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HEALTHY HEART

VOLUME-17 | ISSUE-197 | APRIL 05, 2026

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HEALTHY HEART
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Aortic Dissection

Aortic dissection represents a catastrophic cardiovascular event characterized by the separation of the aortic wall layers due to the intrusion of blood through a tear in the intima. While rare, aortic dissection carries high mortality, necessitating rapid diagnosis and immediate intervention. Recent advances include refined imaging modalities and the evolving role of endovascular repair in management, making a multidisciplinary approach essential for optimal outcomes.

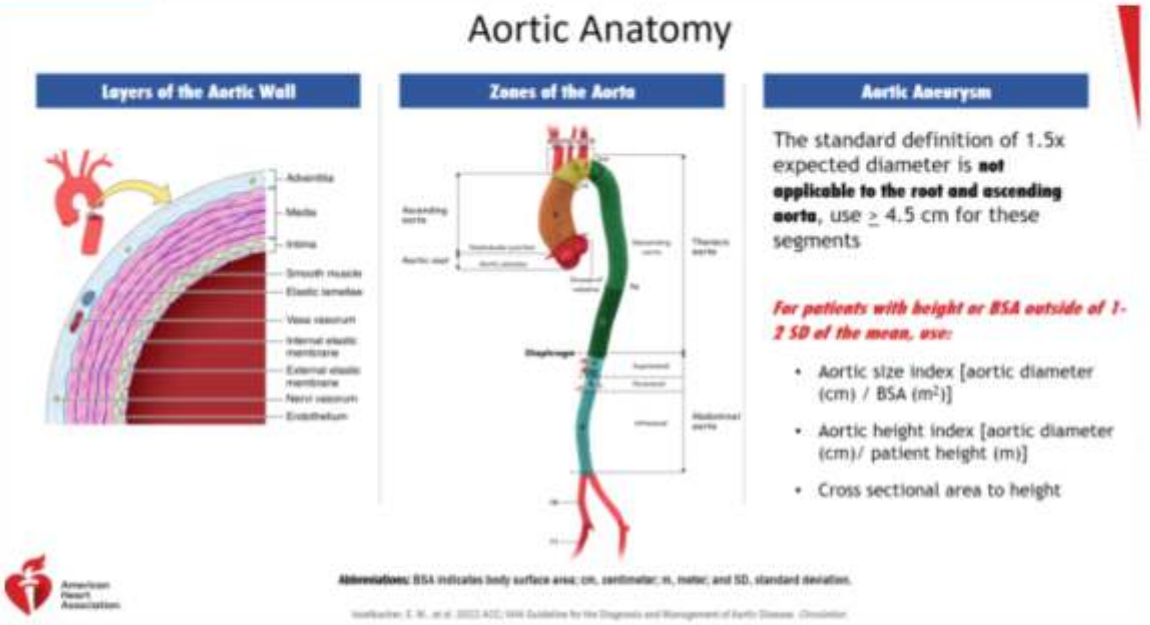
Epidemiology and Risk Factors

Aortic dissection emerges predominantly in men in their sixth or seventh decade. Hypertension is the chief risk factor, contributing directly to increased mechanical stress on the aortic wall, accounting for over 70% of cases. Additional predisposing conditions include:

- **Smoking**
- **Atherosclerosis**
- **Illicit drug use:** Especially stimulants like Cocaine and methamphetamine
- **Aortic aneurysm**
- **Connective tissue disorders:** These include Marfan syndrome, Ehlers-Danlos syndrome, and Loeys-Dietz syndrome
- **Inflammatory diseases:** like Giant cell arteritis, Takayasu's arteritis, Systemic lupus erythematosus, and Rheumatoid arthritis
- Congenital heart defects: Such as **Bicuspid Aortic Valve** and **Aortic Coarctation**
- Genetic conditions: **Turner syndrome** is associated with aortic root dilatation and increased risk
- **Trauma:** Both blunt chest trauma (e.g., car accidents) and iatrogenic injury during medical procedures can cause dissection
- **Pregnancy** and postpartum period: Rare but recognized risk

Pathophysiology

The aorta comprises three distinct layers: intima (innermost), media, and adventitia (outermost). Chronic exposure to elevated pressure or shear stress provokes degeneration, particularly of the media. The initial tear usually develops in the ascending aorta where shear forces are maximal, allowing blood entry between the intima and media. This column of blood cleaves the wall longitudinally, forming a false lumen that may propagate retrograde or distally.



Propagation direction determines clinical complications:

- **Retrograde (proximal) spread:** Can precipitate Hemopericardium, cardiac tamponade, aortic regurgitation, or direct rupture.
- **Anterograde (distal) spread:** May compromise flow in major aortic branches, causing ischemia to organs including the heart, kidneys, intestines, or spinal cord.

The false lumen often expands more rapidly than the true lumen, increasing the risk of aneurysm formation and eventual rupture. The three typical sites for an acute dissection are:

1. 2–2.5 cm above the aortic root. 2. Just distal to the left subclavian artery. 3. Within the aortic arch

Clinical Presentation

Classic symptoms of aortic dissection include sudden, severe, tearing or ripping chest or back pain, with radiation possible to the abdomen, neck, or jaw. Other features include:

- **Syncope:** Due to compromised cerebral perfusion or cardiac tamponade.
- **Stroke-like symptoms:** From carotid or vertebral artery involvement.
- **Limb ischemia:** Obstruction of peripheral arteries.
- **Myocardial infarction:** Rare, affecting up to 8% of cases when coronary arteries are involved.
- **Hypotension or shock:** Suggests rupture or aortic valve involvement.

Physical findings include asymmetrical blood pressures across limbs, deficits in pulses, and a new diastolic murmur if aortic regurgitation develops. Neurological deficits may occur in 20% of cases.

Chronic dissections (>2 weeks duration) present with more subtle features, such as persistent pain or features of heart failure due to regurgitation or aneurysm formation.

Diagnostic Workup

Aortic dissection requires rapid confirmation because mortality increases with delays. Diagnostic steps include:

Clinical Evaluation

Focused history and examination are crucial, paying attention to classic pain characteristics and risk factors.

Imaging Modalities

- **Computed Tomography Angiography (CTA):** Gold standard for diagnosis, rapid, high sensitivity.
- **Transesophageal Echocardiography (TEE):** Bedside option in unstable patients, useful for ascending aorta.
- **Magnetic Resonance Imaging (MRI):** High-resolution image, better for chronic cases, limited utility in acute settings due to time and accessibility.
- **Chest X-ray:** May show widened mediastinum but is only suggestive, not definitive.

Laboratory Tests

- **D-dimer:** Elevated levels appear in dissection, but nonspecific.
- **Cardiac enzymes:** May be elevated if myocardial ischemia or infarction is present.

Risk Stratification Tools

The Aortic Dissection Detection Risk Score (ADD-RS) Combines history, examination, and laboratory data to identify high-risk patients and guide further imaging.

Classification

Aortic dissections are categorized using the Stanford and DeBakey systems:

Recent modifications include recognition of "non-A non-B" dissections and the novel TEM system, focusing on anatomical and malperfusion parameters. These updated classifications aim for a more nuanced clinical decision-making framework.

Classification	Description	Management Approach
DeBakey I	Originates in ascending aorta, propagates distally	Surgical emergency
DeBakey II	Confined to ascending aorta	Surgical emergency
DeBakey III	Originates in descending aorta, propagates distally	Medical or surgical
Stanford A	Any dissection involving ascending aorta	Surgical emergency
Stanford B	Dissection limited to descending aorta	Usually medical

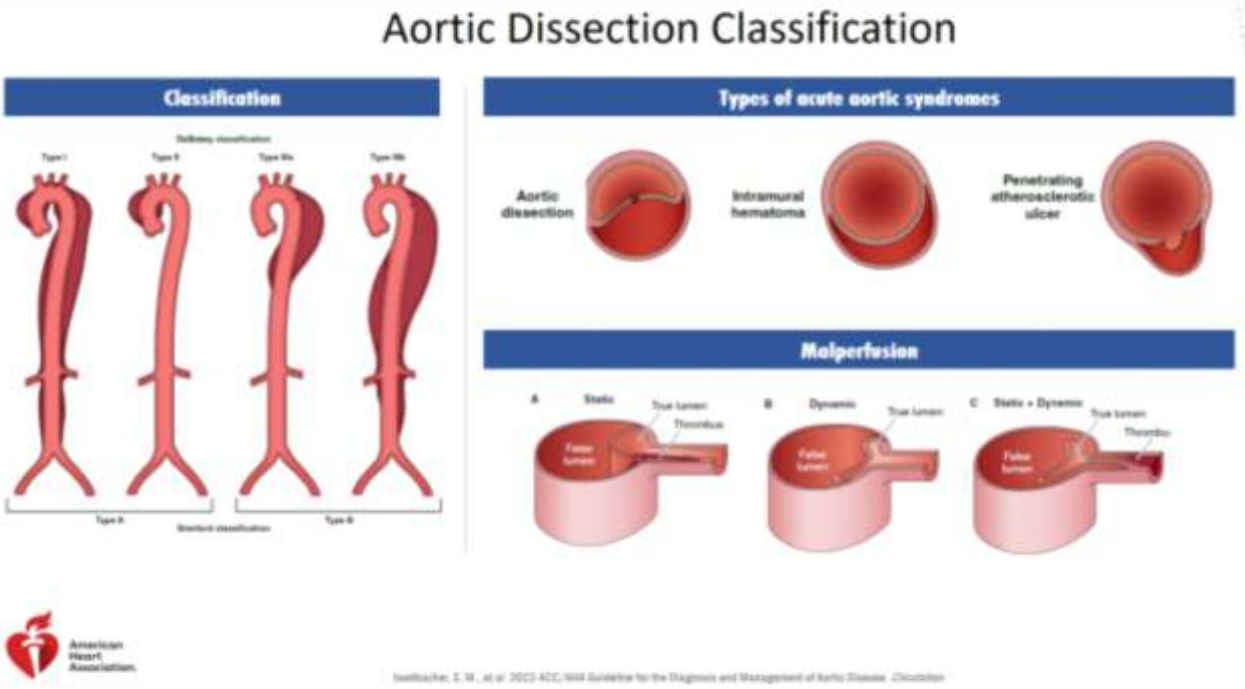
Management

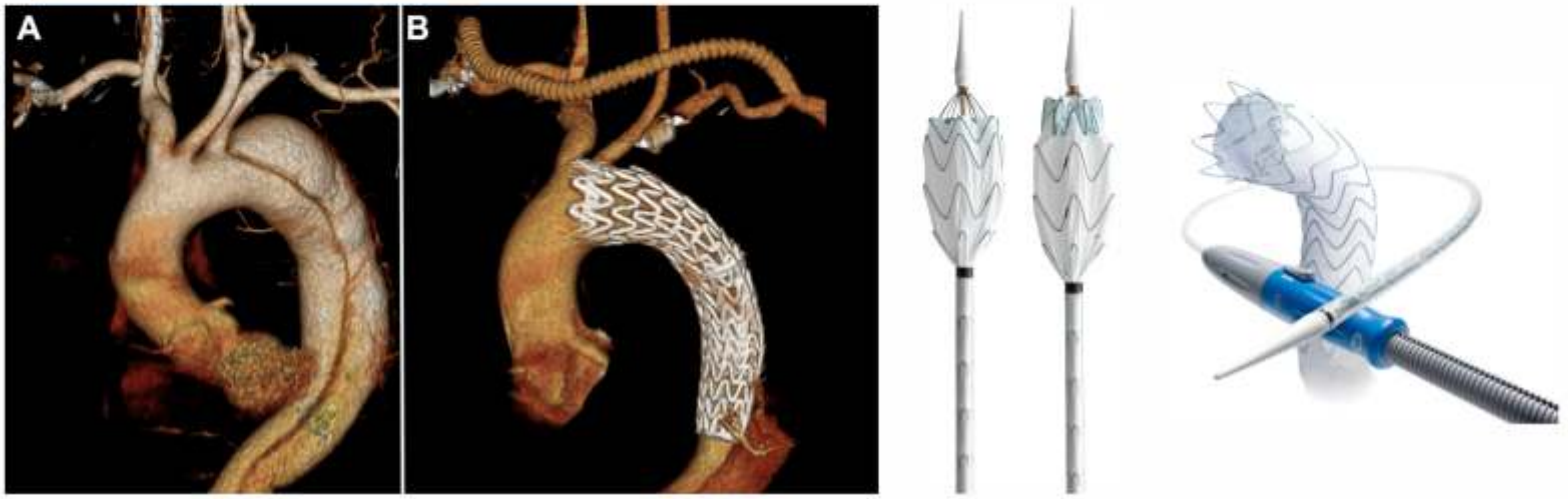
Type A Dissections

Urgent surgical repair is mandatory for all Type A dissections due to the risk of rupture, tamponade, and other lethal complications.

- Surgical Technique
  - o Excision of intimal tear
  - o Closure of entry into false lumen
  - o Aortic replacement using synthetic grafts
  - o Possible aortic valve repair or Bentall procedure if root or valve involved.

Complex arch involvement may also require cerebral protection strategies to reduce neurologic complications.





TEVAR Endovascular Graft

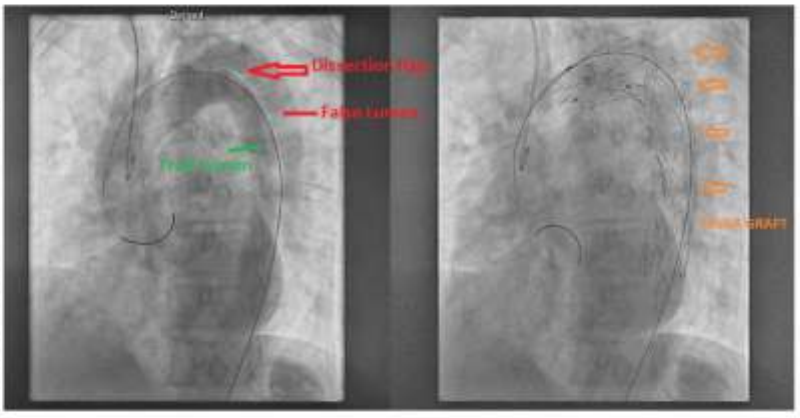
Type B Dissections

Type B dissections (descending aorta) receive initial medical management unless complications arise.

- **Medical Management**
  - o Blood pressure and heart rate control: Intravenous beta-blockers, vasodilators, aiming for systolic pressure <120 mmHg.
  - o Pain management and monitoring for progression.
- **Endovascular Repair**
  - o Thoracic Endovascular Aortic Repair (TEVAR) increasingly favoured for complicated Type B dissections (e.g., ongoing pain, aortic rupture, malperfusion).
  - o Uncomplicated cases: The role of TEVAR is evolving, and conservative therapy remains standard, but newer data suggest possible benefit of prophylactic stent placement.

Chronic Dissection

Long-term management emphasizes blood pressure control, routine imaging for progression, and elective repair for aneurysmal degeneration.



Prognosis

Without treatment, mortality for Stanford Type A dissections exceeds 50% within 48 hours; with effective intervention, hospital mortality drops to 10-20%. Type B dissections fare better but still risk lethal complications if they progress. Chronic dissections require diligent monitoring for late aneurysm formation or rupture. Long-term survival is possible with strict adherence to medical therapy and imaging follow-up. Quality of life depends on the extent of repair, organ involvement, and comorbidities.

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