

## JAMA Clinical Guidelines Synopsis

## Management of Thoracic Aortic Dissection

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**GUIDELINE TITLES** American Association for Thoracic Surgery Expert Consensus Document: Surgical Treatment of Acute Type A Aortic Dissection; Society of Thoracic Surgeons/American Association for Thoracic Surgery Clinical Practice Guidelines on the Management of Type B Aortic Dissection

**RELEASE DATES** April 30, 2021; November 8, 2021

**DEVELOPERS** American Association for Thoracic Surgery (AATS)/Society of Thoracic Surgeons (STS)

**TARGET POPULATION** All adult patients

**MAJOR RECOMMENDATIONS**

- $\beta$ -Blockers and pain relief are recommended in the initial management of acute type A aortic dissection (ATAAD) without severe aortic regurgitation (strong recommendation; strong evidence).
- For patients with ATAAD, emergency surgery is recommended. When cardiac surgery is not immediately available or for patients with complicated ATAAD, transfer to a comprehensive aortic center is recommended (moderate recommendation; moderate evidence).
- For type B aortic dissection (TBAD), a stepwise approach is recommended to assess organ malperfusion or other indications of complicated disease (strong recommendation; moderate evidence).
- If malperfusion, defined as end-organ ischemia, is not present, optimal medical therapy (OMT) is the mainstay for treatment of patients with uncomplicated TBAD (strong recommendation; moderate evidence).

**Summary of the Clinical Problem**

ATAAD and TBAD (involving the ascending and descending aorta, respectively) are associated with high morbidity and mortality. Patients often present emergently in critical condition. Health care clinicians across different specialties encounter aortic dissection, and initial management is important to patient survival and long-term outcome.<sup>1,2</sup> This article summarizes 2 guidelines on initial management and stabilization of patients presenting with ATAAD or TBAD.

**Characteristics of the Guideline Source**

The guideline on the management of ATAAD was developed by 15 surgeon members of the AATS<sup>1</sup> (Table). The committee reviewed articles published since 2000 and older relevant publications to develop the recommendations. Disagreements were resolved through regular meetings and use of the Delphi method.

The guideline on the management of TBAD was developed by a panel of experts from the STS and the AATS.<sup>2</sup> The committee

screened relevant abstracts from MEDLINE and Embase, from which 50 articles met inclusion criteria. The panel rated their recommendations using the American College of Cardiology/American Heart Association classification system with a modified Delphi method. Prior to publication, the final guideline manuscript was approved by the STS/AATS Guideline Steering Committee and then independently by the STS Workforce on Evidence Based Surgery; Council Operating Board on Quality, Research, and Patient Safety; STS Executive Committee; AATS Guidelines Committee; and AATS Executive Committee. The STS/AATS Guideline Steering Committee approved the list of authors after a review of conflict of interest disclosures.

**Evidence Base**

The panel recommended administering  $\beta$ -blockers and pain medication for initial stabilization of patients with ATAAD without severe aortic regurgitation. This recommendation was supported by an International Registry of Acute Aortic Dissection global registry study of 1301 patients with acute aortic dissection (722 with type A and 579 with type B) followed up for a median of 26 months, which showed that  $\beta$ -blockers were associated with improved survival in patients undergoing ATAAD repair (absolute rates not provided; odds ratio, 0.47; 95% CI, 0.25-0.90;  $P = .02$ ).<sup>3</sup> These data were from an observational study that compared patients treated perioperatively with  $\beta$ -blockers with those not treated with  $\beta$ -blockers. In patients with severe aortic regurgitation, vasodilator therapy to control blood pressure without prior  $\beta$ -blockers may cause reflex tachycardia that worsens the dissection.

For patients with ATAAD, emergent surgery is recommended. A study of 2952 patients with ATAAD showed in-hospital mortality associated with emergent surgery to be 19.7% vs 57.1% for patients managed medically ( $P < .001$ ).<sup>4</sup> Another study of 5611 patients showed 48-hour mortality to be 4.4% in patients undergoing emergent repair vs 23.7% in medically managed patients.<sup>5</sup> When cardiac surgery is not immediately available or for patients with complicated ATAAD, transferring patients to a comprehensive aortic

**Table. Guideline Rating**

| Standard  | Rating |
|---|--------|
| Establishing transparency   | Good   |
| Management of conflict of interest in the guideline development group                   | Good   |
| Guideline development group composition   | Good   |
| Clinical practice guideline-systematic review intersection                              | Good   |
| Establishing evidence foundations and rating strength for each guideline recommendation | Good   |
| Articulation of recommendations   |        |
| Guidelines on acute type A aortic dissection  | Good   |
| Guidelines on type B aortic dissection  | Fair   |
| External review   | Fair   |
| Updating  | Good   |
| Implementation issues   | Good   |

center is associated with improved outcomes. In a study of 16 886 Medicare beneficiaries diagnosed with ATAAD from 1999 to 2014, aortic surgery at high-volume centers was associated with a 7.2% (95% CI, 4.1%-10.3%) absolute risk reduction, from 30.1% to 22.9%, in operative mortality compared with low-volume centers, despite delays due to interhospital transfer.<sup>6</sup>

For patients with TBAD, the guideline recommends a stepwise approach to confirm organ malperfusion or other indications of complicated disease. Malperfusion is defined as end-organ ischemia and may follow visceral, kidney, spinal, and/or extremity hypoperfusion. Markers of complicated disease include a primary entry tear site at the concavity of the greater curve of the distal arch (associated with a higher risk of malperfusion and delayed aneurysmal dilatation [48% vs 12%; hazard ratio, 7.26; 95% CI, 3.03-17.36]) and increased diameter (>4.5 cm) of the descending thoracic aorta (hazard ratio, 2.46; 95% CI, 1.54-3.95).<sup>7,8</sup> Thoracic endovascular aortic repair (TEVAR) is indicated for complicated hyperacute (symptom onset, <24 hours), acute (symptom onset, 1-14 days), or subacute (symptom onset, 15-90 days) TBAD with rupture and/or malperfusion and favorable anatomy. Data from a recent systematic review of 2789 patients showed that TEVAR was associated with lower 30-day/in-hospital mortality (9.1% vs 14.7%; odds ratio, 0.54; 95% CI, 0.43-0.68;  $P < .001$ ) and lower 5-year mortality (odds ratio, 0.46; 95% CI, 0.24-0.86;  $P = .02$ ) compared with open surgical repair.<sup>9</sup>

When malperfusion is not present, the mainstay treatment for patients with uncomplicated TBAD is OMT to lower systolic blood pressure, heart rate, and myocardial contractility using  $\alpha$ -blockers

and  $\beta$ -blockers to minimize dissection propagation. Following heart rate control, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and/or dihydropyridine calcium channel blockers may be useful. This is supported by a randomized clinical trial of 140 patients that showed no difference in all-cause mortality or aorta-related mortality at 2 years between OMT and TEVAR/OMT.<sup>10</sup>

### Benefits and Harms

These guidelines clarify the initial management and triage of ATAAD and TBAD. Although OMT has been associated with improved outcomes and is recommended, the evidence is retrospective and the optimal dosage and sequence of drug administration are unclear. Furthermore, TEVAR is associated with complications, including stroke and kidney failure; therefore, underlying pathology must be carefully discerned, particularly for patients with uncomplicated TBAD, who may benefit from OMT.

### Discussion

At experienced centers, there should be prompt involvement of cardiac surgery for ATAAD and cardiac and vascular surgical teams for TBAD. The therapeutic strategy must be carefully tailored to individual patients, considering comorbidities such as coagulopathy, surgical risk, and presence of malperfusion.

### Areas in Need of Future Study or Ongoing Research

Future studies should test systems interventions to expedite triage of patients and novel interventional and operative strategies. Data on the timing of TEVAR in the acute phase of TBAD would be helpful.

#### ARTICLE INFORMATION

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**Section Editor:** David L. Simel, MD, MHS, Associate Editor.

**Published Online:** February 16, 2023.  
doi:10.1001/jama.2023.0265

#### Conflict of Interest Disclosures:

Dr Vallabhajosyula reported advisory board membership with Terumo Corp. No other disclosures were reported.

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