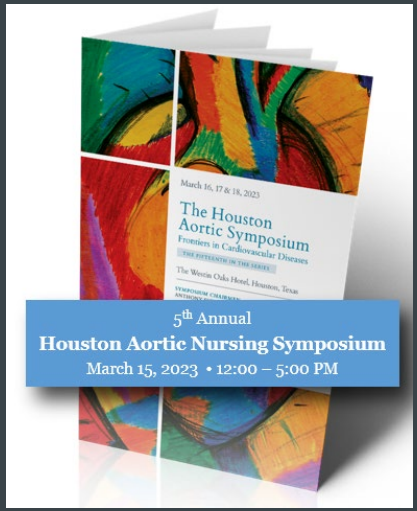
2022 AHA/ACC Guidelines for Diagnosis and Management of Aortic Disease



Rita Weise MSN, ACNPC-AG
Nurse Practitioner Supervisor
Matranga Aortic Center and Marfan and Associated Conditions Clinic
Hoag Memorial Hospital, Newport Beach CA

5th Annual
Houston Aortic Nursing Symposium
May 15, 2023

UTHealth Houston Heart & Vascular
MEMORIAL HERMANN Heart & Vascular

hoag.
Jeffrey M. Carlton Heart & Vascular Institute

Goals of aortic update

1) Know the class of recommendations and levels of evidence

2) What is a multidisciplinary aortic team

3) Shared decision making

4) When to utilize genetic testing

5) Surgical size guidelines

6) Medical Management Acute and Long-term

ACCF/AHA GUIDELINE

2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine

2014 ESC Guidelines on the diagnosis and treatment of aortic diseases

Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult

The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC)

Position Statement

Canadian Cardiovascular Society Position Statement on the Management of Thoracic Aortic Disease

2021 The American Association for Thoracic Surgery expert consensus document: Surgical treatment of acute type A aortic dissection

CLINICAL PRACTICE GUIDELINE

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines

Developed in collaboration with and endorsed by the American Association for Thoracic Surgery, American College of Radiology, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, and Society for Vascular Surgery

Endorsed by the Society of Interventional Radiology and Society for Vascular Medicine

Table

Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care

CLASS (STRENGTH) OF RECOMMENDATION	
CLASS 1 (STRONG)	**Benefit >>> Risk**
Suggested phrases for writing recommendations: • Is recommended • Is indicated/useful/effective/beneficial • Should be performed/administered/other • Comparative-Effectiveness Phrases†: – Treatment/strategy A is recommended/indicated in preference to treatment B – Treatment A should be chosen over treatment B	
CLASS 2a (MODERATE)	**Benefit >> Risk**
Suggested phrases for writing recommendations: • Is reasonable • Can be useful/effective/beneficial • Comparative-Effectiveness Phrases†: – Treatment/strategy A is probably recommended/indicated in preference to treatment B – It is reasonable to choose treatment A over treatment B	
CLASS 2b (Weak)	**Benefit ≥ Risk**
Suggested phrases for writing recommendations: • May/might be reasonable • May/might be considered • Usefulness/effectiveness is unknown/unclear/uncertain or not well-established	
CLASS 3: No Benefit (MODERATE)	**Benefit = Risk**
Suggested phrases for writing recommendations: • Is not recommended • Is not indicated/useful/effective/beneficial • Should not be performed/administered/other	
CLASS 3: Harm (STRONG)	**Risk > Benefit**
Suggested phrases for writing recommendations: • Potentially harmful • Causes harm • Associated with excess morbidity/mortality • Should not be performed/administered/other	

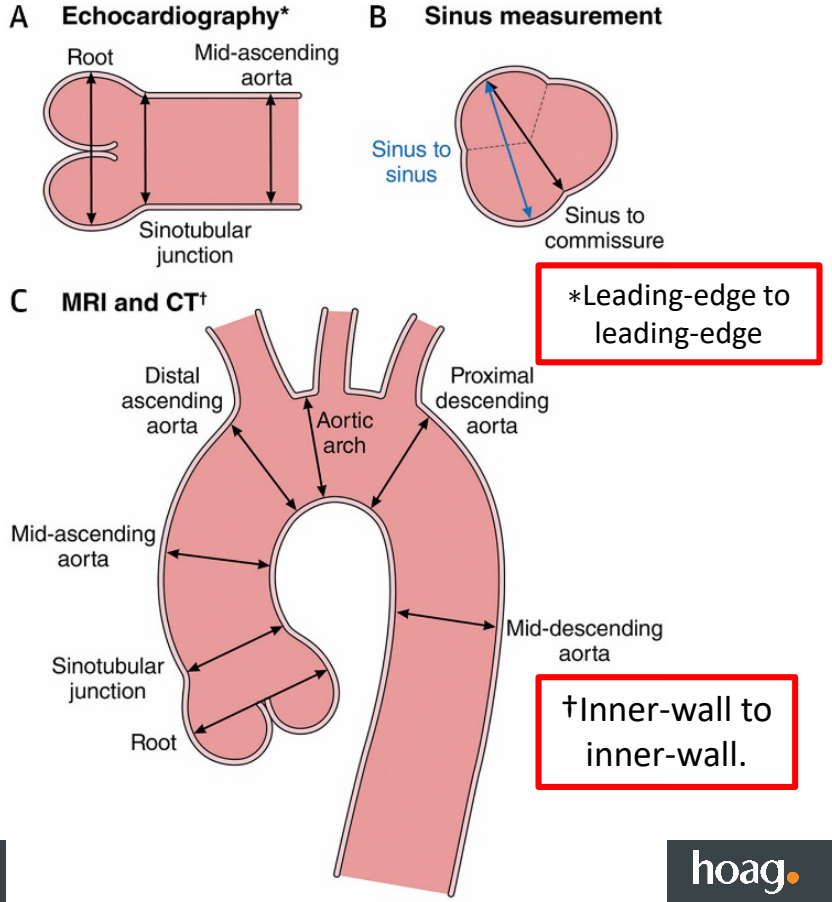
LEVEL (QUALITY) OF EVIDENCE‡	
LEVEL A	
• High-quality evidence‡ from more than 1 RCT • Meta-analyses of high-quality RCTs • One or more RCTs corroborated by high-quality registry studies	
LEVEL B-R	**(Randomized)**
• Moderate-quality evidence‡ from 1 or more RCTs • Meta-analyses of moderate-quality RCTs	
LEVEL B-NR	**(Nonrandomized)**
• Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies • Meta-analyses of such studies	
LEVEL C-LD	**(Limited Data)**
• Randomized or nonrandomized observational or registry studies with limitations of design or execution • Meta-analyses of such studies • Physiological or mechanistic studies in human subjects	
LEVEL C-EO	**(Expert Opinion)**
• Consensus of expert opinion based on clinical experience.	

American Heart Association.

Imaging Modalities

CT, MRI & Echo imaging of patients with aortic disease should follow recommended:

- approaches for image acquisition
- measurement and reporting of relevant aortic dimensions
- frequency of surveillance before and after intervention



Aortic Imaging Techniques to Determine Presence and Progression of Aortic Disease

Recommendations for Aortic Imaging Techniques to Determine Presence and Progression of Aortic Disease Referenced studies that support the recommendations are summarized in the Online Data Supplement.		
COR	**LOE**	**Recommendations**
1	B-NR	1. In patients with known or suspected aortic disease, aortic diameters should be measured at reproducible anatomic landmarks perpendicular to axis of blood flow, and these measurement methods should be reported in a clear and consistent manner. In cases of asymmetric or oval contour, the longest diameter and its perpendicular diameter should be reported.
1	C-LD	2. In patients with known or suspected aortic disease, episodic and cumulative ionizing radiation doses should be kept as low as feasible while maintaining diagnostic image quality.

Aortic Imaging Techniques to Determine Presence and Progression of Aortic Disease (cont'd)

1	C-EO	3. In patients with known or suspected aortic disease, when performing CT or MR imaging, it is recommended that the root and ascending aortic diameters be measured from inner-edge to inner-edge, using an electrocardiographic-synchronized technique. If there are aortic wall abnormalities, such as atherosclerosis or discrete wall thickening (more common in the distal aorta), the outer-edge to outer-edge diameter should be reported (Table 4).
1	C-EO	4. In patients with known or suspected aortic disease, the aortic root diameter should be recorded as maximum sinus to sinus measurement. In the setting of known asymmetry, multiple measurements should be reported, and both short- and long-axis images of the root should be obtained to avoid underestimation of the diameter.
2a	C-LD	5. In patients with known or suspected aortic disease, it is reasonable that a dilated root or ascending aorta be indexed to patient height or BSA in the report, to aid in clinical risk assessment.
2a	C-EO	6. In patients with known or suspected aortic disease, when performing echocardiography, it is reasonable to measure the aorta from leading-edge to leading-edge, perpendicular to the axis of blood flow. Using inner-edge to inner-edge measurements may also be considered, particularly on short-axis imaging.

Multidisciplinary Aortic Teams

Recommendations for Multidisciplinary Aortic Teams		
COR	**LOE**	**Recommendations**
1	**C-EO**	1. For patients with acute aortic disease that requires urgent repair, a multidisciplinary team should determine the most suitable intervention.
2a	**C-LD**	2. For patients who are asymptomatic with extensive aortic disease, or who may benefit from complex open and endovascular aortic repairs, or with multiple comorbidities for whom intervention is considered, referral to a high-volume center (performing at least 30-40 aortic procedures annually) with experienced surgeons in a Multidisciplinary Aortic Team is reasonable to optimize treatment outcomes.[1-6]

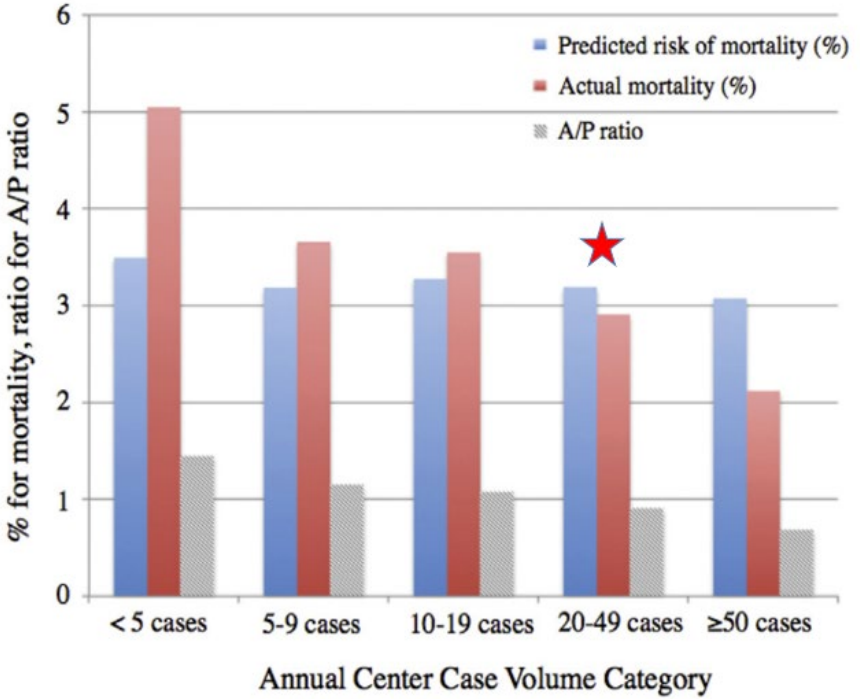
JAMA Cardiology | Original Investigation

Early Mortality in Type A Acute Aortic Dissection
Insights From the International Registry of Acute Aortic Dissection

Kevin M. Harris, MD; Christoph A. Nienaber, MD; Mark D. Peterson, MD; Elise M. Woznicki, BS; Alan C. Braverman, MD; Santi Trimarchi, MD, PhD; Truls Myrmel, MD, PhD; Reed Pyeritz, MD; Stuart Hutchison, MD; Craig Strauss, MD; Marek P. Ehrlich, MD; Thomas G. Gleason, MS, MD; Amit Korach, MD; Daniel G. Montgomery, BS; Eric M. Isselbacher, MD; Kim A. Eagle, MD

Processes of Care and Aortic Centers

The critical group of patients who die before surgery highlights the importance of processes to rapidly identify AD and move these patients to surgery without delay.[3] There are inherent delays in AD recognition and treatment, with times from presentation to diagnosis of 2.5 hours and from diagnosis to surgery of 3.5 hours, totaling 6 hours from emergency department arrival to surgery in IRAD centers.[9] In the group of patients who died awaiting surgery, the median (IQR) time from presentation to death was 8.9 hours (4-32). Interhospital transfer is needed in more than 70% of cases, leading to inherent treatment delays, and several centers have developed regional transfer processes.[3,23-31] A regional care model with emphasis on diagnosis and treatment protocols has been shown to reduce times to diagnosis and treatment.[23]

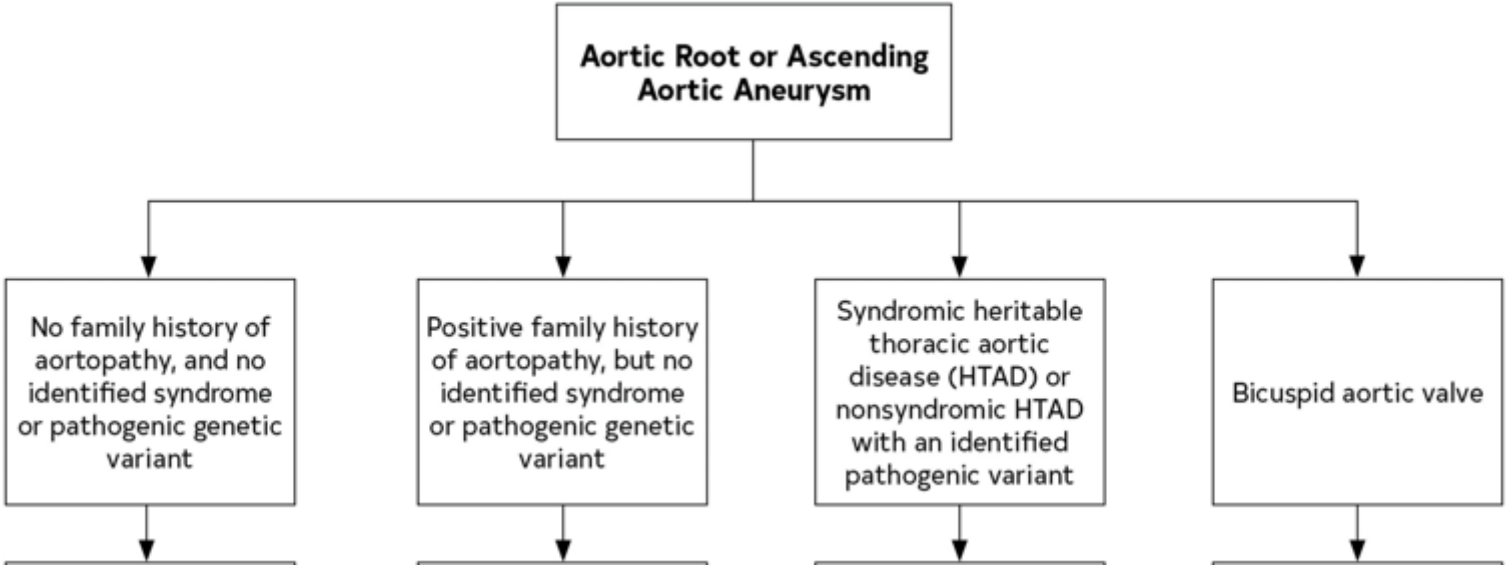


JAMA Cardiol.2022: 7(10):109-1015

hoag.

Shared Decision Making

COR	LOE	RECOMMENDATIONS
1	C-LD	1. In patients with aortic disease, shared decision-making is recommended when determining the appropriate thresholds for intervention, deciding on the type of surgical repair, choosing between open surgical versus endovascular approaches; and in medical management and surveillance.[1-6]
1	C-EO	2. In patients with aortic disease who are contemplating pregnancy or who are pregnant, shared decision-making is recommended when considering the cardiovascular risks of pregnancy, the diameter thresholds for prophylactic aortic surgery, and the mode of delivery.



Sporadic

Familial
Accurate interview

Syndromic
Clinical exam

BAV
Screening

Eric M. Isselbacher. Circulation. 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines, Volume: 146, Issue: 24, Pages: e334-e482, DOI: (10.1161/CIR.0000000000001106)

When to utilize clinical genetic testing?

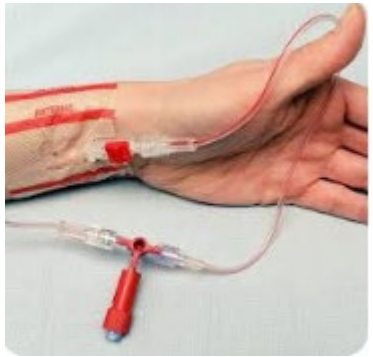
- **Thoracic aortic aneurysm**
  - Syndromic features
  - Dissection/aneurysm before age 60
  - FHx of TAD or SCD <50 y
- **BAV aortopathy**
  - FHx of aortic disease or SCD <50 y
  - With (minor) syndromic features (10% of LDS with BAV)

"It should be recognized that there is no upper limit of age at which patients present with TAD that precludes an underlying genetic cause of the disease."

Personalized Approach (clinical data, and gene variant)

4.0 cm	4.2 cm	4.5 cm	5.0 cm	5.5 cm
PRKG1*	ACTA-2*	ACTA-2	BAV#	BAV
TGFBR1*		TGFBR1		
TGFBR2*		TGFBR2	Sporadic#	Sporadic
vEDS		SMAD3		
		TGFB2	Marfan syndrome	
Turner syndrome (>2.5 cm/m2 in patients 15 y and older)		Concomitant Aortic valve surgery #	HTAD	
			Concomitant aortic valve surgery	
		HTAD (other or unknown gene and with risk factors*)		

Acute Aortic Syndrome
Medication Management



Recommendations for Acute Medical Management of AAS Referenced studies that support the recommendations are summarized in the Online Data Supplement.		
COR	**LOE**	**Recommendations**
1	B-NR	1. In patients presenting to the hospital with AAS, prompt treatment with anti-impulse therapy with invasive monitoring of BP with an arterial line in an ICU setting is recommended as initial treatment to decrease aortic wall stress.[1-5]
1	C-LD	2. Patients with AAS should be treated to an SBP <120 mm Hg or to lowest BP that maintains adequate end-organ perfusion, as well as to a target heart rate of 60 to 80 bpm.[3,6]
1	B-NR	3. In patients with AAS, initial management should include intravenous beta blockers, except in patients with contraindications.[2,5,7]
2a	B-NR	In those with contraindications or intolerance to beta blockers, initial management with an intravenous non-dihydropyridine calcium channel blocker is reasonable for heart rate control.[1,2,5]
1	C-LD	4. In patients with AAS, initial management should include intravenous vasodilators if the BP is not well controlled after initiation of intravenous beta-blocker therapy.[8]
1	C-EO	5. Patients with AAS should be treated with pain control, as needed, to help with hemodynamic management.

Goals: SBP <120 & HR 60-80

- Decrease aortic wall stress by lowering the **systolic blood pressure**, which reduces the possibility of rupture
- Decrease aortic shear stress by minimizing the **rate of rise of aortic pressure** to decrease the likelihood of dissection propagation

- IV Beta blocker:

Esmolol, metoprolol, labetalol

  - Beta-1 selective blocking agent with a short half life.
  - Calcium channel blockers if contraindicated
  - Decreases the inotropic state of the myocardium and decreases the heart rate

- Calcium Channel Blocker

Nicardipine, Amlodipine

- IV Vasodilator: Sodium nitroprusside
  - Direct arterial vasodilator, short onset and duration of action
- Pain control: Treat symptoms

Morphine, Fentanyl

Long Term Medication Management

Recommendations for BP Management in TAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
1	B-NR	1. In patients with TAA and an average systolic BP (SBP) of ≥130 mm Hg or an average diastolic BP (DBP) of ≥80 mm Hg, the use of antihypertensive medications is recommended to reduce risk of cardiovascular events.[1-3]
COR	**LOE**	**Recommendations**
2a	C-LD	2. In patients with TAA, regardless of cause and in the absence of contraindications, use of beta blockers to achieve target BP goals is reasonable.[1,4,5]
2a	C-EO	3. In patients with TAA, regardless of etiology and in the absence of contraindications, ARB therapy is a reasonable adjunct to beta-blocker therapy to achieve target BP goals.[6]

Recommendation for BP Management in AAA
Referenced studies that support the recommendation are summarized in the Online Data Supplement.

COR	LOE	Recommendation
1	B-NR	1. In patients with AAA and an average SBP of ≥130 mm Hg, or an average DBP of ≥80 mm Hg, the use of antihypertensive medication is recommended to reduce risk of cardiovascular events.[1-3]

GOAL: SBP <130/80 mmHg

Beta Blocker: (Metoprolol, Carvedilol)

↓HR, SV

ARB: (Losartan, Valsartan)

↓SVR, SV

Long Term Management Cont.

Recommendations for Treatment of TAA With Statins

COR	LOE	Recommendations
2a	C-LD	1. In patients with TAA and imaging or clinical evidence of atherosclerosis, statin therapy at moderate or high intensity is reasonable.[1,2]
2b	C-LD	2. In patients with TAA who have no evidence of atherosclerosis, the use of statin therapy may be considered.[3-6]

Recommendation for Smoking Cessation in AAA

COR	LOE	Recommendation
1	C-LD	1. In patients with AAA who smoke cigarettes, smoking cessation efforts are recommended.[1-4]

Recommendation for Smoking Cessation in TAA

COR	LOE	Recommendation
1	C-LD	1. In patients with TAA who smoke cigarettes, smoking cessation efforts are recommended.[1,2]

Recommendations for Treatment of AAA With Statins
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
1	B-NR	1. In patients with AAA and evidence of aortic atherosclerosis, statin therapy at moderate or high intensity is recommended.[1-3]
2b	C-LD	2. In patients with AAA but no evidence of atherosclerosis, statin therapy may be considered.[4,5]

Thank You!

Rita.weise@hoag.org

Hoag Memorial Hospital

949-764-5314