

## ORIGINAL ARTICLE

## Thoracic Endovascular Aortic Repair for Acute and Chronic Type B Aortic Dissections: Short- and Long-Term Outcomes

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### Abstract:

**Introduction:** The aim of this study is to identify outcomes of thoracic endovascular aortic repair (TEVAR) for acute and subacute or chronic type B aortic dissections (TBAD) at a tertiary referral center.

**Methods:** All patients who underwent TEVAR for TBAD from 2010 to 2022 at a tertiary referral center were included in this cohort study. The primary outcomes were all-cause mortality, any endoleak, and thoracic aortic reintervention.

**Results:** Thirty-three patients were included (mean age 63 years, male 60.6%), with mean follow-up of 40.7 months. Timing of TEVAR was classified by timing of intervention since onset of symptoms: hyperacute (0-2 weeks: 54.6%), acute (2-12 weeks: 24.2%), and subacute or chronic (> 12 weeks: 21.2%). The extent of the TBAD was in 21.2% contained to the thoracic aorta, and in 24.2% and 54.6% it was extending to the abdominal aorta and iliac segment, respectively. The thirty-day all-cause mortality was 0%, rupture 0%, retrograde type A dissection 3% (n=1), myocardial infarction 0%, stroke 12.1% (n=4), spinal cord ischemia 0%, endovascular reinterventions 3%, intervention for visceral malperfusion 3%, and intervention for limb ischemia 0%. The follow-up all-cause mortality was 21.9%, rupture 0%, retrograde type A dissection 6.5%, any endoleak (32%), and thoracic aortic endovascular reintervention 32.3%.

**Conclusion:** TEVAR has emerged as a valuable tool in the management of TBAD. Nonetheless, endoleaks and other aortic-related complications are not uncommon during follow-up. Careful patient selection and an individualized approach play a crucial role for durable outcomes.

**Keywords:** aortic dissection, thoracic endovascular aortic repair, aortic surgery, type B aortic dissection, TEVAR

### INTRODUCTION

Stanford Type B aortic dissections (TBAD) involve an entry tear in the intima of the thoracic aorta, distal to the left subclavian artery, and allow for false lumen (FL) development and expansion over time.<sup>1</sup> Most often, the true lumen supplies the celiac axis, superior mesenteric artery, and right renal artery, while the false lumen supplies the left renal artery.<sup>2</sup> False lumen expansion and distal extent of the dissection can progress to arterial compromise in the visceral segment and lower extremities, leading to end-organ malperfusion and ischemic events.

Medical management is the mainstay for uncomplicated TBAD, but those with high-risk anatomic features, refractory pain, or uncontrolled hypertension may benefit from TEVAR.<sup>3</sup>

The objective of a TEVAR is to occlude the entry tear and promote false lumen thrombosis, which would help depressurize the aorta and minimize the risk of aortic degeneration.<sup>4</sup> In this study, we aim to present short- and long-term outcomes of TEVAR for acute, subacute, and chronic TBAD at a tertiary referral center, emphasizing lesion characteristics, utilizing Vascular Quality Initiative (VQI) cases.

### METHODS

#### *Selection of Patients and Procedure Details*

All patients (n = 173) who underwent TEVAR at Stony Brook University Hospital between 2010 and 2022 were identified using the local Vascular Quality Initiative registry. Patients who had acute, subacute, or chronic TBAD were included. Those with residual TBAD after type A repair was excluded. Patients undergoing hybrid thoracoabdominal procedures (combining endovascular techniques with open debranching or bypass) were excluded. After inclusion and exclusion criteria were applied, the number of patients studied in our cohort was thirty-three.

Patients were classified by the timing of TEVAR from the onset of symptoms: hyperacute (0-2 weeks), acute (2-12

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doi: 10.59037/4m4ee537

eISSN: 2732-7167 / 2026 Hellenic Society of Vascular and

Endovascular Surgery Published by Rotonda Publications

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weeks), subacute or chronic (> 12 weeks), and asymptomatic versus symptomatic status. Indications for treatment in subacute or chronic TBAD cohort included refractory chest, abdominal, or back pain or uncontrolled hypertension. TEVAR case planning was performed using three-dimensional reconstruction software, and the case was discussed preoperatively at case conferences among multiple vascular surgeons. Spinal drainage was performed at the surgeon's discretion based on anticipated aortic length coverage or concern for spinal cord ischemia postoperatively. Anti-thrombotic therapy with anti-platelets (e.g., aspirin, clopidogrel) or anti-coagulants was administered pre- and post-procedurally based on the operator's preference. Follow-up consisted of in-person visits with CT angiography at 48 hours postoperatively, 1 month, 6 months, 12 months, and annually thereafter, unless an endoleak was detected, in which case closer surveillance was undertaken at the discretion of the operator.

### Data Collection

Patient characteristics and preoperative comorbidities were collected from the electronic medical record, including a histo-

ry of hypertension (HTN), coronary artery disease (CAD), and prior aortic surgery (Table 1). Operative details and adjunct procedures were registered. Important lesion characteristics, including thoracic and abdominal aorta diameters, number of re-entry tears, and determination of luminal flow to visceral arteries, were measured using Computed Tomography Angiography (CTA) and registered (Table 2). The measurements were performed on CTA images with intravenous contrast in the arterial phase, with the absence of contrast in the false lumen suggestive of false lumen thrombosis.

### Study Outcomes

The primary outcomes of our study included all-cause mortality, any endoleak, and any aortic reintervention related to the index TBAD repair. Secondary outcomes included the rate of major complications perioperatively (i.e., within 30 days) and during follow-up (i.e., rupture, retrograde type A dissection, immediate type IA endoleak, and ESRD). Maximum diameter in the thoracic and abdominal aorta was also measured during follow-up to assess for aortic remodeling.

**Table 1** Important patient demographics

Variables	Event/Total	Percentage, %
Male	20/33	60.6
Caucasian	25/33	75.8
HTN	28/33	84.5
Dyslipidemia	9/33	27.3
DM	8/33	24.2
CVD	7/33	21.2
CAD	8/33	24.2
Pulmonary disease	5/33	15.2
Previous Smoker	9/33	27.3
Current smoker	8/33	24.2
CKD	5/33	15.2
ESRD	0/33	0.0
Prior aortic surgery	2/33	6.1
Pre-operative aspirin	20/33	60.6
Pre-operative P2Y12 antagonist	2/33	6.1
Pre-operative statin	6/33	18.2
Pre-operative beta blocker	19/33	57.6
Pre-operative ACE-Inhibitor/ARB	12/33	36.4
Pre-operative chronic anticoagulant	1/33	3.0
Aspirin on discharge	30/33	93.8
P2Y12 antagonist on discharge	6/33	18.8
Statin on discharge	13/32	40.6
Beta blocker on discharge	28/32	87.5
ACE-Inhibitor/ARB on discharge	12/32	37.5
Chronic anticoagulant on discharge	5/32	15.6
Variables	Observations	Mean (SD)
Mean age, yrs	33/33	63.0 (13.6)
BMI	31/33	29.3 (7.2)

HTN: hypertension, DM: diabetes, CVD: cerebrovascular disease, CAD: coronary artery disease, CKD: chronic kidney disease, ASA: American Society of Anesthesiologists physical status classification, SD: standard deviation, yrs: years, BMI: body mass index

**Table 2** Important lesion characteristics

Variables	Event/Total	Percentage, %
Hyperacute intervention (0-2 weeks)	18/33	54.6
Acute intervention (2-12 weeks)	8/33	24.2
Subacute intervention (>12 weeks)	7/33	21.2
Symptomatic	26/33	78.8
Extent of dissection - thoracic	7/33	21.2
Extent of dissection - thoracoabdominal	8/33	24.2
Extent of dissection - to the iliacs	18/33	54.6
False lumen of thoracic aorta - patent	19/33	57.6
False lumen of thoracic aorta - partially thrombosed	13/33	39.4
False lumen of thoracic aorta - completely thrombosed	1/33	3.0
N of re-entry tears - 0	9/33	27.3
N of re-entry tears - 1	5/33	15.2
N of re-entry tears - $\geq 2$	19/33	57.6
Blood supply of Celiac - true lumen	26/33	78.8
Blood supply of Celiac - false lumen	4/33	12.1
Blood supply of Celiac - both	3/33	9.1
Blood supply of SMA - true lumen	27/33	81.8
Blood supply of SMA - false lumen	2/33	6.1
Blood supply of SMA - both	4/33	12.1
Blood supply of Left renal artery - true lumen	28/33	84.9
Blood supply of Left renal artery - false lumen	5/33	15.2
Blood supply of Left renal artery - both	0/33	0.0
Blood supply of Right renal artery - true lumen	20/30	60.6
Blood supply of Right renal artery - false lumen	11/33	33.3
Blood supply of Right renal artery - both	2/33	6.1
Variables	Observations	Mean (SD)
Maximum diameter of thoracic aorta, mm	33/33	37.9 (12.3)
Maximum diameter of thoracic false lumen, mm	33/33	21.7 (6.8)
Maximum diameter of abdominal aorta, mm	33/33	29.9 (11.9)
Size of most proximal entry tear, mm	30/33	11.8 (7.2)
Aortic diameter at most proximal visible entry tear, mm	30/33	37.4 (8.9)

SMA: superior mesenteric artery, SD: standard deviation

### Statistical Analysis

Categorical variables were presented as absolute and relative frequencies (i.e., percentages), while continuous variables were presented as means  $\pm$  standard deviations. The cumulative incidence of primary and secondary outcomes was also presented with absolute and relative frequencies. Furthermore, the Kaplan-Meier (KM) method was used to estimate the 24-month freedom from primary and secondary endpoints. All analyses were performed using STATA software (version 14.1; STATA Corporation, College Station, TX, USA).

## RESULTS

### Patients and lesion characteristics

The average age of this patient cohort was  $63.0 \pm 13.6$  years. Most of the patients were Caucasian males and had a history of hypertension. About one-fourth of the patients had diabetes and coronary artery disease (CAD) at presentation. Most

of the cases were symptomatic (78.8%) and were treated in the hyperacute (54.6%) or acute setting (24.2%). Involvement of the thoracoabdominal aorta with dissection extending to the common iliac arteries was observed in 54.6% of the cases, with the false thoracic lumen being completely patent in most cases. The average maximum thoracic and abdominal aortic diameters were  $37.9 \pm 12.3$  mm and  $29.9 \pm 11.9$  mm, respectively. Details regarding patients' baseline demographics and lesion characteristics are summarized in **Tables 1 & 2**, respectively.

### Procedural characteristics and short-term outcomes

As this was a retrospective study, all included patients were deemed suitable candidates for TEVAR, and no patients were denied treatment for anatomical reasons. Stent grafts were deployed in all cases, followed by bare metal stents in 12.1%. The average initial covered length of the aorta was  $166 \pm 36.9$ mm. Intravascular ultrasound (IVUS) was used in 81.8% of

**Supplementary Table 1** Important procedural characteristics

Variables	Event/Total	Percentage, %
IVUS	27/33	81.8
TEE	3/33	9.1
Proximal landing at zone 2	16/33	48.5
Proximal landing at zone 3	17/33	51.5
More than one aortic stent placed	13/33	39.4
Bare metal stents	4/33	12.1
LCCA-LSCA bypass during same admission	3/33	9.1
LSCA snorkeling stenting	1/33	3.0
CSF drain placement	17/33	51.5
Variables	Observations	Mean (SD)
Fluoroscopy time	31/33	28.9 (27.6)
Procedure time	33/33	175 (117.5)
Contrast, ml	32/33	108.9 (52.2)
ICU stay, days	31/33	3.9 (2.9)
Time from admission to procedure, days	33/33	3.1 (4.1)

IVUS: intravascular ultrasound, TEE: transesophageal echocardiogram, LCCA: left common carotid, LSCA: left subclavian, CSF: cerebrospinal fluid, ICU: intensive care unit, SD: standard deviation

**Supplementary Table 2** Periprocedural outcomes

Variables	Event/Total	Percentage, %
All-cause mortality	0/33	0.0
Rupture	0/33	0.0
Retrograde type A dissection	1/33	3.0
Immediate type Ia endoleak	0/33	0.0
Myocardial Infarction	0/33	0.0
Stroke	4/33	12.1
Spinal cord ischemia	0/33	0.0
Reintervention	1/33	3.0
Intervention for visceral malperfusion	1/33	3.0
Intervention for limb ischemia	0/33	0.0

the cases, and transesophageal echocardiography (TEE) was utilized in 9.1% of the cases to facilitate accurate deployment. The stent grafts were placed at zone 2 in 48.5% of the cases. Left carotid subclavian bypass was performed in 9.1% during the same admission, while 3% of the cases underwent left subclavian snorkeling stenting during the same procedure. A spinal drain was placed in 51.5% of the cases. Details are presented in **Supplementary Table 1**.

The average procedure time was  $175 \pm 117.5$  min, with an average fluoroscopy time of  $28.9 \pm 27.6$  min and an average contrast volume of  $108.9 \pm 52.2$  mL. During the procedure, one patient experienced retrograde type A aortic dissection that required further intervention. Additionally, one patient required intervention for visceral malperfusion in the same setting. No peri-operative mortality was observed, although 4 patients experienced peri-operative neurologic deficits. The average length of intensive care unit (ICU) stay is  $3.9 \pm 2.9$  days. No peri-operative all-cause mortality was observed. No

patients experienced myocardial infarction or spinal cord ischemia. The incidence of short-term outcomes is summarized in **Supplementary Table 2**.

#### Long-term outcomes

The average follow-up was  $40.7 \pm 30.77$  months, with up to 8.7 years maximum follow-up. The follow-up was performed with CT scan at 48h post-op, 1 month, 6 months and at 12 months and yearly after unless endoleak occurs. Aortic remodeling with complete thrombosis of the false lumen or resolution of the aortic dissection was observed in 23.3% and 40% of the cases. However, an increase in the average maximum thoracic diameter was observed compared to preoperative values. The average maximum thoracic and abdominal aortic diameters during follow-up were  $40.2 \pm 30.7$  mm and  $40.2 \pm 15.7$  mm, respectively. Over time an endoleak was observed in 10 out of 31 cases with long-term CT data (i.e., type Ia: 12.9%, type Ib: 6.5%, type II: 6.55%, type III: 6.55%) and

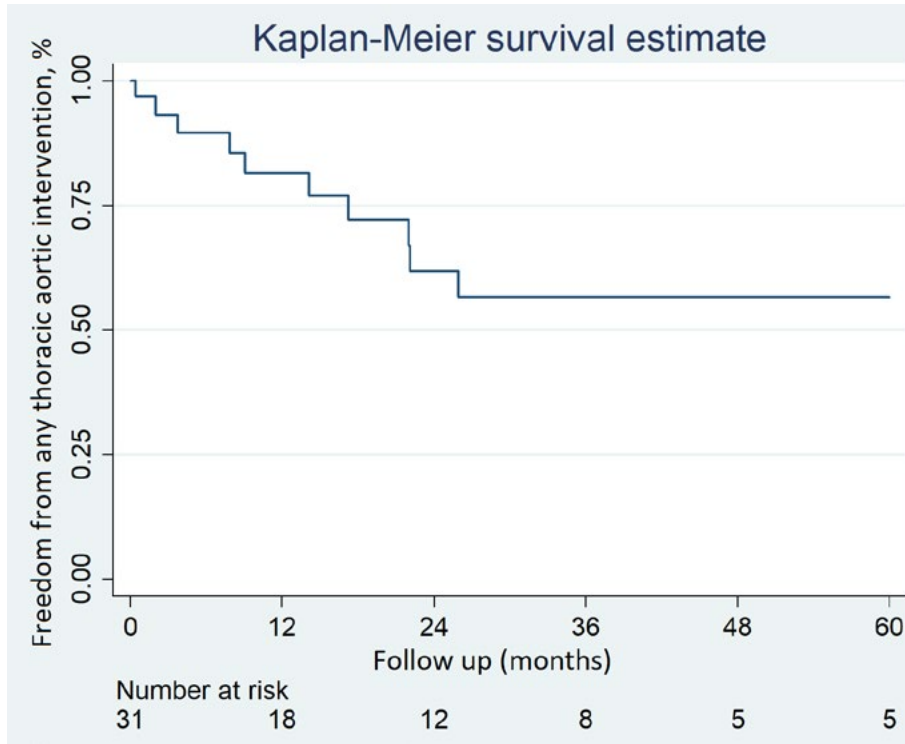


Figure 1 Freedom from any thoracic aortic intervention during follow-up

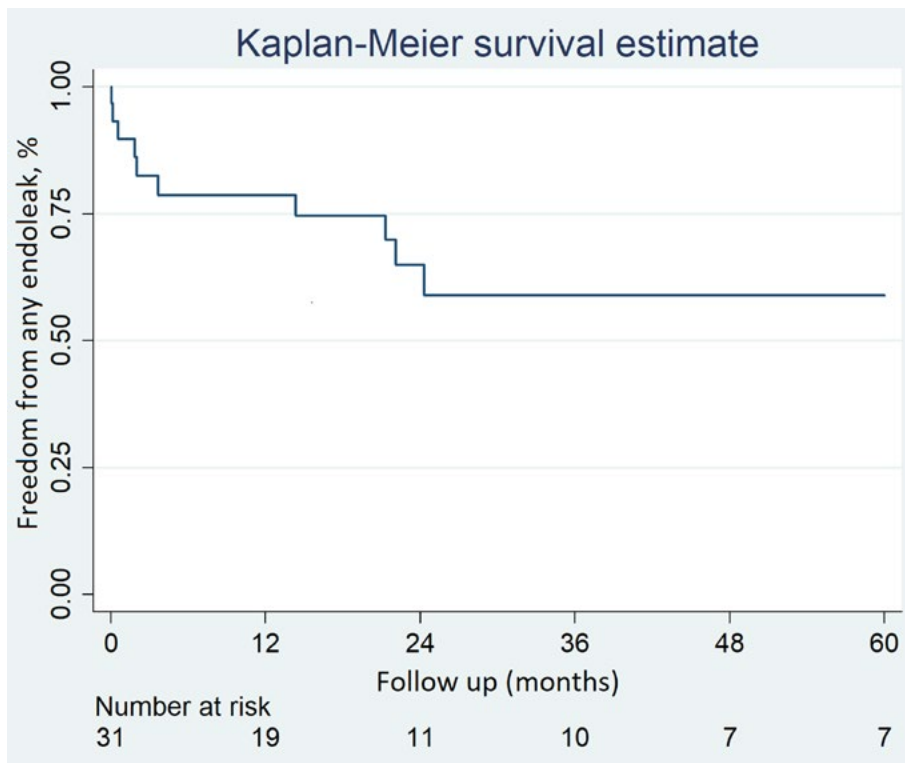
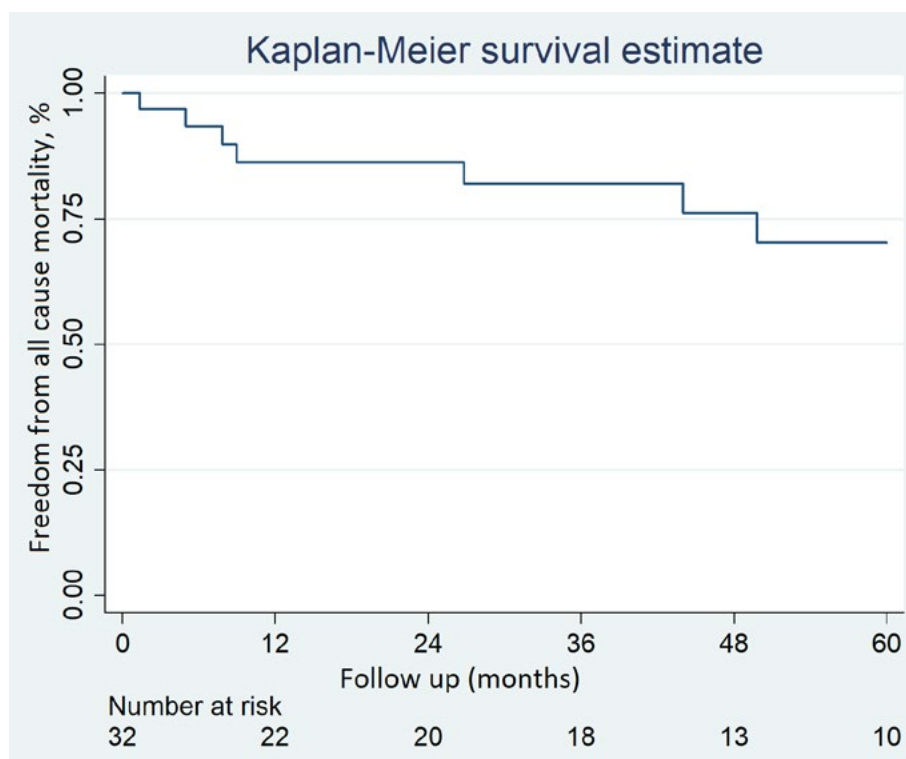


Figure 2 Freedom from any endoleak during follow-up



**Figure 3** Freedom from all-cause mortality during follow-up

**Table 3** Outcomes during follow-up

Variables	Event/Total	Percentage, %
All-cause mortality	7/32	21.9
Rupture	0/33	0.0
Retrograde type A dissection	2/31	6.5
Endoleak, type Ia	4/31	12.9
Endoleak, type Ib	2/31	6.5
Endoleak, type II	2/31	6.5
Endoleak, type III	2/31	6.5
Thoracic aortic reintervention	10/31	32.3
ESRD	4/31	12.9
False lumen of thoracic aorta - patent	1/30	3.3
False lumen of thoracic aorta - partially thrombosed	10/30	33.3
False lumen of thoracic aorta - completely thrombosed	7/30	23.3
False lumen of thoracic aorta - normal	12/30	40
False lumen of abdominal aorta - patent	15/30	50
False lumen of abdominal aorta - partially thrombosed	5/30	16.7
False lumen of abdominal aorta - completely thrombosed	1/30	3.3
False lumen of abdominal aorta - normal	9/30	30.0
Variables	Observations	Mean (SD; range)
Mean follow-up, months	32/33	40.7 (30.77; 0.1-103.7)
Time from procedure to last CT scan, months	30/33	40.1 (30.7; 1.4-112.5)
Maximum diameter of thoracic aorta, mm	30/30	40.2 (15.7; 3.3-77.4)
Maximum diameter of abdominal aorta, mm	30/30	32.5 (12.8; 4.8-67.9)

CT: computed tomography, SD: standard deviation

**Supplementary Table 3** 5-year Kaplan - Meier estimates for long term outcomes

Variables	KM estimate % (95% CI)
All-cause mortality	70.2% (45.1%-85.1%)
Rupture	100% (N/A)
Retrograde type A dissection	87.1% (51.6%-97.2%)
Endoleak	58.9% (36.1%-76.1%)
Thoracic aortic reintervention	56.7% (33.7%-74.4%)
ESRD	85.0% (60.2%-94.9%)

KM: Kaplan-Meier, CI: confidence interval, N/A: not available, ESRD: end stage renal disease

required thoracic aortic reintervention (**Figure 1**). The 5-year KM estimate for freedom from any endoleak was 58.9%, and the corresponding survival curve is presented in **Figure 2**. The overall all-cause mortality rate was 21.9% without any events associated with aortic rupture. Outcomes during follow-up are summarized in **Table 3**. The 5-year KM curve for freedom from all-cause mortality is illustrated in **Figure 3**. The 5-year Kaplan - Meier estimates for primary outcomes are summarized in **Supplementary Table 3**.

### Discussion

Aortic dissection is estimated to affect about 4 to 5 persons per 100,000 annually, constituting one of the most common aortic emergency pathologies associated with high morbidity and mortality rates<sup>5</sup>. Its incidence is increasing as a result of the aging of the population and superior imaging techniques that facilitate early diagnosis. Stanford TBAD originate just distal to the ostium of the left subclavian artery and can extend to the iliac arteries. Type B aortic dissections can be complicated (i.e., rupture, malperfusion) or uncomplicated (e.g., asymptomatic, hypertension, etc.) based on the symptoms at presentation.

Early intervention with an open repair or, more recently, with TEVAR, the first-line therapeutic option, is recommended for complicated aortic dissections<sup>5,6</sup>, while best medical management is usually preferred for uncomplicated cases<sup>7,8</sup>. Nonetheless, a significant proportion of uncomplicated cases of TBAD will eventually experience adverse aortic remodeling requiring TEVAR<sup>8</sup>. Furthermore, experts suggest that “prophylactic” TEVAR in certain occasions of high-risk features may be beneficial<sup>9,10</sup>. However, long-term data have been limited for studies investigating the outcomes of TEVAR for complicated but uncomplicated aortic dissections, with a reported mean follow-up of fewer than 20 months in most cases<sup>11-14</sup>. The current study aimed to summarize institutional VQI TEVAR data with long-term follow-up<sup>15</sup>.

In our study, no peri-operative mortality (within 30 days) was observed, although neurologic deficits were observed in 4 out of 33 patients, with 1 out of 4 cases causing significant disability. Interestingly no incidents of spinal cord ischemia were observed. Although the incidence of neurologic complications is closely correlated with the population characteristics (e.g., trauma vs. no trauma cases, zone 2 vs. zone 3 coverage, etc.), it has been shown that stroke and transient ischemic

attack rates can approximate 8% and 3% respectively<sup>14-16</sup>, with in-hospital mortality reaching up to 4%<sup>6</sup>, with patients presenting with visceral ischemia having worse short- and long-term outcomes<sup>17,18</sup>. This was shown in our study as well. One patient who developed visceral ischemia perioperatively expired 11 weeks after the procedure, accounting for our study’s only short-term all-cause death event.

Aortic-related complications during the chronic stage are common and depending on the severity of the disease at presentation, it can affect up to one-third of the cases<sup>9</sup>. Similarly, in our study, during an average follow-up of about 41 months, a thoracic reintervention was required in 32.3% of the cases, with endoleaks constituting the most common aortic-related complication (32.4%). A late *endoleak* is defined as one occurring 30 days post-TEVAR, and the most commonly occurring types of late endoleaks are I and II.<sup>19</sup> The reported rates of type I and type II endoleaks after TEVAR range from approximately 0% to 15% and 10-40% in various studies and systematic reviews, depending not only on aortic characteristics (e.g., diameter, aneurysmal degeneration, oversizing) but also on the duration of follow-up. In our study, type Ia, Ib, and II endoleaks were seen in 12.9%, 6.5%, and 6.5% of the cases, respectively. Although there are currently no standardized ways to predict the probability of late aortic expansion and associated aortic-related complications in general, advancements in stent graft technology, operator expertise, and ongoing research are continually improving the outcomes of TEVAR.

While there is current enthusiasm about TEVAR procedures given promising short- and mid-term outcomes, the long-term (e.g., > 2 years) durability of aortic remodeling after TEVAR is an ongoing area of research. In our study, the average maximum thoracic and abdominal aortic diameters were 37.9 mm and 29.9 mm at presentation and 40.2 mm and 40.2 mm during follow-up, respectively. In our cohort, gradually over time, all patients experienced a degree of aortic “degeneration” reflected by larger mean diameters, although only one-third of the patients required a reintervention. Further research is needed to help identify at-risk patients who would benefit from more intense follow-up or a different initial approach. Clinical decision-making is challenged even further by developing newer devices (e.g., branched devices, conformable covered stent grafts, etc.) and techniques (e.g., Petticoat technique); additional research is warranted.

### Limitations

The present study has several limitations. It is based on data from a single center, and the study population is small. Using a retrospective cohort design introduces the possibility of unaccounted confounding factors. It has led to a heterogeneous study population, including cases of acute, subacute, and chronic presentations of TBAD, which grossly translated to hyperacute, acute, and subacute interventions. Imaging interpretation was performed by the same reviewers, which reduces variability but may introduce observer bias, as no independent core lab was used.

### CONCLUSION

TEVAR is an effective treatment for TBAD, with favorable perioperative outcomes but substantial rates of late endoleaks and reinterventions. Careful patient selection and an individualized approach to optimizing outcomes are crucial for durable outcomes. Future research in stent designs and techniques (e.g., patient-specific, branched/fenestrated, hybrid approaches, etc.), imaging and navigation modalities, and surveillance protocols is warranted to improve patients' outcomes.

### REFERENCES

- Criado FJ. Aortic dissection: a 250-year perspective. *Tex Heart Inst J*. 2011;38(6):694-700.
- Nienaber CA, Clough RE. Aortic Dissection. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2025 May 19]
- Howard C, Sheridan J, Picca L, et al. TEVAR for complicated and uncomplicated type B aortic dissection-Systematic review and meta-analysis. *J Card Surg*. 2021;36(10):3820-3830.
- Lin PH, Huynh TT, Kougiass P, Huh J, LeMaire SA, Coselli JS. Descending thoracic aortic dissection: evaluation and management in the era of endovascular technology. *Vasc Endovascular Surg*. 2009;43(1):5-24.
- Zeeshan A, Woo EY, Bavaria JE, et al. Thoracic endovascular aortic repair for acute complicated type B aortic dissection: superiority relative to conventional open surgical and medical therapy. *J Thorac Cardiovasc Surg*. 2010;140(6 Suppl):S109-115; discussion S142-S146.
- Cambria RP, Crawford RS, Cho JS, et al. A multicenter clinical trial of endovascular stent graft repair of acute catastrophes of the descending thoracic aorta. *J Vasc Surg*. 2009;50(6):1255-1264.e1251-1254.
- Alfson DB, Ham SW. Type B Aortic Dissections: Current Guidelines for Treatment. *Cardiol Clin*. 2017;35(3):387-410.
- Akin I, Kische S, Ince H, Nienaber CA. Indication, timing and results of endovascular treatment of type B dissection. *Eur J Vasc Endovasc Surg*. 2009;37(3):289-296.
- Riambau V, Böckler D, Brunkwall J, et al. Editor's Choice - Management of Descending Thoracic Aorta Diseases: Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS). *Eur J Vasc Endovasc Surg*. 2017;53(1):4-52.
- Tadros RO, Tang GHL, Barnes HJ, et al. Optimal Treatment of Uncomplicated Type B Aortic Dissection: JACC Review Topic of the Week. *J Am Coll Cardiol*. 2019;74(11):1494-1504.
- Eggebrecht H, Nienaber CA, Neuhäuser M, et al. Endovascular stent-graft placement in aortic dissection: a meta-analysis. *Eur Heart J*. 2006;27(4):489-498.
- Parker JD, Golledge J. Outcome of endovascular treatment of acute type B aortic dissection. *Ann Thorac Surg*. 2008;86(5):1707-1712.
- Xiong J, Jiang B, Guo W, Wang SM, Tong XY. Endovascular stent graft placement in patients with type B aortic dissection: a meta-analysis in China. *J Thorac Cardiovasc Surg*. 2009;138(4):865-872.
- Lombardi JV, Cambria RP, Nienaber CA, et al. Prospective multicenter clinical trial (STABLE) on the endovascular treatment of complicated type B aortic dissection using a composite device design. *J Vasc Surg*. 2012;55(3):629-640.e622.
- The VIRTUE Registry of type B thoracic dissections--study design and early results. *Eur J Vasc Endovasc Surg*. 2011;41(2):159-166.
- Buth J, Harris PL, Hobo R, et al. Neurologic complications associated with endovascular repair of thoracic aortic pathology: Incidence and risk factors. a study from the European Collaborators on Stent/Graft Techniques for Aortic Aneurysm Repair (EUROSTAR) registry. *J Vasc Surg*. 2007;46(6):1103-1110; discussion 1110-1101.
- Trimarchi S, Jonker FH, Froehlich JB, et al. Acute type B aortic dissection in the absence of aortic dilatation. *J Vasc Surg*. 2012;56(2):311-316.
- Umaña JP, Miller DC, Mitchell RS. What is the best treatment for patients with acute type B aortic dissections-medical, surgical, or endovascular stent-grafting? *Ann Thorac Surg*. 2002;74(5): S1840-1843; discussion S1857-1863.
- Ameli-Renani S, Pavlidis V, Morgan RA. Secondary Endoleak Management Following TEVAR and EVAR. *Cardiovasc Intervent Radiol*. 2020;43(12):1839-1854.