What Are the Current Guidelines for Treating Thoracic Aortic Disease?

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Presenter Disclosure Information

• No relationships to disclose
• Will discuss the off-label use of ARBs
Ascending vs. Descending Aneurysms

Ascending vs. Descending Aneurysms

- Marfan syndrome
- Loeys-Dietz syndrome
- Bicuspid aortic valve
- Familial thoracic aortic aneurysm syndrome
- Sporadic/idiopathic

- Advanced age
- Hypertension
- Atherosclerosis
- Smoking

Thoracic Aortic Aneurysms: Natural History

Asymptomatic TAA

Growth
Rates of Growth

Thoracic Aortic Aneurysms: Natural History

Asymptomatic TAA

Growth

Rupture Dissection
Medical Management of Thoracic Aortic Aneurysms
Beta Blockers

- Proven benefit in Marfan syndrome
- No trials in TAAs of other etiologies
- Mainstay of therapy.
Newer Therapeutic Strategy For Treating Marfan Syndrome

• Hal Dietz et al
  – Many consequences of Marfan syndrome result from excessive TGF-β signaling

• Losartan, an angiotensin II type 1 receptor (AT1) blocker, inhibits activity of TGF-β.
Efficacy of Losartan in Mouse Model of MFS: Aortic Growth Over 6 Months

Hagashi J, et al. Science 2006;312:117-121
Losartan to Treat Humans: Non-Randomized Trial Before and After Rx

Atenolol vs. losartan for MFS: A randomized blinded placebo-controlled trial

Could Losartan Be More Effective as Add-on Therapy?

- **Marfan-Sartan Trial**
  - A randomized, double-blind, placebo-controlled trial comparing add-on losartan vs. placebo in Marfan patients, 86% already on beta-blocker

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**Graphs**

- Placebo vs. Losartan over 5 years

**References**

Medical Therapy of Thoracic Aneurysms: 2010 ACC/AHA Guidelines

• Class I
  – Beta-blockers should be administered to all patients with MFS and aortic aneurysm unless contraindicated.

• Class IIa
  – For patients with thoracic aortic aneurysms, it is reasonable to reduce BP with beta blockers and ACEIs or ARBs to the lowest point patients can tolerate without adverse effects.
  – An ARB is reasonable for patients with MFS, to reduce the rate of aortic dilatation, unless contraindicated.

ACC/AHA Guidelines for Management of Thoracic Aortic Disease, J Am Coll Cardiol 2010;55: e27-e129
Thoracic Aortic Aneurysms: Natural History

Asymptomatic TAA

Growth

Rupture

Dissection

Repair
Weighing the Risk of Aortic Dissection vs. the Risk of Intervention
Rate of Aortic Events vs. Ascending Aortic Diameter

Risk of Aortic Dissection vs. the Risk of Surgery

Mortality of Unoperated Ascending TAA vs. Size

- Sporadic
- Congenital
Indications for Intervention
Ascending Aortic Aneurysms: Indications for Aortic Repair

• Class I
  – Idiopathic (sporadic) aneurysms: ≥ 5.5 cm
    • High risk surgery: ≥ 6.0 cm
    • Low risk for surgery: ≥ 5.0 cm
  – Rapid expansion
    • ≥ 0.5 cm/year
    • Perhaps ≥ 0.3 cm/year, if consistent growth (extrapolated from ESC guidelines)
  – Severe AR: Symptoms or LV dysfunction.

J Am Coll Cardiol 2010; 55:e27-e129
Ascending Aortic Aneurysms: Indications for Aortic Repair

• Class I
  - Marfan syndrome or familial: ≥ 5.0 cm
    • Low risk for surgery: ≥ 4.5 cm
    • Increased risk for dissection (FHx of AoD at a small diameter): ≥ 4.0 cm.

J Am Coll Cardiol 2010; 55:e27-e129
Histogram of ages at time of AoD of sporadic vs. familial syndrome patients

Proband ages at AoD vs. other dissecting family member’s ages at AoD

Should we be more aggressive for aneurysm patients with a BAV?
BAV and Risk of Aortic Dissection

• Presumed to be genetically mediated

• Histologically similar to Marfan syndrome.
2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease: Executive Summary


Endorsed by the North American Society for Cardiovascular Imaging

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ACC/AHA Guidelines for Management of Thoracic Aortic Disease, J Am Coll Cardiol 2010;55: e27-e129
Maximal Root or Ascending Aortic Diameter at the Time of Dissection

5.6 ± 1.1 cm

6.6 ± 1.5 cm

Equal Rates of Aortic Dissection / Rupture

2016, 5.5 cm threshold for surgery in BAV

ACC/AHA GUIDELINES CLARIFICATION

Surgery for Aortic Dilatation in Patients With Bicuspid Aortic Valves

A Statement of Clarification From the American College of Cardiology/
American Heart Association Task Force on Clinical Practice Guidelines

A Statement of Clarification From the ACC/AHA, J Am Coll Cardiol 2016; 67:724-731
Aneurysms: Size Matters
What About Patient Size?
Two women in their 50s with a bicuspid aortic valve

5.5 cm

4.5 cm
Factoring Height into a Threshold for Surgery

- Class IIa
  - Elective aortic replacement is reasonable for patients with MFS or other genetic diseases, when the ratio of maximal ascending or aortic root area in cm² divided by the patient’s height in meters exceeds 10

\[ \pi r^2 (\text{cm}^2)/\text{height (m)} > 10 \]

ACC/AHA Guidelines for Management of Thoracic Aortic Disease,
J Am Coll Cardiol 2010;55: e27-e129
Factoring Height into a Threshold for Surgery in those with TAV

- Masri et al, Cleveland Clinic
  - Consecutive patients with dilated aortic root or ascending aorta identified by echo or CT (2003-2007)
  - Followed a mean of 10.8 years
  - 327 patients with a tricuspid aortic valve and aortic diameter 4.5-5.5 cm
  - 44% had an aortic root area/height ratio ≥10
    - 78% died
    - Aortic surgery associated with improved survival.

Cross-sectional area to height ratio ≥ 10

Cross-sectional area to height ratio ≥ 10

Next Guidelines?
Aortic Arch Aneurysms: Indications for Aortic Repair

• Class IIa
  – Isolated arch aneurysm: ≥ 5.5 cm
  – Aortic arch repair may be considered in pts with arch aneurysm who already have an indication for surgery of an adjacent aneurysm located in the ascending or descending aorta

J Am Coll Cardiol 2010; 55:e27-e129
Eur Heart J 2014; 35:2873–2926
Descending Aortic Aneurysms: Indications for Aortic Repair

• Class IIa
  – Chronic dissection: ≥ 5.5 cm
    • If due to connective tissue disorder, open repair rather than TEVAR
  – Degenerative aneurysm
    • TEVAR candidates: ≥ 5.5cm
    • Requiring open surgery ≥ 6.0 cm
  – Rapid expansion (≥ 0.5 cm/year).

J Am Coll Cardiol 2010; 55:e27-e129
Eur Heart J 2014; 35:2873–2926
Time is up!