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Outcome After Surgery for Acute Type A Aortic Dissection With or Without Primary Tear Resection

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ABSTRACT

BACKGROUND The outcome in patients after surgery for acute type A aortic dissection without replacement of the part of the aorta containing the primary tear is undefined.

METHODS Data of 1122 patients who underwent surgery for acute type A aortic dissection in 8 Nordic centers from January 2005 to December 2014 were retrospectively analyzed. The patients with primary tear location unfound, unknown, not confirmed, or not recorded (n = 243, 21.7%) were excluded from the analysis. The patients were divided into 2 groups according to whether the aortic reconstruction encompassed the portion of the primary tear (tear resected [TR] group, n = 730) or not (tear not resected [TNR] group, n = 149). The restricted mean survival time ratios adjusted for patient characteristics and surgical details between the groups were calculated for all-cause mortality and aortic reoperation–free survival. The median follow-up time was 2.57 (interquartile range, 0.53-5.30) years.

RESULTS For the majority of the patients in the TR group, the primary tear was located in the ascending aorta (83.6%). The reconstruction encompassed both the aortic root and the aortic arch in 7.4% in the TR group as compared with 0.7% in the TNR patients ($P < .001$). There were no significant differences in all-cause mortality (adjusted restricted mean survival time ratio, 1.01; 95% confidence interval, 0.92-1.12; $P = .799$) or reoperation-free survival (adjusted restricted mean survival time ratio, 0.98; 95% confidence interval, 0.95-1.02; $P = .436$) between the TR and TNR groups.

CONCLUSIONS Primary tear resection alone does not determine the midterm outcome after surgery for acute type A aortic dissection.

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Acute type A aortic dissection (ATAAD) requires emergent surgery.[1,2] Prehospital mortality is estimated to be 18% to 49%[3-6] and increases up to 2% per hour after onset of symptoms in patients that are not referred for surgery.[7-9] The acutely torn intima and pressurized false lumen may clinically emerge as aortic rupture, tamponade, organ malperfusion, cardiac failure, or a combination thereof. Traditionally, the risk of subsequent aortic events is considered imminent without the excision of the primary tear.[10] Some advocate an extended aortic reconstruction to

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completely excise the primary tear,[11] while others propose that a limited ascending and hemiarch replacement suffices.[12] However, even after resection of primary tear in ATAAD, up to 78% of patients have residual perfused false lumen at follow-up, possibly increasing the risk for late aortic events including reinterventions.[13]

The identification of the primary tear is believed to play a key role in determining the extent of reconstruction in the ATAAD surgery. However, primary tear identification is not always possible by preoperative diagnostic procedures. During surgery, if the integrity of the ascending aorta together with the aortic root and arch appear preserved, or if the primary tear is situated distally from the aortic arch, the primary tear location often remains undefined. When the primary tear location is not recorded, the ascending aorta is usually replaced to secure blood flow in the aortic true lumen and to avoid retrograde dissection to the coronary arteries. In addition, tear repair without complete resection may be technically feasible.[14]

The aim of this study was to evaluate the midterm and reoperation-free survival in ATAAD patients with and without recorded surgical resection and reconstruction of the aortic portion involving the primary tear using the Nordic Consortium for Acute Type A Aortic Dissection (NORCAAD) registry.

PATIENTS AND METHODS

The NORCAAD registry is a Nordic multicenter project involving 8 tertiary care cardiac surgery units in Sweden, Denmark, Finland, and Iceland. Detailed description of the NORCAAD register has been published previously.[15]

SURGICAL TECHNIQUE. The decision for surgical treatment and approach for ATAAD was under the discretion of the responsible surgeon. As previously outlined, routine operation involved median sternotomy and cardiopulmonary bypass with cardiac arrest and repeated cardioplegia.[15] Cannulation sites varied according to center, surgeon preferences, and patient characteristics. When performing an open distal anastomosis, deep (<20 °C) or moderate (24 °C) hypothermia during circulatory arrest with or without antegrade or retrograde cerebral perfusion was applied. The location of the primary tear of the ascending aorta, the arch, and the descending aorta was determined by preoperative computed tomography or transesophageal echocardiography, and confirmed by careful inspection during surgery, whenever possible. The aortic root was replaced if the tear involved the coronary ostia or was situated in the sinus of Valsalva, or if severe aortic root dilatation was present. If the aortic valve required surgical restoration, commissural resuspension, subcommissural plication, or valvuloplasty were considered. When necessary, prosthetic aortic valve replacement or composite graft implantation was performed. Likewise, the extent of distal aortic reconstruction depended on the location of primary tear and extent of aortic dilatation. A hemiarch or a total arch reconstruction was performed, if the primary tear encompassed the aortic arch. Supra-aortic branches were reimplanted if needed. In some cases, and if considered technically feasible, the primary tear was sutured without excision and replacement. The tear of the descending aorta was left untouched, when it was considered unreachable during sternotomy. The tubular part of the ascending aorta was replaced, even if no tear was visualized at surgery. Additional procedures, such as coronary artery bypass, were performed when required.

VARIABLES AND OUTCOMES. The primary tear location included the aortic root, ascending aorta, aortic arch, and descending aorta. The 243 (21.7%) patients with unfound, unknown, not confirmed, or not recorded primary tear locations at surgery were excluded from the analysis. The final cohort was divided into 2 groups according to whether the aortic reconstruction encompassed the primary tear (tear resected [TR] group, n = 730) or not (tear not resected [TNR] group, n = 149). The TR group consisted of the patients with recorded resection of the part of the aorta that involved the primary tear and replacement of the resected part using a prosthesis. Patients with subtotal resection of the primary tear and repair, instead of complete resection of the primary tear, were included in the TNR group.

The main outcome variables were all-cause mortality, postoperative stroke, and aortic reoperation-free survival. The definition of all-cause mortality encompassed death from any cause. The definition of postoperative stroke included new neurological symptoms associated with radiologically confirmed cerebral infarction or intracerebral hemorrhage. Aortic reoperation was defined as open surgery related to primary aortic pathology after the index inpatient period.

STATISTICAL METHODS. The data are provided using mean ± SD or median (interquartile range [IQR]), when appropriate. Patient characteristics, clinical findings, and surgical details were compared between the groups using independent samples *t* test for continuous variables and chi-square test for categorical variables. Kaplan-Meier estimate curves illustrated all-cause mortality and aortic reoperation-free survival between the groups. To ensure stability of the Kaplan-Meier estimates, the follow-up time was determined according to the last year with number of patients at risk including over 10% of the total patient count in the groups resulting in follow-up time of 6 years. A *P*-value less than .05 was considered statistically significant. Differences in survival between groups

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TABLE 1 Patient Characteristics

Variable	TR Group (n = 730)	TNR Group (n = 149)	*P* Value
Male	508 (69.6)	100 (67.1)	.618
Age, y	61.1 ± 12.5	60.1 ± 11.2	.306
BMI, kg/m^2	26.9 ± 4.9	26.2 ± 4.3	.068
Bicuspid aortic valve	44 (6.0)	9 (6.0)	1.000
Previously known thoracic aorta aneurysm	68 (9.3)	11 (7.4)	.549
Family history for aortic dissection	47 (6.4)	5 (3.4)	.149
Family history for thoracic aortic aneurysm	27 (3.7)	6 (4.0)	1.000
Previous cardiac surgery	16 (2.2)	0 (0)	.344
Previous aortic surgery	13 (1.8)	2 (1.3)	.309
Chronic diseases			
Medically treated hypertension	380 (52.1)	65 (43.6)	.072
Diabetes mellitus	19 (2.6)	4 (2.7)	.983
Peripheral vascular disease	24 (3.3)	4 (2.7)	.847
Hypercholesterolemia	82 (11.2)	18 (12.1)	.859
Chronic kidney disease	14 (1.9)	3 (2.0)	1.000
Chronic obstructive pulmonary disease	42 (5.8)	4 (2.7)	.182
Coronary artery disease	24 (3.3)	8 (5.4)	.375
History of stroke	29 (4.0)	7 (4.7)	.857
History of TIA	11 (1.5)	4 (2.7)	.506
Connective tissue disorder			.791
Marfan syndrome	26 (3.6)	4 (2.7)	
Ehlers-Danlos syndrome	3 (0.4)	1 (0.7)	
Antithrombotic medication in use			
Aspirin	185 (25.3)	37 (24.8)	.900
Other antiplatelet agents	76 (10.4)	15 (10.1)	.972
Warfarin	51 (7.0)	8 (5.4)	.560
DeBakey			.025
Type I	522 (71.5)	121 (81.2)	
Type II	204 (27.9)	28 (18.8)	
Preoperative hypotensive shock	167 (22.9)	27 (18.1)	.243
Preoperative cardiac arrest	36 (4.9)	5 (3.4)	.537
Pericardial effusion	306 (41.9)	58 (38.9)	.689
Malperfusion			
Any	189 (25.9)	53 (35.6)	.021
Cardiac	57 (7.8)	11 (7.4)	.768
Gastrointestinal	26 (3.6)	3 (2.0)	.734
Renal	36 (4.9)	9 (6.0)	.357
Iliofemoral vessels	106 (14.5)	26 (17.4)	.067
Innominate arteries	51 (7.0)	15 (10.1)	.060
Cerebral	52 (7.1)	14 (9.4)	.130
Spinal	16 (2.2)	8 (5.4)	.015
Penn class			.104
A (no ischemia)	454 (62.2)	84 (56.4)	
B (localized ischemia)	151 (20.7)	43 (28.9)	
C (generalized ischemia)	78 (10.7)	16 (10.7)	
B and C (localized and generalized ischemia)	45 (6.2)	5 (3.4)	

Values are n (%) or mean ± SD. BMI, body mass index; TIA, transient ischemic attack; TNR, tear not resected; TR, tear resected.

were examined using the log-rank test and restricted mean survival time (RMST) ratio along with the 95% confidence intervals (CIs) for both investigated survival types.[16,17] The RMST is the ratio of population averages of the amount of event-free survival time during follow-up. Tau was set to 6 years. RMST was also adjusted for age, sex, occurrence of preoperative organ malperfusion, presence of aortic root, and hemiarch or total arch reconstruction, and cardiopulmonary bypass time and aortic cross-clamp time between the groups were calculated. Risk of postoperative stroke according to excision of primary tear was examined using logistic regression analysis adjusted for the aforementioned covariates. Last, subgroup analyses including only

TABLE 2 Distribution of Primary Tear Locations

Primary Tear Location	TR Group	TNR Group
Aortic root	51 (7.0)	82 (55.0)
Ascending aorta	610 (83.6)	9 (6.1)
Aortic arch	69 (9.5)	48 (32.2)
Descending aorta	0 (0.0)	10 (6.7)

Values are n (%). TNR, tear not resected; TR, tear resected.

TABLE 3 Operation Characteristics

Variable	TR Group	TNR Group	*P* Value
Extent of aortic reconstruction			<.001
Root to ascending	151 (20.7)	14 (9.4)	
Root to hemiarch	42 (5.8)	1 (0.7)	
Root to total arch	19 (2.6)	0 (0.0)	
Ascending to ascending	337 (46.2)	110 (73.8)	
Ascending to hemiarch	143 (19.6)	13 (8.7)	
Ascending to total arch	29 (4.0)	3 (2.0)	
Other	3 (0.4)	2 (1.3)	
Proximal repair			<.001
Ascending graft only	221 (30.3)	59 (39.6)	
Aortic valve resuspension and ascending graft	155 (21.2)	16 (10.8)	
Aortic valve replacement and ascending graft	272 (37.3)	68 (45.6)	
Biological composite graft	19 (2.6)	2 (1.3)	
Mechanical composite graft	38 (5.2)	3 (2.0)	
Distal repair			<.001
Ascending aorta	488 (66.8)	125 (83.9)	
Hemiarch	186 (25.5)	14 (9.4)	
Total arch	49 (6.7)	3 (2.0)	
Other	2 (0.3)	1 (0.7)	
Undefined	2 (0.3)	2 (1.3)	
Elephant trunk or frozen elephant trunk	7 (1.0)	0 (0)	
Open distal anastomosis	624 (85.5)	124 (83.2)	.537
Hypothermic arrest technique			.001
Hypothermic arrest only	316 (43.3)	47 (31.5)	
Antegrade cerebral perfusion	188 (25.8)	34 (22.8)	
Retrograde cerebral perfusion	146 (20.0)	42 (28.2)	
Antegrade and retrograde cerebral perfusion	2 (0.3)	4 (2.7)	
Other	6 (0.8)	0 (0)	
Unknown	72 (9.9)	22 (14.8)	
Operation time, min	367 ± 139	354 ± 102	.268
Cardiopulmonary bypass time, min	207 ± 79	193 ± 56	.021
Aortic cross-clamp time, min	107 ± 58	91 ± 43	.004
Hypothermic arrest time, min	31 ± 18	31 ± 21	.708
Coronary artery bypass grafting	39 (5.4)	8 (5.4)	1
Intraoperative death	49 (6.7)	9 (6.0)	.763

Values are n (%) or mean ± SD. TNR, tear not resected; TR, tear resected.

patients with primary tear in aortic root and aortic arch were conducted, and unadjusted RMST ratios were calculated for TR and TNR patients. Statistical analyses were performed using R 4.0.3 statistical software (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

PATIENTS. The NORCAAD registry included patients with onset of symptoms leading to surgery for ATAAD in less than 2 weeks. Eighty-three percent of the patients had symptoms in less than 48 hours before surgery (Supplemental Figure 1). A total of 879 patients with complete follow-up data were included. The median follow-up time was 2.75 (IQR, 0.70-5.32) years. The mean age was 60.9 ± 12.3 years. In 730 (83.0%) patients, the section of the aorta including the primary tear was excised and replaced with a prosthetic graft, whereas in the rest (n = 149, 17.0%), the primary tear was not excised. Comparison of characteristics and clinical findings between the groups showed minor differences with higher proportion of malperfusion in the TNR group as compared with the TR group (Table 1). Comparison of patient and outcome characteristics of TR, TNR, and excluded patients revealed only relatively modest differences (Supplemental Table 1).

TEAR LOCATION AND AORTIC RESECTION. The distribution pattern of primary tear locations differed between the groups. In the majority of the TR group patients, the tear was located in the ascending aorta (83.6%) (Table 2), while in the TNR group, the tear was located in the aortic root (55.0%) or in the aortic arch (32.2%). The reconstruction was more extensive in the TR group, encompassing both the aortic root and the aortic arch in 7.4% of the cases as compared with 0.7% in the TNR patients ($P < .001$) (Table 3). In the majority of the TNR patients (73.8%), aortic reconstruction included an ascending graft only, and the primary tears in the aortic root or arch were not excised or replaced by a prosthetic graft. Cardiopulmonary bypass and aortic cross-clamp times were longer in the TR group, whereas overall operation and hypothermic arrest times were comparable between the groups (Table 3). The TR group had a lower rate of retrograde cerebral perfusion and a lower combination of antegrade and retrograde cerebral perfusion, but antegrade cerebral perfusion per se was more frequent in the TR group than in the TNR group (Table 3).

ALL-CAUSE MORTALITY AND AORTIC REOPERATION–FREE SURVIVAL. There was no significant difference in 30-day mortality between the TR and TNR group (15% vs 12%). The unadjusted all-cause mortality and the aortic reoperation-free survival did not significantly differ between the groups (log-rank test, $P = .424$ and $P = .792$, respectively) (Figure 1). There were no significant differences in all-cause mortality (adjusted RMST ratio

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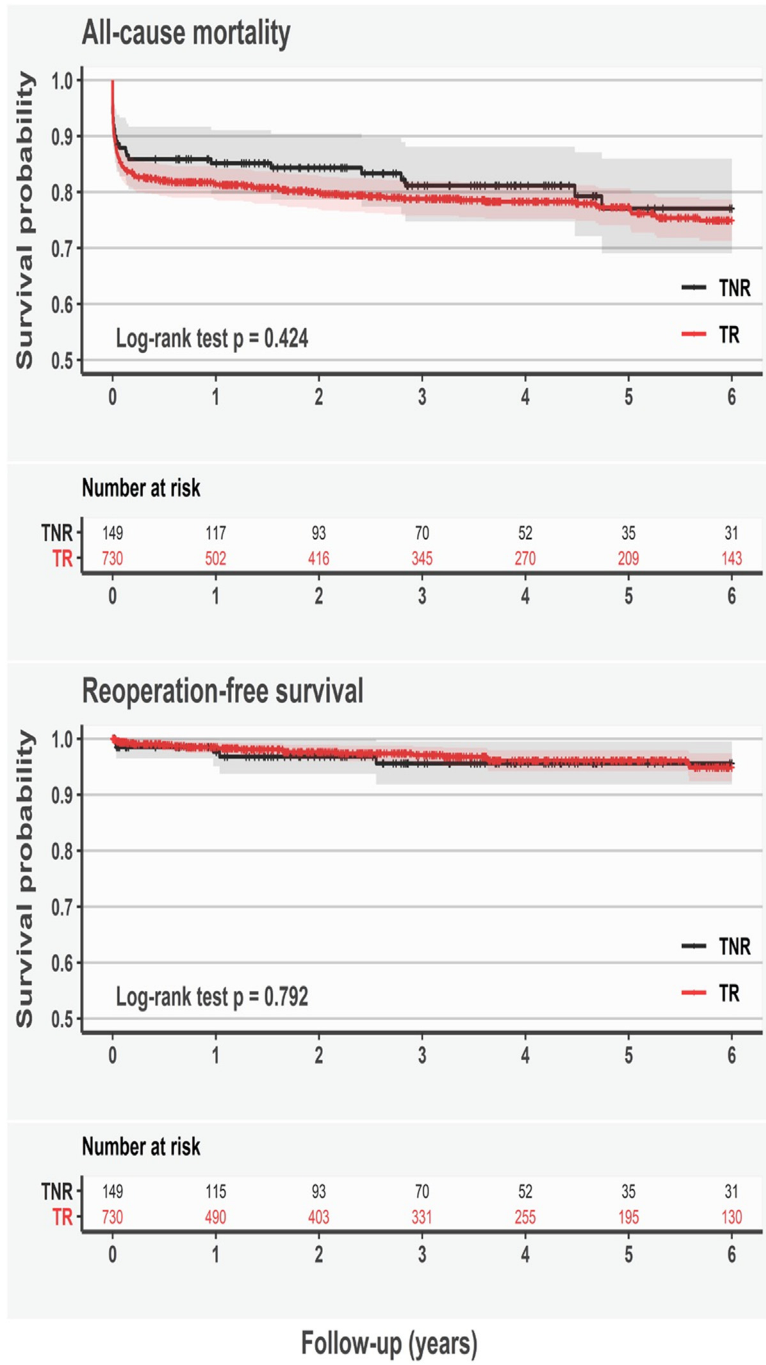

FIGURE 1 Probability of survival by time for patients after surgery for acute type A aortic dissection for patients with the primary tear resected (TR) (red line) and tear not resected (TNR) (black line). The shaded areas show 95% confidence intervals for survival estimates (lines) based on Kaplan-Meier analysis. The ticks in the survival curves present the censored patients.

1.01; 95% CI, 0.92-1.12; *P* = .799) or reoperation-free survival (adjusted RMST ratio, 0.98; 95% CI, 0.95-1.02; *P* = .436) between the TR group and TNR groups (Table 4). Of all patients, 37 (4.2%) had a reoperation during the follow-up. Among the TR patients, the late reoperation rate was 4.4%, with a median time from the primary operation to the reoperation of 19.8 (IQR, 2.2-39.5) months. In the TNR patients, the rate was

TABLE 4 RMST Estimates for the TR and TNR Groups

Survival	RMST Estimate (95% CI)		Unadjusted RMST Ratio (95% CI)	*P* Value	Adjusted RMST Ratio (95% CI)	*P* Value
	TR Group	TNR Group				
All-cause mortality	4.75 (4.57-4.92)	4.92 (4.56-5.28)	0.96 (0.89-1.05)	.384	1.01 (0.92-1.12)	.799
Reoperation-free survival	5.72 (5.63-5.82)	5.78 (5.60-5.97)	0.99 (0.95-1.03)	.551	0.98 (0.95-1.02)	.436

CI, confidence interval; RMST, restricted mean survival time; TNR, tear not resected; TR, tear resected.

3.4% and the time lapse was 11.7 months at median (IQR, 0.4-12.4 months). The rates of postoperative stroke did not differ significantly (adjusted odds ratio, 0.92; 95% CI, 0.55-1.54; $P = .750$) between the TR and the TNR groups. Omitting the patients with DeBakey type I (n = 643, 73.2%) revealed no statistically significant differences between TR and TNR patients in survival (adjusted RMST ratio, 1.06; 95% CI, 0.95-1.19; $P = .290$) or reoperations (adjusted RMST ratio, 0.99; 95% CI, 0.94-1.03; $P = .552$).

AORTIC ROOT AND ARCH SUBGROUP ANALYSIS. In the subgroup analysis including only patients with primary tear in the root or aortic arch, there was no significant difference in unadjusted all-cause mortality (log-rank test, $P = .277$ and $P = .676$, respectively) as well as in aortic reoperation-free survival (log-rank test, $P = .496$ and $P = .763$, respectively) between the TR and the TNR groups (Figures 2 and 3). Similarly, there were no significant differences between the TR and TNR patients in all-cause mortality (RMST ratio, 0.92; 95% CI, 0.77-1.08; $P = .299$; and RMST ratio, 1.04; 95% CI, 0.86-1.25; $P = .691$) and aortic reoperation-free survival (RMST ratio, 1.00; 95% CI, 0.92-1.09; $P = .994$; and RMST ratio, 0.98; 95% CI, 0.92-1.05; $P = .595$) in the aortic root tear and aortic arch tear subgroups, respectively (Table 5).

COMMENT

According to this study, resection of primary tear alone is not associated with midterm mortality or aortic reoperation-free survival after surgery for ATAAD. The surgical strategy for ATAAD includes risk stratification of patient characteristics, clinical presentation of ATAAD, extent of aortic resection, and primary tear resection.

This study indicates that the resection of the ascending aorta suffices in the majority of the ATAAD patients, as the primary tear often resides in the tubular part of the ascending part of the aorta. Sometimes, surgical control without extended prosthetic replacement of the primary tear of the aortic root or the arch may be considered at the acute setting of ATAAD. With regard to the primary tear location only, the results indicate that similar midterm outcome may be anticipated regardless of the extension of the aortic resection; extensive aortic tissue destruction, risk of additional bleeding from the anastomotic sites, preexisting aortic dilatation, presence of malperfusion, low patient age, and connective tissue disease may further determine the need for extension of the aortic resection. It remains to be seen whether ATAAD should be subclassified according to the location of primary tear together with the extension of the dissection and associated clinical features.[18] While the NORCAAD register reflects data from 8 mainstream Nordic centers with homogeneous treatment protocols in a coherent geographical area, The Society for Thoracic Surgeons (STS) National Adult Cardiac Surgery Database has a new STS Aorta Surgeon Worksheet for dissection that also identifies primary tear sites.[19] In the future, the significance of primary tear resection in a more heterogeneous population could be investigated using the STS Database and compared with the NORCAAD register. The STS Database may also further elucidate the significance of residual perfused false lumen during follow-up in patients after surgery for ATAAD.

Traditionally, extensive aortic reconstruction during ATAAD is justified whenever the primary tear is located beyond the ascending aorta, either proximally or distally.[11,12,14] In the acute setting of ATAAD, the location of the primary tear may be unclear or not properly documented.[14] The majority of the patients included in the NORCAAD registry had onset of symptoms leading to surgery in less than 48 hours. A proportion of the undefined primary tears may originate in the descending aorta encompassing the development of a retrograde ATAAD.[10] In contrast with a previous study,[10] we identified all of the ATAAD patients without excision, including also those in whom surgery for primary tear included only repair. Furthermore, an RMST analysis was performed to eliminate the risk of violating the proportional hazards assumption.

Some centers advocate for an extended aortic reconstruction in almost all ATAAD cases to avoid future reoperations.[20] The risk stratification includes evaluating the possibility of perioperative complications together with the need of reoperations.[18] Usually, the simplest solution is to resect and reconstruct the dissected ascending aorta. In the current study, some

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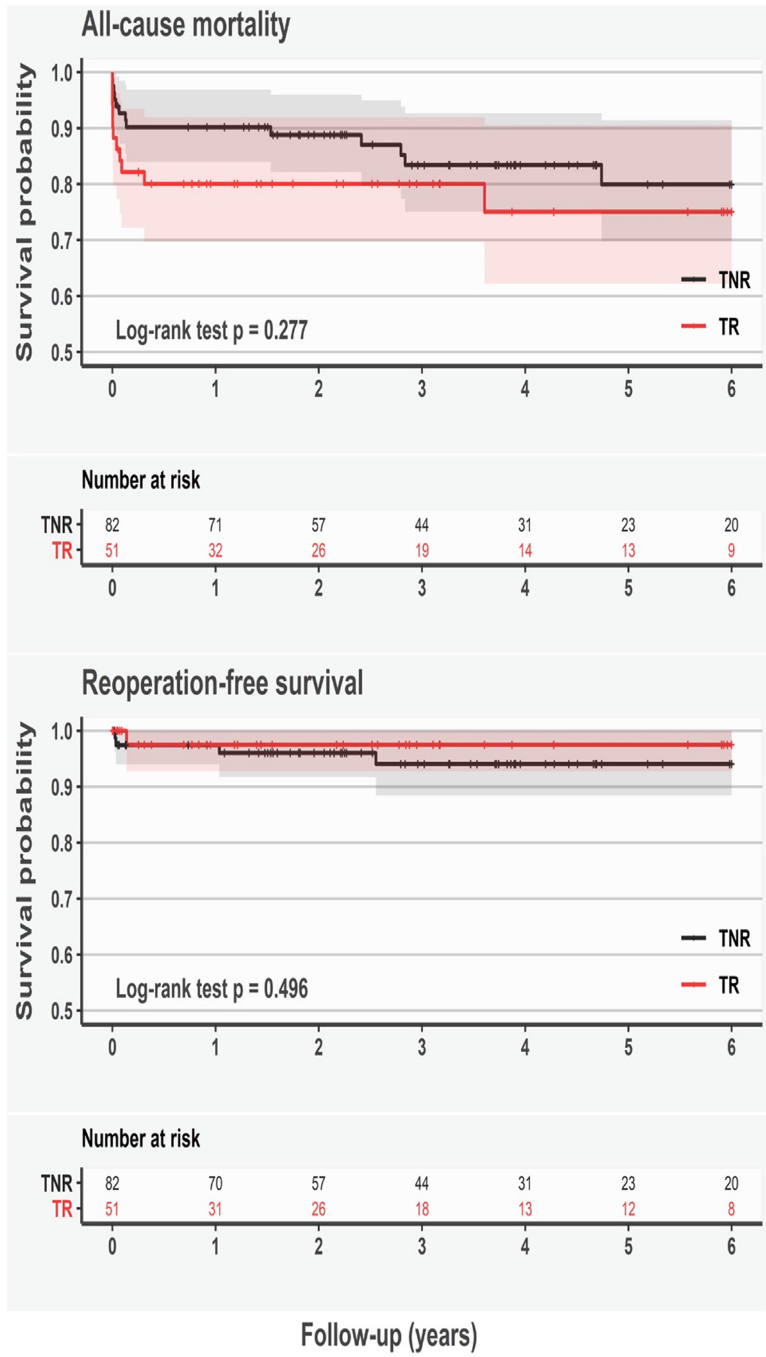

FIGURE 2 Probability of survival by time for patients with primary tear in the aortic root with the tear resected (TR) (red line) and tear not resected (TNR) (black line) in the surgery. The shaded areas show 95% confidence intervals for survival estimates based on Kaplan-Meier analysis. The ticks in the survival curves present the censored patients.

aortic dissections with primary tears in the aortic root and arch were repaired without excision, and the aortic reconstruction included exclusively an ascending graft. Solitary reconstruction of the ascending aorta was the procedure performed most often, and importantly, the survival and the aortic reoperation-free survival did not significantly differ in patients with or without prosthetic replacement of the primary tear together with the dissected portion of the aorta. There were no major preoperative differences among the TR and the TNR

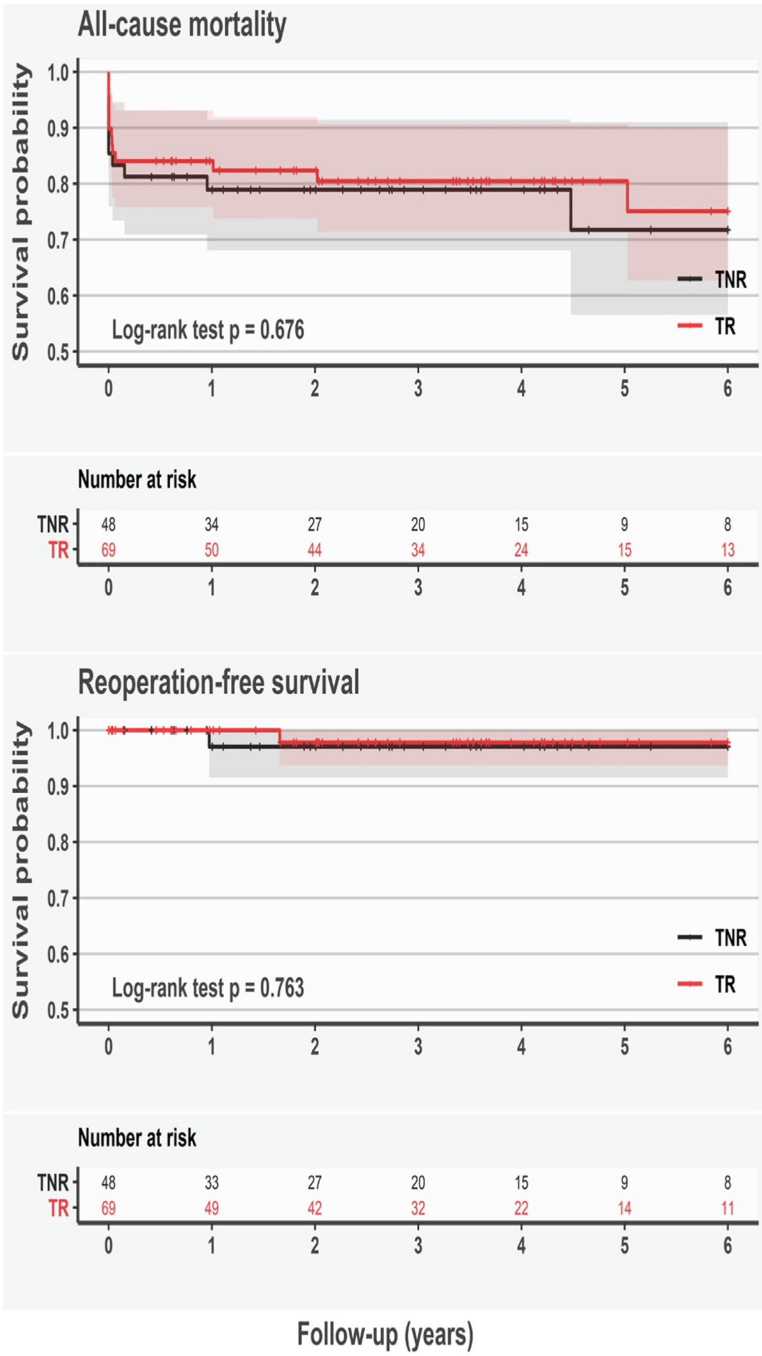

FIGURE 3 Probability of survival by time for patients with primary tear in the aortic arch with the tear resected (TR) (red line) and tear not resected (TNR) (black line) in the surgery. The shaded areas show 95% confidence intervals for survival estimates based on Kaplan-Meier analysis. The ticks in the survival curves present the censored patients.

patients with the exception of any malperfusion and spinal malperfusion. However, malperfusion was statistically more often present in the TNR patients, and the outcome was still statistically similar between the TR and TNR patients.

Based on the design of this study, we were unable to detect statistical differences in outcome between the TR and TNR patients. The repair of the tear may suffice in, eg, the very elderly, and avoiding complex surgery in some patients may balance out the benefits of prolonged

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TABLE 5 RMST Estimates for the TR and TNR Groups in Each Survival Type in the Root and Arch Tear Subgroups

	RMST Estimate (95% CI)			
Survival	TR Group	TNR Group	Unadjusted RMST Ratio (95% CI)	*P* Value
Tear in aortic root				
All-cause mortality	4.70 (4.01-5.38)	5.13 (4.70-5.57)	0.92 (0.77-1.08)	.299
Reoperation-free survival	5.71 (5.31-6.10)	5.71 (5.43-5.99)	1.00 (0.92-1.09)	.994
Tear in aortic arch				
All-cause mortality	4.83 (4.29-5.38)	4.65 (3.96-5.35)	1.04 (0.86-1.25)	.691
Reoperation-free survival	5.74 (5.46-6.03)	5.85 (5.57-6.14)	0.98 (0.92-1.05)	.595

CI, confidence interval; RMST, restricted mean survival time; TNR, tear not resected; TR, tear resected.

surgery with complete resection of the dissecting aorta. As the heterogeneity of the patients prevents from generalizing the results of this study to all patients with regard to long-term outcome, for some types of tears and patients, a straightforward emergency-type surgical solution may suffice to secure midterm survival. As previously described from the NORCAAD registry, in some selected cases, it was decided not to resect some of the tears even in the ascending aorta, and repair of the tear with the aortic clamp-on was performed.[21]

There are limitations in this study. The retrospective study design makes the data vulnerable to selection bias. Despite a relatively large sample size, the extent of aortic resection and reconstruction included several options. Hence, the subgroups were small, thus limiting control of potential confounding factors. Reporting on the location of the primary tear depended on interpretation of preoperative computed tomography scanning and surgical vigilance. The NORCAAD data did not include the aortic diameter after surgery for ATAAD, and aortic dilatation per se may be a poor indicator for aortic events after surgery.[22] Longer follow-up is needed. However, the homogeneous populations and uniform health care systems in the Nordic countries yielded complete follow-up of a relatively large cohort of surgical patients with ATAAD.

Midterm mortality and aortic reoperation-free survival were comparable between the patients having the primary tear site resected and patients in whom the tear site was repaired or left untouched. This indicates that the decision to resect the primary tear alone does not determine the midterm outcome after surgery for ATAAD.

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Worth Rethinking How We Do Type A Dissection Surgery?

INVITED COMMENTARY:

Type A dissection surgery revolves around a few basic principles. At the top of that list is excising the intimal tear, a principle echoed by Cohen and colleagues in their publication "Type A Aortic Dissection Repair: How I Teach It."[1] Uimonen and colleagues[2] provide a provocative challenge to this most sacred tenet of type A surgery in this issue of *The Annals of Thoracic Surgery*. They report on over 1000 patients undergoing acute type A dissection surgery at 8 Nordic centers from 2005 to 2014 and conclude that primary tear resection does not determine midterm survival.

The decades of experience within the cardiac surgical community treating type A dissections with tear excision and the limitations within the study by Uimonen and colleagues will understandably make a paradigm shift away from primary tear site excision unlikely. The lack of any radiographic follow-up or long-term clinical follow-up are limitation in the study by Uimonen and colleagues. Also the subgroup analysis leads to comparisons between relatively small groups, consequently decreasing the statistical power of the study. This subjects it to classic Type II statistical error where there is an inaccurate determination of no difference between the 2 groups. In this instance the erroneous conclusion could be no difference in midterm survival based on whether the primary tear site was excised or not in type A aortic dissection surgery.

However to improve the outcomes of type A dissection surgery we must continually study our therapies and scrutinize our performance. This includes the willingness to reevaluate even fundamental principles of therapies. Starting in July 2020 The Society of Thoracic Surgeons Database made a significant leap forward by introducing the first aortic surgery model to recognize both the different pathologies of the aorta (aneurysm, dissection, other) and different therapies (open, endovascular and other). As branched thoracic endografts, uncovered stents, and other future therapies continue to emerge, an in-depth understanding of patient risk factors, details of the surgical intervention, institutional experience and volume, and other factors should all be closely studied as part of The Society of Thoracic Surgeons Database to progress the field of dissection surgery through better data and better patient outcomes.

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