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Impact of coronary artery involvement on mortality in patients with acute type A aortic dissection: results from a large-scale cohort study

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ABSTRACT

BACKGROUND Understanding the type and extent of coronary artery involvement in patients with acute type A aortic dissection (ATAAD) is vital for surgical planning. The Neri classification has been proposed as a guide for surgical strategies, however, its prognostic impact on postoperative mortality rates remains understudied in large-scale cohorts.

METHODS We reviewed 600 ATAAD patients who underwent surgery and coronary computed tomography angiography from 2016 to 2020 at Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China. Patients were classified based on the Neri classification system: no coronary artery involvement, type A (ostial involvement), type B (dissection in coronary body), and type C (circumferential detachment or complete avulsion). The primary endpoint was 30-day mortality.

RESULTS Overall, 28.3% of the patients had coronary artery involvement, with Neri type A, Neri type B, and Neri type C accounting for 13.3%, 11.2%, and 3.8%, respectively. The right coronary artery was more frequently involved (25.3%) than the left coronary artery (8.0%). In the unadjusted analysis, patients with coronary artery involvement exhibited a numerically higher 30-day mortality compared to those without (5.3% *vs.* 2.3%) (OR = 2.35, 95% CI: 0.94–5.88, $P = 0.07$), though this difference did not reach statistical significance. However, multivariable adjustment revealed significant association (adjusted OR = 3.71, 95% CI: 1.05–13.13, $P = 0.04$). Interestingly, after additional adjustment for coronary artery bypass grafting, the impact of coronary artery involvement on 30-day mortality no longer remained statistically significant (adjusted OR = 3.13, 95% CI: 0.85–11.58, $P = 0.09$). The 1-year mortality was higher in those with coronary artery involvement, but this significant association disappeared after adjusting for potential confounding variables. Furthermore, no significant difference in 30-day and 1-year mortality were observed among patients with different Neri classifications.

CONCLUSIONS In patients with ATAAD who undergo surgery, the presence of coronary artery involvement is significantly associated with an increased risk of 30-day mortality. Proactive coronary artery bypass grafting may potentially mitigate the adverse impact of coronary artery involvement on 30-day mortality.

In patients diagnosed with acute type A aortic dissection (ATAAD), understanding the specific type and extent of coronary artery involvement is crucial for surgeons in determining the most appropriate surgical approach.[1] Specifically, the Neri classification has been proposed as a guide for surgical strategies, particularly in addressing coronary artery concerns during surgical interventions for proximal aortic dissections.[1] The Neri classification categorizes coronary artery involvement into three types: type A for dissection at the ostium, type B for dissection with a false lumen involving the coronary artery, and type C for circumferential detachment or complete avulsion of the coronary artery.[1] Generally, for Neri type A and most Neri type B lesions, repair surgery is sufficient to address coronary artery issues, while coronary artery bypass grafting (CABG) was a simple and straightforward revascularization technique for Neri type C lesions.[1] However, the prognostic effect of coronary artery involvement and the types of Neri classification in patients with ATAAD undergoing surgical treatment has not been well studied. This study aims to evaluate the impact of ATAAD with coronary artery involvement, classified according to the Neri system, on 30-day and long-term mortality rates in a large-scale cohort study.

METHODS

Study Design and Population

This was a retrospective cohort study, and the study design has been described in existing literatures.[2,3] Briefly, from January 2016 to December 2020, 1322 consecutive patients diagnosed as ATAAD based on aortic computed tomography angiography (CTA) were enrolled in Emergency Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China. ATAAD is defined as an aortic dissection that involves the ascending aorta, regardless of the site of the primary intimal tear, and is diagnosed within 14 days from the onset of symptoms.[4] This study complied with the principles of the Declaration of Helsinki and was approved by the Institutional Review Board of Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China (No.2023-2089). All the participants provided written informed consent before enrollment.

In this analysis, 466 patients who did not undergo coronary CTA, 255 patients who did not receive surgery, and one patient who sought treatment at our hospital > 14 days after symptom onset were excluded (supplemental material, Table 1S). Two cardiovascular radiologists with more than 10 years of experience assessed all aortic CTA and coronary CTA images, and any disagreements (n = 13) were resolved through discussion with a third cardiovascular radiologist. As a result, we analyzed a total of 600 ATAAD patients who underwent surgery, of which 170 patients with coronary involvement were detected (Figure 1). Based on the Neri classification, coronary CTA manifestations of coronary artery involvement were divided into three types, including type A (n = 80), type B (n = 67), and type C (n = 23). Of note, when a patient has concurrent involvement of the left and right coronary arteries, their Neri classification should be set based on the most severe Neri condition.

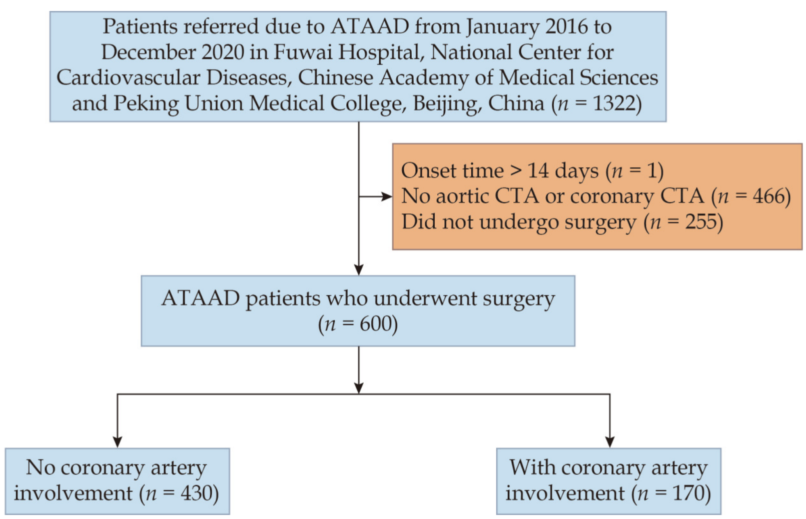

Figure 1 Flow chart of the study. ATAAD: acute type A aortic dissection; CTA: computed tomography angiography.

Biochemical Analysis

After admission, we obtained laboratory samples from each participant, and all tests were performed at Department of Clinical Chemistry, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China. Cardiac troponin I (cTnI) was assayed using the PATHFAST instrument manufactured by Medins Co., Ltd., with a normal reference range established at 0–0.02 ng/mL.[5] The admission glucose level was determined using the enzymatic hexokinase method and the total leukocyte count and its subtypes were analyzed with the Sysmex XE-5000 (Sysmex Corporation, Kobe, Japan) automated hematology analyzer.

Surgical Procedures

Throughout the surgical procedure, conventional anesthetic approaches, inclusive of endotracheal intubation, were utilized. Cardiopulmonary bypass was established through cannulation of the right axillary artery. Depending on clinical necessity, deep hypothermic circulatory arrest was employed, accompanied by the selective use of unilateral or bilateral cerebral perfusion. Proximal aortic surgical interventions encompassed various techniques, such as the implementation of supracoronary aortic grafting, the utilization of bovine pericardium neomedia for sinus of Valsalva reconstruction, the resuspension of the aortic valve, the utilization of a valved conduit for aortic root replacement, a combined procedure of aortic valve replacement with supracoronary aortic grafting, and the preservation of the aortic valve during aortic root replacement through the valvesparing technique. The surgical procedure also involved the application of a four-branch prosthetic graft for total aortic replacement, which necessitated the re-anastomosis of the right innominate brachiocephalic trunk, left common carotid artery, and left subclavian artery to their respective prosthetic vessel branches. Additionally, a frozen elephant trunk stent was surgically inserted into the descending aorta.

The approach to coronary artery repair hinges significantly on the lesion type. For type A, successful strategies often involve ostial or supracoronary repairs using meticulous 6-0 suture techniques to reconnect dissected layers.[1] Limited superior dissection usually warrants supracoronary repair, with optional aortic reinforcement using 6-0 sutures and bovine pericardium. For type B, precise dissection assessment and heart surface inspection for hematoma are crucial. Slow cardioplegia infusion helps detect coronary artery compression. Type B often opts for ostial or supracoronary repair, with immediate CABG conversion for failure signs. Fragile orifice tissues or high compression risks necessitate primary CABG with 6-0 sutures. All type C lesions undergo CABG.[6,7]

Data Collection and Clinical Follow-up

Demographics, onset time, pain location, medical history (hypertension, dyslipidemia, diabetes mellitus, coronary artery disease, stroke, smoking, aortic disease and aortic valve replacement), clinical parameters, laboratory results, imaging findings, emergency intravenous medication, and main treatment strategies were prospectively collected with standardized questionnaires by independent research personnel.

After discharge, patients underwent follow-up evaluations at 1, 6, and 12 months. The primary endpoint was death occurring within 30 days of symptom onset. Additionally, the secondary endpoint was death within one year of symptom onset. All deaths were adjudicated by blinded medical personnel, based solely on death certificates, hospital record abstracts, and pertinent reports such as autopsies, biopsies, and diagnostic outputs.

Statistical Analysis

Continuous variables were presented as mean ± SD or medians (interquartile range) and were compared using the independent Student's *t*-test or the Wilcoxon rank-sum test, depending on their distribution. Categorical variables were expressed as counts (percentages) and were compared using the Pearson's chi-squared test or the Fisher's exact probability test, whichever was appropriate. Notably, most variables have no missing values with a few exceptions. Missing information on covariates, *i.e.*, heart rate (0.2%), body mass index (15.3%), ascending aorta diameter (1.0%), pO_2 (7.2%), lactic acid (7.2%), N-terminal pro-B-type natriuretic peptide (10.7%), and serum albumin (4.3%), were imputed with a sequential regression multiple imputation method. To assess the impact of coronary artery involvement on both short-term and long-term mortality, we conducted both single variable and multivariable logistic regression analyses, calculating odds ratio (OR) with 95% CI. In the multivariable analysis, we incorporated clinically significant factors and statistically significant variables identified in the single variable analysis. Two logistic regression models were fitted. Model 1 adjusted for age, gender, hypertension, diabetes mellitus, dyslipidemia, coronary artery disease, stroke, smoking status, onset time, systolic blood pressure, heart rate, body mass index, lactic acid levels, white blood cell count, aspartate aminotransferase levels, and involvement of the superior arch artery, Model 2 further adjusted for CABG. All statistical analyses were performed using SPSS 23.0 (SPSS Inc., Chicago, Illinois, USA), and a two-sided *P*-value < 0.05 was considered statistically significant.

RESULTS

Baseline Characteristics of Study Population

Among the 600 ATAAD patients who underwent surgery, 28.3% of patients had coronary artery involvement, with Neri type A, Neri type B, and Neri type C accounting for 13.3%, 11.2%, and 3.8%, respectively (Figure 2A). Specifically, for the right coronary artery (RCA), 25.3% of the patients had involvement, with type A, type B, and type C comprising 13.2%, 8.3%, and 3.8%, respectively, based on the Neri classification (Figure 2B). For the left coronary artery, 8.0% of the patients had involvement, with Neri type A, Neri type B, and Neri type C accounting for 3.8%, 4.2%, and 0, respectively (Figure 2C).

As shown in supplemental material, Table 1S, the excluded patients in this study had worse clinical conditions. They exhibited lower systolic blood pressure, faster heart rates, and a higher proportion of lower limb pain, coma and shock. Moreover, their levels of lactic acid, peak cTnI, N-terminal pro-B-type natriuretic peptide, white blood cell count, alanine aminotransferase, aspartate aminotransferase, admission glucose, creatinine, and D-dimer were higher than that in patients included in this study. This might be the reason why these patients chose to forgo coronary CTA or surgical procedures.

Baseline characteristics of the participants are listed in Table 1. When compared to individuals without coronary artery involvement, those with coronary artery involvem-

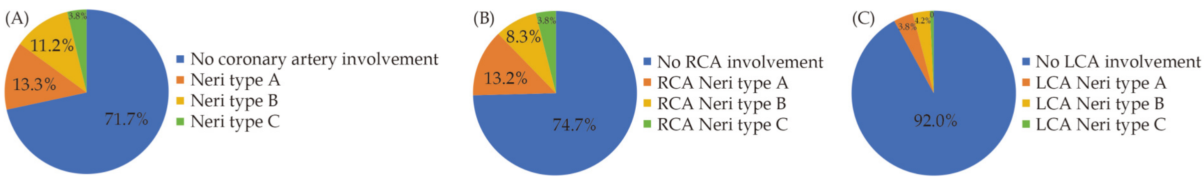

Figure 2 Distributions of coronary artery involvement types. (A) Both RCA and LCA included; (B) RCA only; and (C) LCA only. LCA: left coronary artery; RCA: right coronary artery.

Table 1 Baseline characteristics of the participants.

Variables	No coronary artery involvement (*n* = 430)	With coronary artery involvement (*n* = 170)	*P*-value
Age, yrs	56 (46-63)	55 (46-61)	0.295
Male	311 (72.3%)	125 (73.5%)	0.766
Hypertension	363 (84.4%)	146 (85.9%)	0.652
Diabetes mellitus	20 (4.7%)	7 (4.1%)	0.776
Dyslipidemia	108 (25.1%)	39 (22.9%)	0.577
Previous coronary artery disease history	56 (13.0%)	19 (11.2%)	0.538
Stroke	29 (6.7%)	13 (7.6%)	0.696
Aortic valve replacement	8 (1.9%)	1 (0.6%)	0.457
Aortic disease	9 (2.1%)	2 (1.2%)	0.736
Smoking	173 (40.2%)	66 (38.8%)	0.751
Onset time, h	16 (8-48)	10 (6-19)	< 0.001
Systolic blood pressure, mmHg	146 (129-165)	146 (124-167)	0.456
Diastolic blood pressure, mmHg	78 (65-90)	75 (60-89)	0.137
Heart rate, beats/min	77 (67-88)	77 (67-88)	0.838
Body mass index, kg/m^2	26 (24-29)	25 (24-28)	0.143
Chest pain	351 (81.6%)	139 (81.8%)	0.969

Continued

Variables	No coronary artery involvement (n = 430)	With coronary artery involvement (n = 170)	P-value
Back pain	174 (40.5%)	72 (42.4%)	0.672
Lumbar and abdominal pain	88 (20.5%)	34 (20.0%)	0.899
Lower limb pain	19 (4.4%)	8 (4.7%)	0.878
Syncope	24 (5.6%)	9 (5.3%)	0.889
Coma	0	0	Not available
Shock	0	0	Not available
Branch vessels involved on CTA			
Superior arch artery	260 (60.5%)	123 (72.4%)	0.006
Celiac artery	104 (24.2%)	51 (30.0%)	0.143
Superior mesenteric artery	101 (23.5%)	47 (27.6%)	0.287
Renal artery	102 (23.7%)	49 (28.8%)	0.194
Iliac artery	170 (39.5%)	72 (42.4%)	0.526
Left ventricular, mm	50 (46-55)	50 (46-54)	0.268
Left ventricular ejection fraction, %	60 (59-62)	60 (60-63)	0.515
Ascending aorta diameter, mm	46 (42-51)	46 (42-50)	0.289
Moderate/large pericardial effusion	16 (3.7%)	4 (2.4%)	0.400
Moderate/large aortic regurgitation	107 (24.9%)	46 (27.1%)	0.582
pO_2, mmHg	76 (65-92)	79 (66-96)	0.173
Lactic acid, mmol/L	1.4 (1.0-2.0)	1.7 (1.3-2.3)	< 0.001
Peak cTnI, ng/mL	0 (0-0.02)	0 (0-0.15)	< 0.001
N-terminal pro-B-type natriuretic peptide, pg/mL	249 (96-784)	194 (74-681)	0.157
White blood cell, × 10^9/L	11.6 (9.6-13.8)	12.8 (10.3-15.0)	0.001
Neutrophil, × 10^9/L	9.8 (7.6-12.0)	10.9 (8.7-13.3)	< 0.001
Platelet, × 10^9/L	175 (142-213)	171 (138-203)	0.301
Serum albumin, g/L	41 (37-43)	41 (38-43)	0.966
Alanine aminotransferase, u/L	20 (14-33)	20 (14-29)	0.641
Aspartate aminotransferase, u/L	25 (19-36)	28 (22-43)	0.003
Admission glucose, mmol/L	7.2 (6.4-8.2)	7.4 (6.7-8.6)	0.071
Creatinine, µmol/L	88 (73-107)	91 (75-119)	0.066
Uric acid, µmol/L	374 (290-455)	383 (315-446)	0.170
D-dimer, µg/mL	6.3 (2.7-17.0)	16.4 (5.1-20.0)	< 0.001
Fibrinogen degradation products, µg/mL	17.6 (8.1-37.4)	35.4 (14.1-77.1)	< 0.001
Emergency intravenous medication			
Beta-blockers	286 (66.5%)	115 (67.6%)	0.790
Alpha-blockers	229 (53.3%)	78 (45.9%)	0.103
Sodium nitroprusside	83 (19.3%)	31 (18.2%)	0.764
Calcium antagonist	93 (21.6%)	35 (20.6%)	0.779
Received CABG	50 (11.6%)	51 (30.0%)	< 0.001

Data are presented as median (interquartile range) or n (%). CABG: coronary artery bypass grafting; CTA: computed tomography angiography; cTnI: cardiac troponin I.

ent exhibited a significantly shorter onset time to admission ($P < 0.001$). Additionally, they were more prone to superior arch artery involvement ($P = 0.006$) and demonstrated elevated levels of lactic acid ($P < 0.001$), peak cTnI ($P < 0.001$), white blood cell count ($P = 0.001$), neutrophils ($P < 0.001$), aspartate aminotransferase ($P = 0.003$), D-dimer ($P < 0.001$), and fibrinogen degradation products ($P < 0.001$). Furthermore, they were more likely to undergo CABG during surgical procedures ($P < 0.001$).

Association between Coronary Artery Involvement and Mortality

In total, 19 patients (3.2%) passed away within 30 days of symptom onset, while 32 patients (5.3%) succumbed to their conditions within one year of symptom manifestation. Compared to individuals without coronary artery involvement, those with coronary artery involvement exhibited a numerically higher 30-day mortality rate, albeit not statistically significant (5.3% *vs.* 2.3%) (OR = 2.35, 95% CI: 0.94–5.88, $P = 0.07$) (Figure 3). After adjusting for potential confounders, coronary artery involvement was found to be significantly associated with an increased risk of 30-day mortality (adjusted OR = 3.71, 95% CI: 1.05-13.13, $P = 0.04$) (Table 2). Interestingly, after additional adjustment for CABG, the impact of coronary artery involvement on 30-day mortality no longer remained statistically significant (adjusted OR = 3.13, 95% CI: 0.85-11.58, $P = 0.09$).

Regarding 1-year mortality, patients with coronary artery involvement experienced a significantly higher rate compared to those without (8.2% *vs.* 4.2%) (OR = 2.05, 95% CI: 1.00-4.23, $P = 0.05$) (Figure 3). However, upon further adjustment for potential confounding variables, the significant associat-

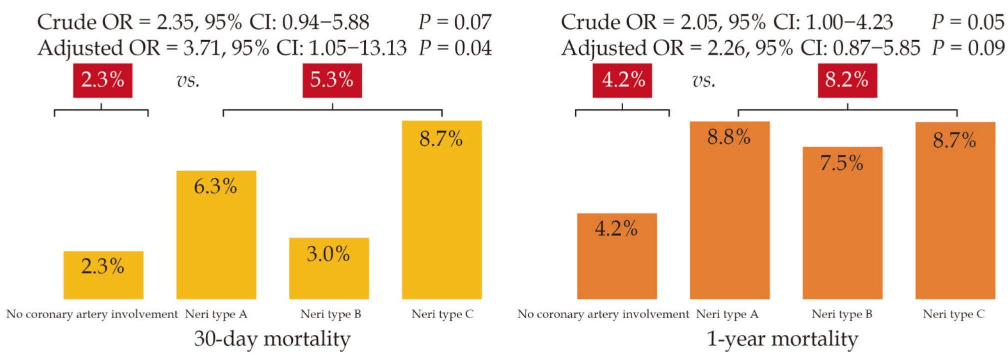

Figure 3 The 30-day and 1-year mortality in patients with different coronary artery involvement types.

Table 2 Multivariable analysis for 30-day mortality.

Variables	OR (95% CI)	*P*-value
With versus without coronary artery involvement	3.71 (1.05-13.13)	0.04
Age	0.99 (0.93-1.06)	0.83
Female	0.25 (0.05-1.18)	0.08
Hypertension	1.55 (0.24-9.85)	0.64
Diabetes mellitus	0.63 (0.05-8.68)	0.73
Dyslipidemia	3.32 (0.72-15.27)	0.12
Previous coronary artery disease history	1.00 (0.18-5.59)	1.00
Stroke	0.90 (0.09-8.89)	0.93
Smoking	0.86 (0.16-4.81)	0.87
Onset time	1.00 (0.99-1.02)	0.60
Systolic blood pressure	0.97 (0.95-1.00)	0.02
Heart rate	0.98 (0.94-1.02)	0.33
Body mass index	0.94 (0.79-1.13)	0.52
Lactic acid	1.87 (0.95-3.69)	0.07
White blood cell	0.85 (0.66-1.09)	0.19
Aspartate aminotransferase	1.01 (1.00-1.01)	0.04
Superior arch artery involvement	2.15 (0.45-10.30)	0.34

Table 3 Multivariable analysis for 1-year mortality.

Variables	OR (95% CI)	*P*-value
With versus without coronary artery involvement	2.26 (0.87-5.85)	0.09
Age	1.03 (0.98-1.08)	0.26
Female	0.72 (0.24-2.13)	0.55
Hypertension	0.68 (0.20-2.28)	0.53
Diabetes mellitus	0.55 (0.06-5.35)	0.60
Dyslipidemia	1.80 (0.60-5.42)	0.30
Previous coronary artery disease history	0.99 (0.26-3.74)	0.99
Stroke	0.59 (0.07-4.96)	0.62
Smoking	0.39 (0.11-1.36)	0.14
Onset time	1.00 (0.99-1.01)	0.99
Systolic blood pressure	0.98 (0.96-1.00)	0.04
Heart rate	0.99 (0.96-1.02)	0.53
Body mass index	1.05 (0.94-1.17)	0.41
Lactic acid	1.39 (0.83-2.33)	0.21
White blood cell	0.94 (0.80-1.12)	0.51
Aspartate aminotransferase	1.00 (1.00-1.01)	0.13
Superior arch artery involvement	1.10 (0.40-3.07)	0.53

ion between coronary artery involvement and 1-year mortality was no longer observed (adjusted OR = 2.26, 95% CI: 0.87-5.85, P = 0.09) (Table 3). After additional adjustment for CABG, coronary artery involvement still had no statistically significant impact on 1-year mortality (adjusted OR = 2.05, 95% CI: 0.77-5.47, P = 0.15).

Association between Neri Classification and Mortality

Among patients with coronary artery involvement, the 30-day mortality rates for type A, type B, and type C patients were 6.3%, 3.0%, and 8.7%, respectively (P > 0.05) (Figure 2A). Similarly, the corresponding 1-year mortality rates were 8.8%, 7.5%, and 8.7%, respectively (P > 0.05) (Figure 2B). However, neither single variable nor multivariable logistic regression analyses revealed any statistically significant association between the Neri classification and short-term or long-term mortality, though statistical power was limited for type C (supplemental material, Table 2S).

DISCUSSION

The current study reveals significant findings that provide invaluable insights into the characteristics and outcomes for patients with coronary artery involvement in the context of ATAAD who undergo emergency surgical interventions. The principal findings are as follows: (1) RCA involvement is more frequent among patients with coronary artery involvement, and a larger proportion of these patients undergo CABG during surgical procedures compared to those without coronary artery involvement; (2) in patients with ATAAD who undergo surgery, coronary artery involvement is associated with an elevated 30-day mortality; (3) proactive CABG may potentially offset the impact of coronary artery involvement on 30-day mortality; and (4) no significant difference in mortality is observed among patients with different Neri classifications.

The proportion of patients with coronary artery involvement identified in this study is higher than that reported in previously studies. This may be attributed to the fact that all patients enrolled in our study underwent both coronary CTA and aortic CTA. Due to technological differences, coronary CTA can more accurately detect coronary artery involvement with a lower misdiagnosis rate. Consistent with our findings, previous studies also documented a higher prevalence of RCA involvement among patients with coronary artery involvement in the context of ATAAD.[6,8–10] The explanation could be attributed to a tendency for intimal tears to affect the larger, right-sided curve of the aorta, potentially linked to hemodynamics. Alternatively, it might stem from a difference in fatality rates between RCA and left coronary involvement, as fewer patients with left coronary artery occlusion manage to survive until reaching the hospital. Clinicians should be vigilant in assessing the RCA in patients with ATAAD during surgical interventions. This is crucial as RCA involvement can lead to significant ischemia and potential myocardial infarction, which can further complicate the clinical course of these patients.

Although ATAAD is inherently a highly lethal condition, the presence of coronary artery involvement in patients undergoing surgery for this disorder further elevates their 30-day mortality risk.[11] This heightened mortality may stem from multiple factors, including myocardial ischemia, the intricate nature of the surgical procedures, and the potential for perioperative complications associated with coronary artery disease.[12,13] Specifically, myocardial damage resulting from coronary dissection stands out as a major predictor of in-hospital mortality.[2,14] Furthermore, insufficient coronary perfusion can complicate cardiopulmonary bypass weaning, prolonging cardiopulmonary bypass duration and intensifying complement-mediated inflammatory responses. Myocardial ischemia not only triggers inflammatory cascades but also raises the incidence of acute respiratory distress syndrome, myocardial stunning, and other adverse events, ultimately contributing to higher mortality rates.[15,16] Our findings add to the existing evidence that coronary artery involvement is a significant risk factor for adverse outcomes in patients with ATAAD and underscores the need for early identification and management of coronary artery disease in this patient population.

Interestingly, our study found no statistically significant difference in mortality rates among patients with varying Neri classifications, suggesting that the Neri classification may not serve as an effective predictor of mortality for patients with ATAAD who also have coronary artery involvement. In fact, this precisely indicates that surgical strategies formulated based on Neri classification can effectively reduce mortality rates in patients with severe coronary artery involvement. Regarding surgical strategy, Neri, *et al.*[1] preferred repair of torn coronary arteries over CABG. Here are the notable benefits: (1) anatomic reconstruction of the coronary ostia eliminates the need for extensive revascularization on vessels with uncertain diameters, significance, and conditions; (2) this approach circumvents the ligation of the coronary ostium, which could lead to full myocardial perfusion dependence on the graft across vast areas; and (3) by maintaining antegrade flow within the coronary tree, it prevents the complications associated with competitive flow and potential coronary re-dissection. Meanwhile, Kawahito, *et al.*[17] and Eren, *et al.*[18] favored CABG over local repair due to its simplicity, minimal invasiveness, and applicable in treating various aortic dissection types. On the other hand, local coronary artery repair is limited to certain patients with Neri type A dissection. Actually, direct repair of the coronary ostia may increase the risk of coronary stenosis and occlusion than CABG.

LIMITATIONS

To be honest, this study has a number of limitations. Firstly, it is a secondary analysis of a prospective cohort study. This implies that although a rigorous multivariable-adjusted analysis was carried out, it remained difficult to account for all confounding factors. Secondly, patients who did not undergo coronary CTA or did not receive surgery had worse clinical conditions and higher mortality rates. The findings of this study cannot represent the impact of coronary artery involvement on mortality within this population. Moreover, the conclusions drawn from this study should not be extended to non-Asian populations without further validation. Thirdly, despite the absence of a statistically significant difference in mortality rates among patients with different Neri classifications, we cannot rule out the possibility that the limited number of patients with coronary artery involvement may have resulted in inadequate statistical power for the tests. In the future, larger-scale studies are needed to explore the impact of different Neri classifications on mortality. Fourthly, variations in surgical techniques, anesthesia protocols, cerebral protection measures, and perioperative care, which were not recorded in this study, could potentially influence the results. Last but not least, the impact of coronary artery involvement on the prognosis of patients with ATAAD requires longer-term follow-up observations.

CONCLUSIONS

In patients with ATAAD who undergo surgical procedures, the presence of coronary artery involvement is significantly associated with an increased risk of 30-day mortality. This finding highlights the importance of evaluating coronary artery involvement in ATAAD patients prior to surgical intervention and considering its potential impact on surgical outcomes. Proactive CABG may potentially mitigate the adverse impact of coronary artery involvement on 30-day mortality.

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