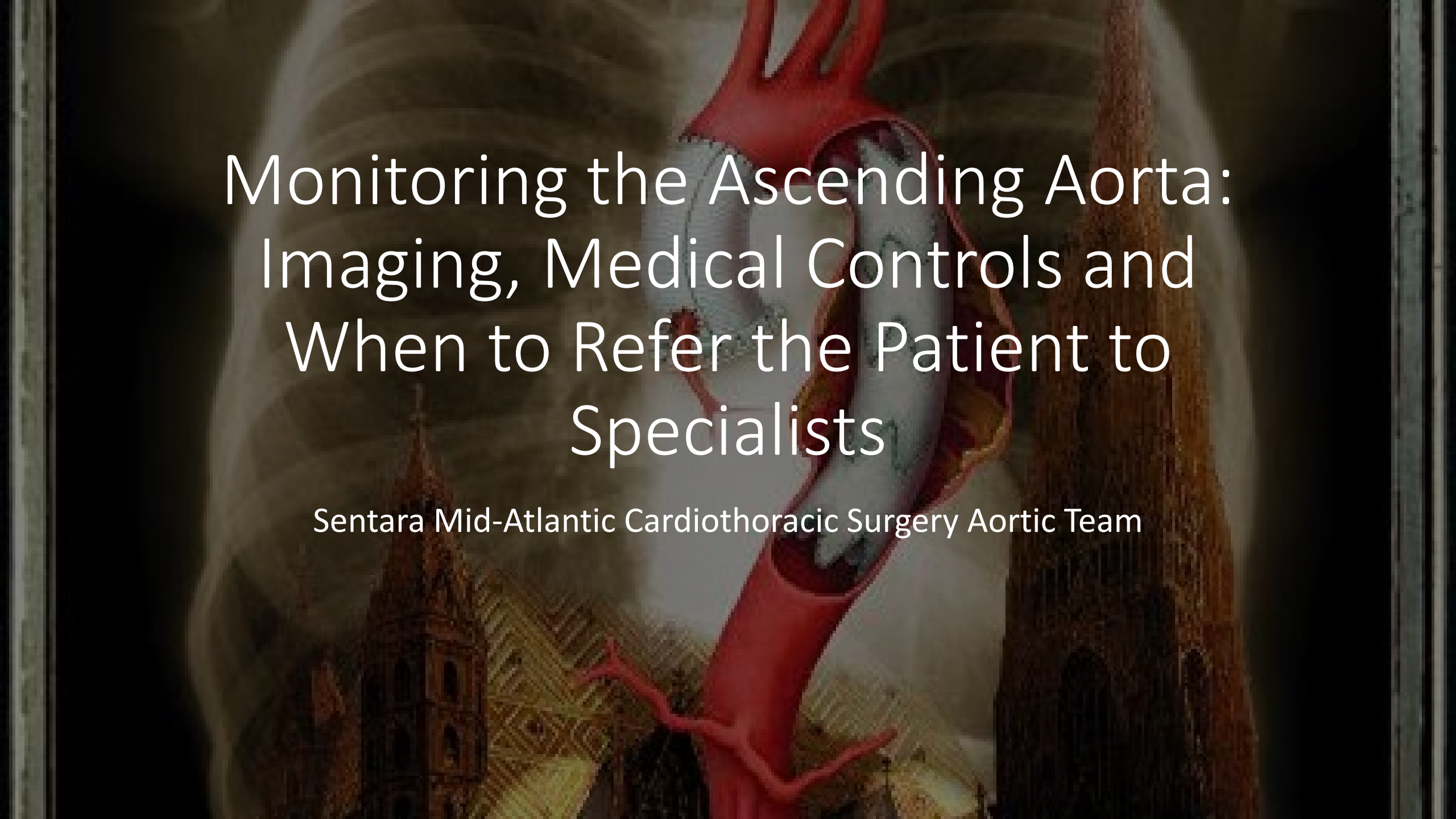
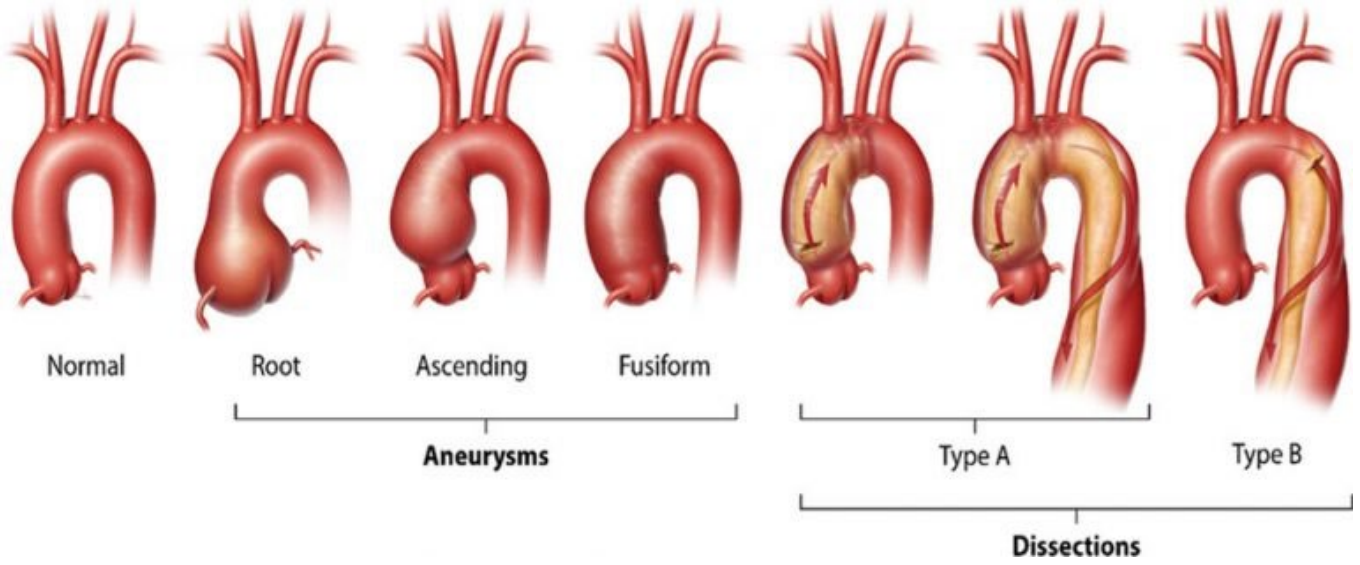


Monitoring the Ascending Aorta: Imaging, Medical Controls and When to Refer the Patient to Specialists

Sentara Mid-Atlantic Cardiothoracic Surgery Aortic Team

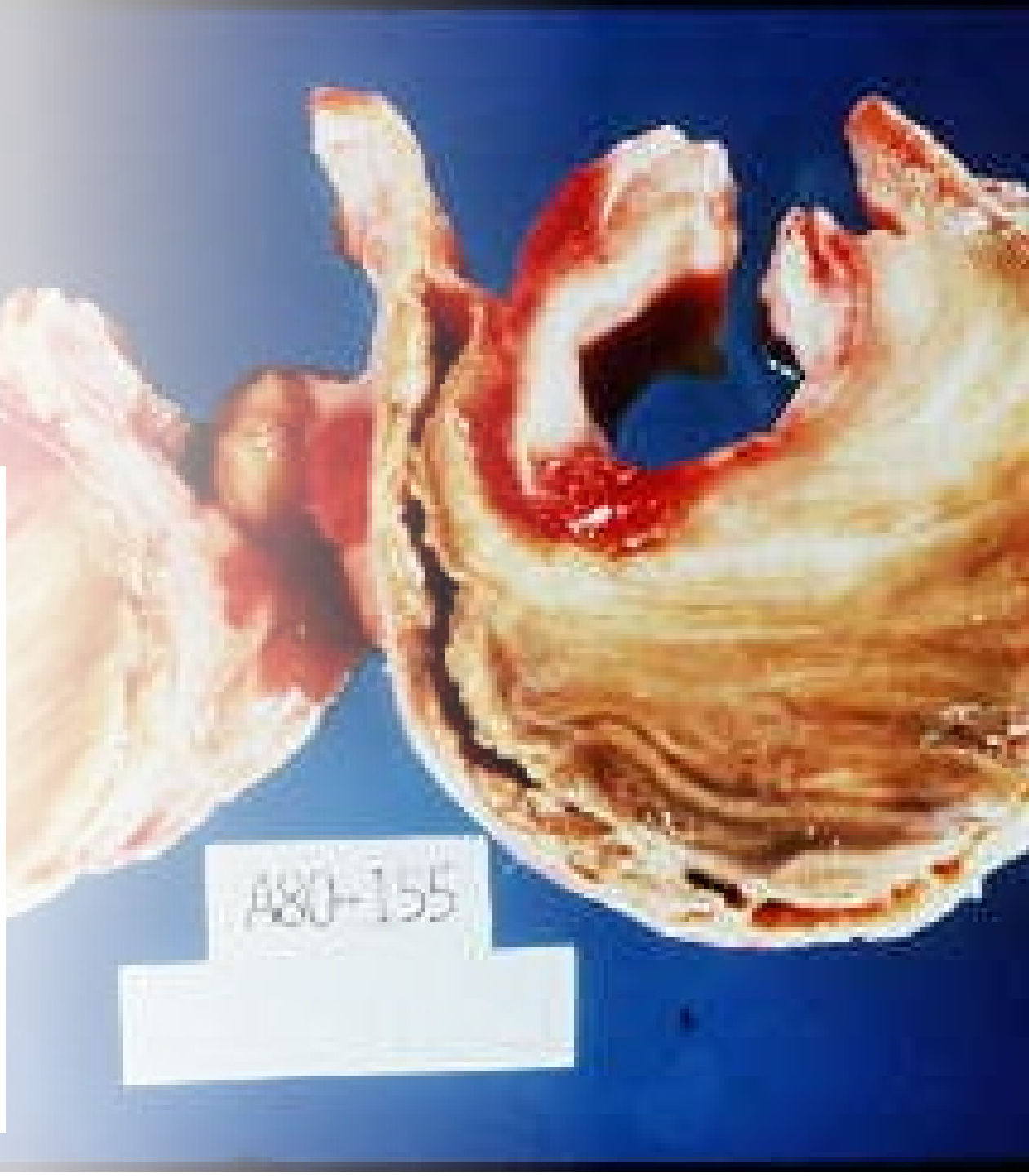
Thoracic Aortic Aneurysms

- Incidence: 10/100 000 person years
- Root/Ascending most common: 60%
- Descending: 30%
- Arch: 10%
- Growth rates variable
  - Marfans: 2.6-4.6 mm/yr
  - Bicuspid aortic valve: 0.6 mm/yr
  - Tricuspid aortic valve: 0.1mm/yr
  - Arch: 2.5 mm/yr
  - Descending: 1.9 mm/yr
  - AAA: 2.5-5 mm/yr



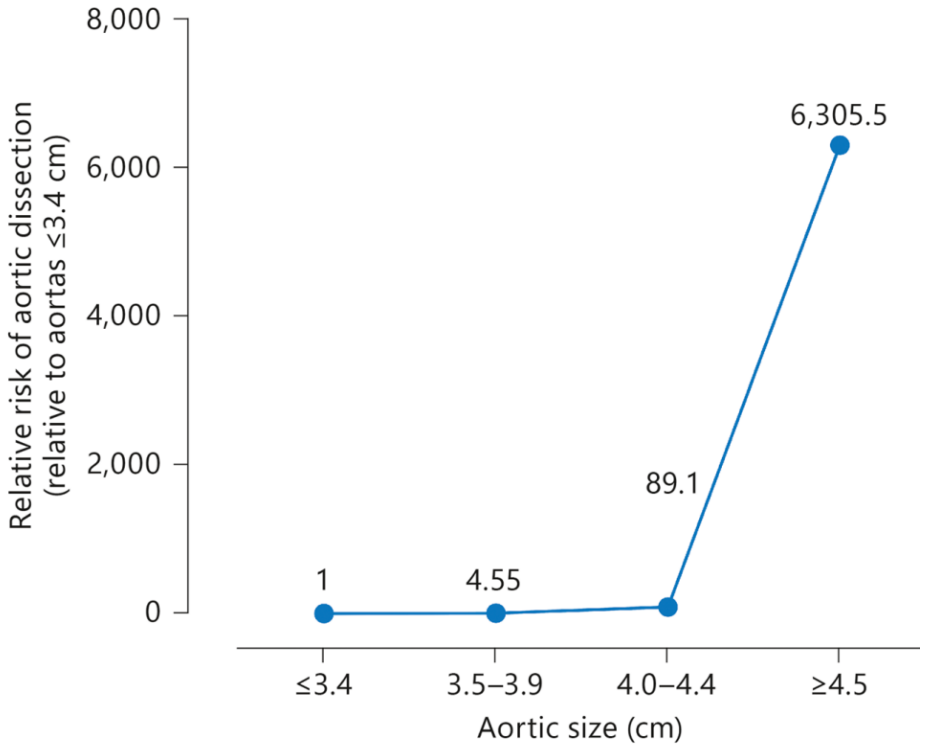
Etiology of Ascending Aortic Aneurysms

- Congenital
  - Bicuspid AV, Turners, Coarct
- Syndrome associated
  - Marfan, Loeys-Dietz, vascular Ehlers-Danlos
- Heritable Thoracic Aortic Disease, non syndromic
  - Familial
  - Gene associated
- Sporadic
  - HTN, Atherosclerosis, Degenerative, inflammatory, infectious, prior dissection

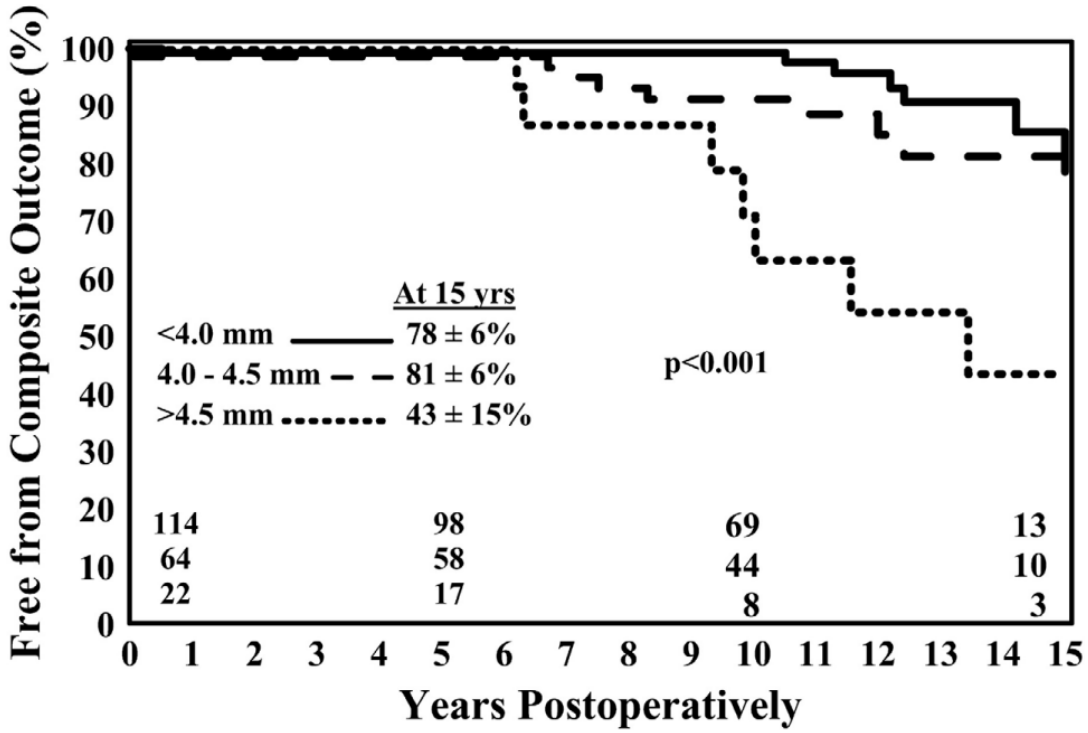


Dilation of Ascending Aorta Is Associated with Increased Risk of Aortic Dissection and Death

DISSSECTION



DEATH

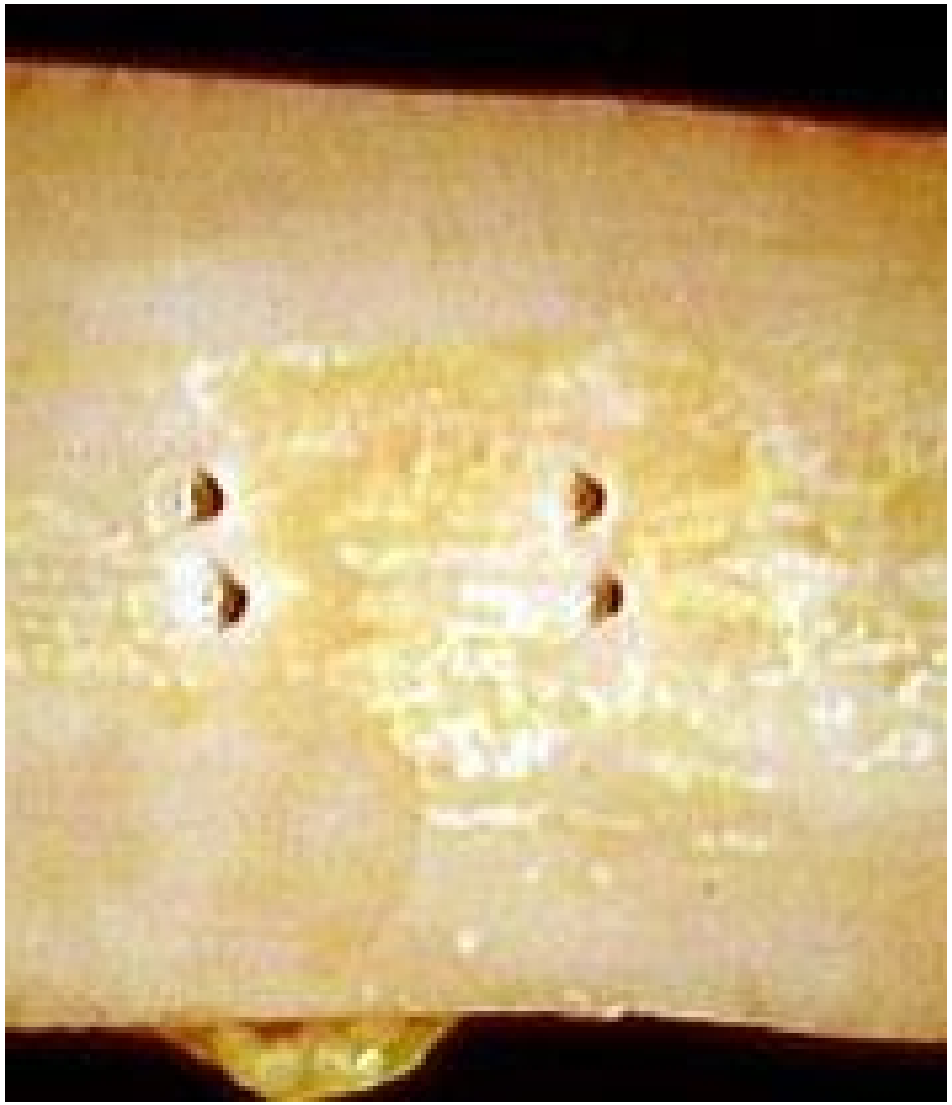


Size Matters but Indexing Gives Perspective

- Aortic Height Index: Aortic Diameter/Height
- Aortic Size index: Aortic Diameter/BSA
- Cross-Section Area to height ratio: Cross Sectional Area : height

Management based on Phenotype

- No family history
- Non-syndromic Heritable thoracic aortic disease
- Syndromes associated with Ascending aortic aneurysms
- Congenital: Bicuspid aortic valve



De novo thoracic aneurysm

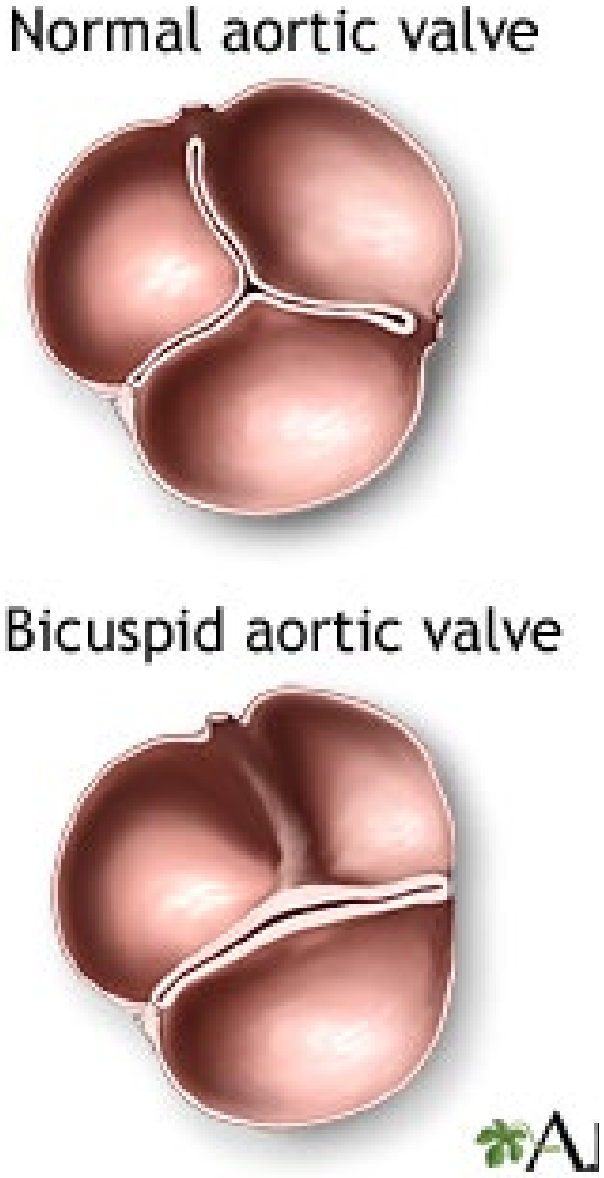
- Definition
  - No family history
  - Tricuspid aortic valve
  - No genetic syndromes associated with TAA
- Associated causes
  - HTN
  - Atherosclerosis
- In our practice, most often identified on imaging study for some other medical condition
- Medical Management
  - Blood pressure management
    - Beta blockers (shear stress)
  - Smoking cessation
  - Prospective monitoring

Surgical Intervention for aortic root/ascending aorta

- Elective surgery is performed when Operative risks < Observation risk
  - Elective ascending replacement has an operative risk of ~2% nationally
  - Operative risk is reduced with high-volume centers
    - SMACTS is a high-volume center

- Aortic Size Thresholds
  - Isolated aortic replacement
    - Size >= 5.5 cm
    - Rapid growth: 5 mm/yr
  - Concomitant cardiac surgical procedure
    - Reasonable to replace >4.5 cm
  - Bicuspid valve
    - Size >= 5.5 cm
    - Reasonable to replace >5 cm if
      - Risk factors: FH of dissection, Growth >3 mm/yr

      or
      - Felt to be low risk for surgery
- Emergent surgery for type a dissection



Non-syndromic Heritable thoracic aortic disease

- 2 or more family members with thoracic aortic disease
- No associated syndromic features
- Family history of aortic dissection at a diameter <5 cm
- Family history of unexplained sudden death <50 y/o
- Rapid aortic growth: 5 mm yr x 1 yr or 2 consecutive years of 3 mm growth
- May be up to 20% of Thoracic aneurysm population
- Tend to dissect at smaller aortic diameters

- Medical management the same as sporadic
- Lifelong surveillance

Management of Non-Syndromic Heritable thoracic aortic disease

- Aortic Size Thresholds
  - > 5 cm given higher propensity of dissection at smaller diameters
  - >= 4.5 cm with family history of dissection <5 cm or unexplained sudden death of relatives <50 year of age in patients <50 years of age

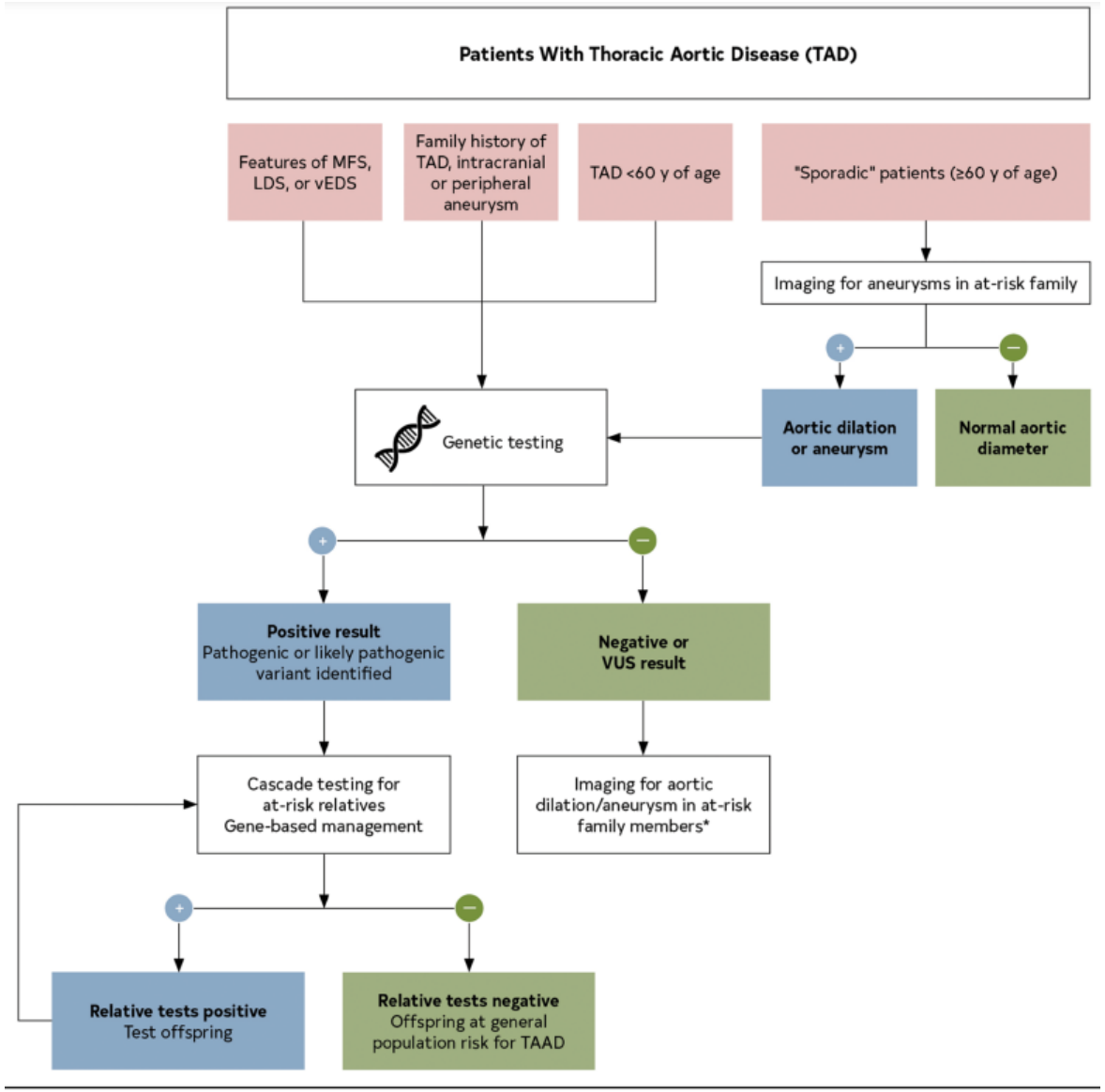
- Medical management the same as sporadic

Syndrome Associated Aneurysms

- Marfans
  - Aortic root dilation and root dissection leading cause of morbidity/mortality
  - Can dilate rapidly
- Medical Management
  - Beta blockers, arbs
- Surveillance
  - 6-month surveillance interval until proven stable then yearly
- Surgical
  - >=4.5 cm with concerning features (rapid growth, family history of dissection, vertebral artery tortuosity
  - >=5 cm otherwise

Evaluation and Genetic testing

Genetic Testing for Syndromic patients, family history of aortic or other aneurysm, or age <60



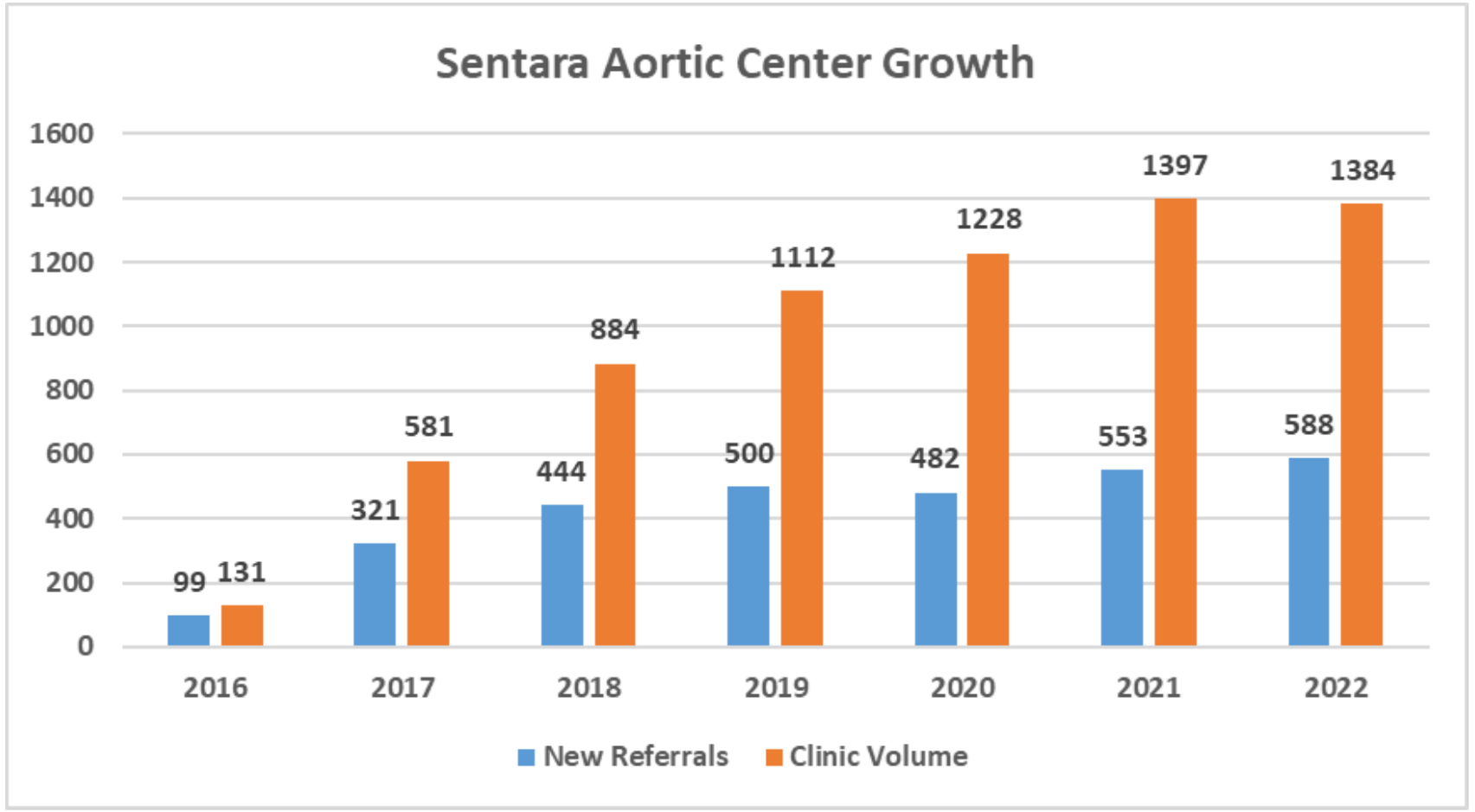
Surveillance

- Patients with dilated ascending aortas should be referred for prospective surveillance
  - Reduce risk of aortic complications
  - Guide medical management
  - Identify underlying familial/genetic etiologies
- Surveillance schedule varies depending on cause of aortic dilation and patient status

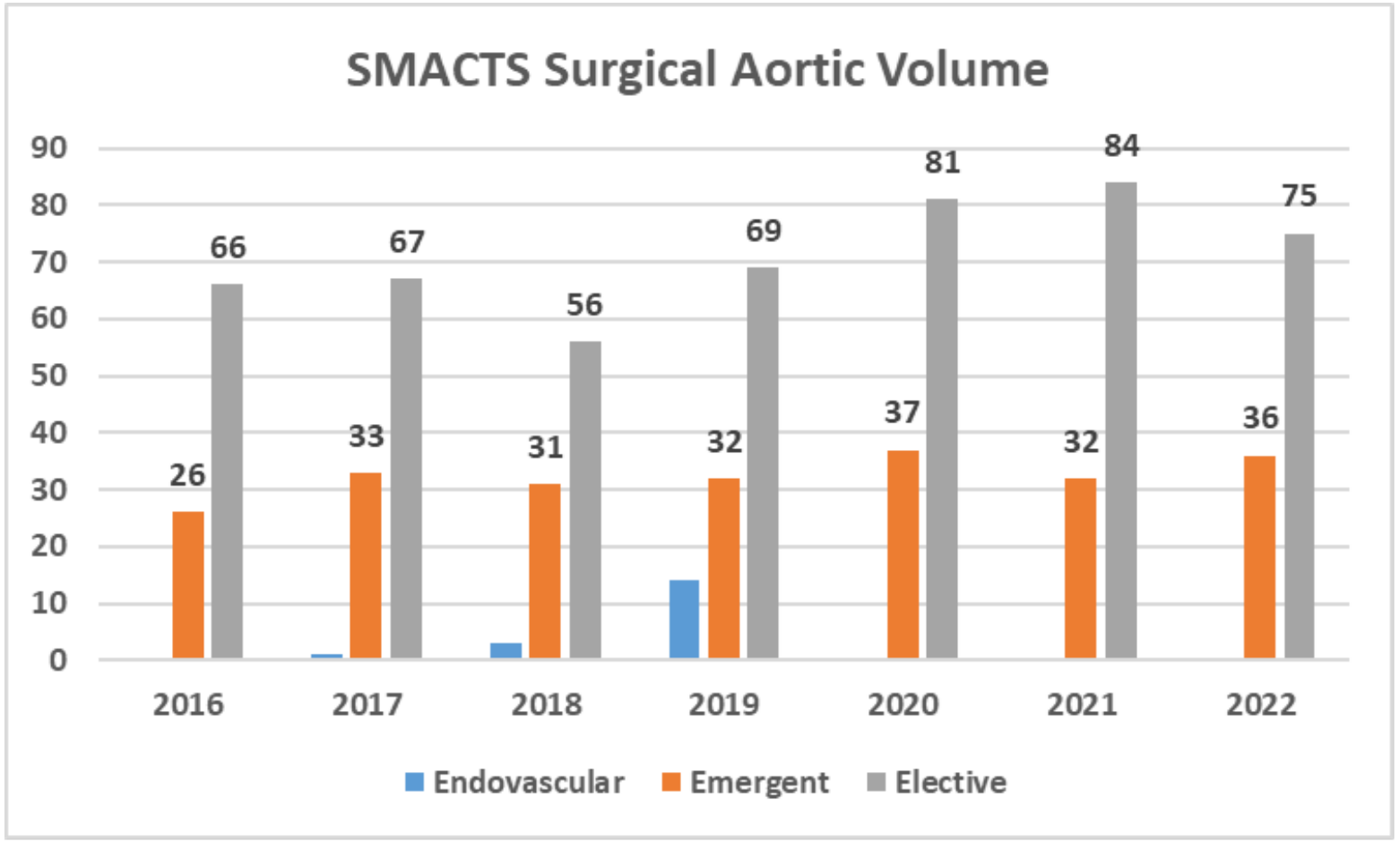
SMACTs Aortic Clinic

- Who gets referred
  - Any patient with dilated ascending aorta can be referred
    - Ascending > 3.5 cm
    - All modalities accepted
      - Echocardiograms can be less unreliable for precise measurements (user dependent)
      - Best imaging is CTA
- What we do
  - Review imaging, repeat as needed
  - Echocardiogram
  - In person visit
    - Review imaging, education
  - Develop monitoring strategy
  - Operative planning as needed

Sentara Mid Atlantic Cardiothoracic Surgery Clinic Volume

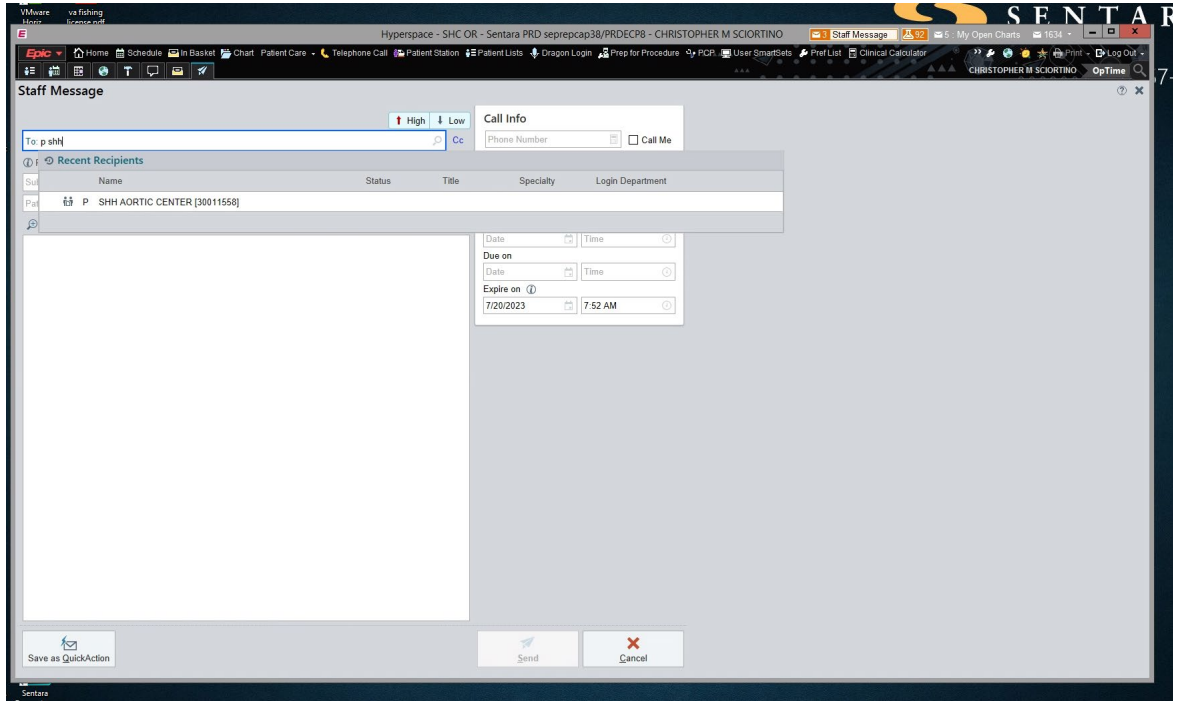


Sentara Mid Atlantic Cardiothoracic Surgery Aortic Surgery Volume



How to Refer to sMACTS Aortic Clinic

- Internal (Epic) in basket
  - SHH AORTIC CENTER
- Kristy Lovingood @ Office (757) 388-6304
- Fax referral (757) 222-3107
- Physician to physician



Important facts to remember

- Ascending aortic aneurysms are not a death sentence
- Many patients with smaller aneurysms will never need surgery
- OK to reassure patients, especially those with no family history
- Findings of ascending aortas >= 5 cm should be referred asap
- Primary tenet of preventative treatment is BP control
- Most patients requiring elective surgery for the proximal aorta are in the low surgical risk cohort