (%)	145 (43.9)	0.89	0.33–2.35	0.82
Body mass index, kg/m^2 (mean ± SD)	25.5±7.9	0.98	0.91–1.03	0.57
Smoking, n (%)	128 (38.8)	0.90	0.35–2.16	0.81
Diabetes mellitus, n (%)	34 (10.3)	0.87	0.13–3.15	0.85
Hypertension, n (%),	229 (69.4)	0.76	0.31–1.95	0.55
Renal failure, n (%)	10 (3.0)	NA		
Pulmonary disease, n (%)	4 (1.2)	4.84	0.23–39.7	0.18
Cerebrovascular disease, n (%)	23 (7.0)	0.62	0.04–3.19	0.65
Marfan, n (%)	3 (0.9)	NA		
Intramural hematoma, n (%)	58 (17.6)	0.21	0.01–1.04	0.13
Prior cardiac surgery, n (%)	63 (19.1)	0.40	0.06–1.44	0.23
Rupture at admission, n (%)	5 (1.5)	24.2	3.79–191.9	<0.001
Malperfusion, n (%)	105 (31.8)	6.56	2.61–18.8	<0.001
Left ventricular mass, g (mean ± SD)	104.9±31.5	0.99	0.98–1.01	0.68
Extent of arch surgery*	112/58/70/90 pts	0.81	0.55–1.16	0.26

*, categorically evaluated as 0 for ascending only, 1 for one-partial, 2 for two-partial and 3 for three-partial arch vessel replacements. SD, standard deviation; NA, not available; pts, patients.

CPB which are usually regarded as minimal hazards. Moreover, patients undergoing acute type A AD repair in the non-emergent setting doesn't mean safe because the in-hospital aortic rupture are reportedly almost 10% unless the dissected ascending aorta is replaced (12). Third, validation tests for the nomogram models are not understandable. In *Fig. 3* of the study from Zuo, lines are under the half crossing line [which means 0.5 of area under curve (AUC)], but the listed AUCs were 0.825 and 0.841 for LVH and LVMI models, respectively.

Nevertheless, the core message in manuscript leads us to focus more on the baseline conditions with high degree of suspicion in the evaluation of the patients with acute type A AD. When we reviewed our institutional database from 2010 to 2018, the baseline characteristics were not significantly different from the Zuo's manuscript (*Table 1*). Our in-hospital mortality rate was 6.7% (22/330). When we performed univariable logistic regression analysis, the presence of aortic rupture and malperfusion at the time of admission were significantly associated with the in-hospital mortality. The LVMI was not significantly related with the outcome (P=0.68).

Through decades, many treatment options such as extended versus limited repair, immediate versus timely surgery in the presence of malperfusion have been argued to repair the acute type A AD repair (13,14). These debates are principally based on an earnest mind to save patients with the desperate vascular condition. Although the patients visiting hospital for acute type A AD are relatively less prevalent of heart failure, the existence of LVH may add harmful effects on the postoperative outcomes, especially for patients requiring long-term cardiac ischemic time due to extensive surgery. Therefore, further evaluations based on more robust analyses in larger cohort with well-designed study are warranted.

For the publication, Wan Kee Kim drafted the manuscript, Suk-Won Song provided overall concept, and Kyung-Jong Yoo supervised (*Figure 1*).

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Figure 1 Suk-Won Song, Kyung-Jong Yoo, Wan Kee Kim (left to right). This image is published with the participants' consent.

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