



DO WE NEED NEW THRESHOLD FOR AORTIC ROOT AND ASCENDING AORTA SURGERY ?

Panel Discussion

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

Endorsed by the North American Society for Cardiovascular Imaging

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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) 

9.2.2.1. ASCENDING AORTA AND AORTIC SINUSES

9.2.2.1.1. Recommendations for Asymptomatic Patients With Ascending Aortic Aneurysm

CLASS I

1. Asymptomatic patients with degenerative thoracic aneurysm, chronic aortic dissection, intramural hematoma, penetrating atherosclerotic ulcer, mycotic aneurysm, or pseudoaneurysm, who are otherwise suitable candidates and for whom the ascending aorta or aortic sinus diameter is 5.5 cm or greater, should be evaluated for surgical repair. (371) (*Level of Evidence: C*)
 2. Patients with Marfan syndrome or other genetically mediated disorders (vascular Ehlers-Danlos syndrome, Turner syndrome, bicuspid aortic valve, or familial thoracic aortic aneurysm and dissection) should undergo elective operation at smaller diameters (4.0 to 5.0 cm depending on the condition; see Section 5) to avoid acute dissection or rupture. (81,114,143,371, 436–439) (*Level of Evidence: C*)
 3. Patients with a growth rate of more than 0.5 cm/y in an aorta that is less than 5.5 cm in diameter should be considered for operation. (*Level of Evidence: C*)
 4. Patients undergoing aortic valve repair or replacement and who have an ascending aorta or aortic root of greater than 4.5 cm should be considered for concomitant repair of the aortic root or replacement of the ascending aorta. (*Level of Evidence: C*)
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7.1.5.1 Ascending aortic aneurysms

Indications for surgery are based mainly on aortic diameter and derived from findings on natural history regarding the risk of complications weighed against the risk of elective surgery. Surgery should be performed in patients with Marfan syndrome, who have a maximal aortic diameter ≥ 50 mm.³¹⁹ A lower threshold of 45 mm can be considered in patients with additional risk factors, including family history of dissection, size increase >3 mm/year (in repeated examinations using the same technique and confirmed by another technique), severe aortic regurgitation, or desire for pregnancy.³¹² Patients with Marfanoid manifestations due to connective tissue disease, without complete Marfan criteria, should be treated as Marfan patients. Earlier interventions have been proposed for aortic diameters >42 mm in patients with LDS.⁸ However, the underlying evidence is self-contradictory and the Task Force chose not to recommend a different threshold from Marfan syndrome.^{320,321} Patients with Ehlers-Danlos syndrome are exposed to a high risk of aortic complications, but no data are available to propose a specific threshold for intervention. ????

9.2.2.1. ASCENDING AORTA AND AORTIC SINUSES

9.2.2.1.1. Recommendations for Asymptomatic Patients With Ascending Aortic Aneurysm

CLASS IIa

1. Elective aortic replacement is reasonable for patients with Marfan syndrome, other genetic diseases, or bicuspid aortic valves, when the ratio of maximal ascending or aortic root area (πr^2) in cm^2 divided by the patient's height in meters exceeds 10. (16,143) (*Level of Evidence: C*)
2. It is reasonable for patients with Loeys-Dietz syndrome or a confirmed *TGFBR1* or *TGFBR2* mutation to undergo aortic repair when the aortic diameter reaches 4.2 cm or greater by transesophageal echocardiogram (internal diameter) or 4.4 to 4.6 cm or greater by computed tomographic imaging and/or magnetic resonance imaging (external diameter). (78) (*Level of Evidence: C*)

9.2.2.1. ASCENDING AORTA AND AORTIC SINUSES

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$$\pi r^2/h$$

$$1,75m, 1,80m$$

45mm:

$$3,14 \times 506,25 / 1,75 = 9,08$$

50mm:

$$3,14 \times 625 / 1,75 = 11,2$$

55mm

$$3,14 \times 756,25 / 1,80 = 9,4$$

Aortic diameter \geq 5.5 cm is not a good predictor of type A aortic dissection: observations from the International Registry of Acute Aortic Dissection (IRAD).

Pape LA¹, Tsai TT, Isselbacher EM, Oh JK, O'gara PT, Evangelista A, Fattori R, Meinhardt G, Trimarchi S, Bossone E, Suzuki T, Cooper JV, Froehlich JB, Nienaber CA, Eagle KA; International Registry of Acute Aortic Dissection (IRAD) Investigators.

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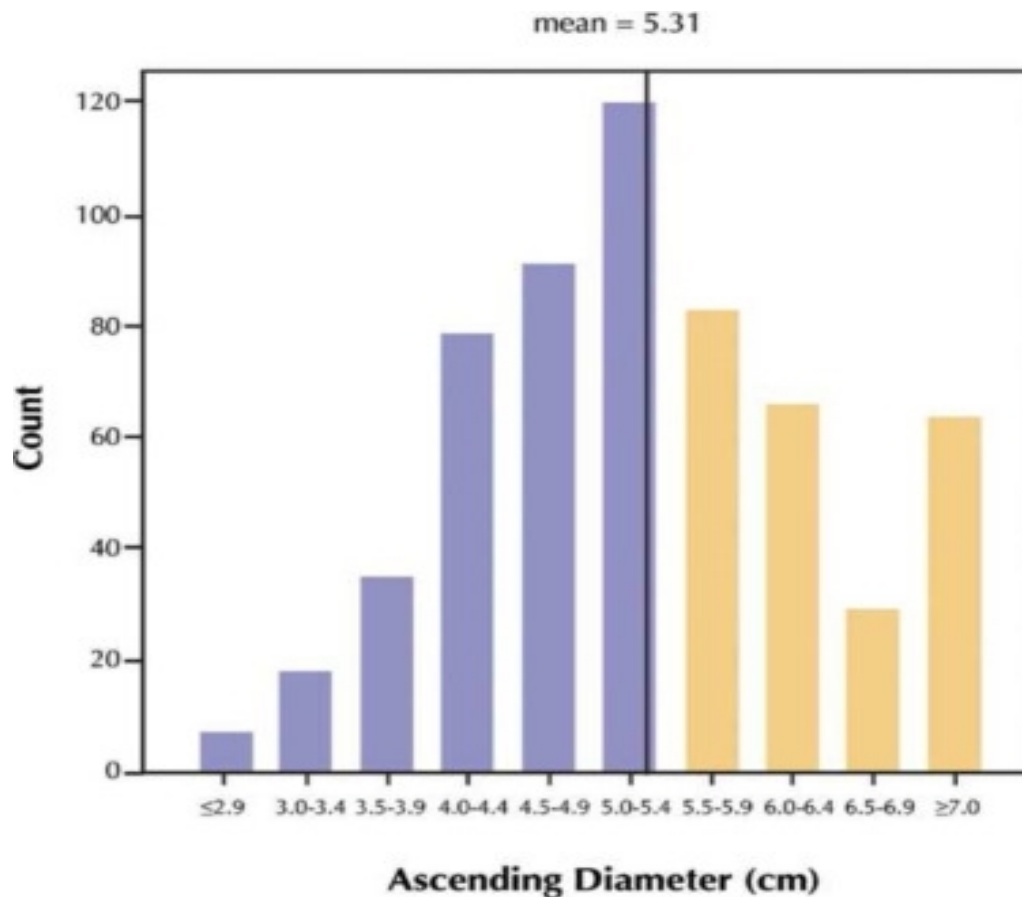
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Abstract

BACKGROUND: Studies of aortic aneurysm patients have shown that the risk of rupture increases with aortic size. However, few studies of acute aortic dissection patients and aortic size exist. We used data from our registry of acute aortic dissection patients to better understand the relationship between aortic diameter and type A dissection.

METHODS AND RESULTS: We examined 591 type A dissection patients enrolled in the International Registry of Acute Aortic Dissection between 1996 and 2005 (mean age, 60.8 years). Maximum aortic diameters averaged 5.3 cm; 349 (59%) patients had aortic diameters <5.5 cm and 229 (40%) patients had aortic diameters <5.0 cm. Independent predictors of dissection at smaller diameters (<5.5 cm) included a history of hypertension (odds ratio, 2.17; 95% confidence interval, 1.03 to 4.57; $P=0.04$), radiating pain (odds ratio, 2.08; 95% confidence interval, 1.08 to 4.0; $P=0.03$), and increasing age (odds ratio, 1.03; 95% confidence interval, 1.00 to 1.05; $P=0.03$). Marfan syndrome patients were more likely to dissect at larger diameters (odds ratio, 14.3; 95% confidence interval, 2.7 to 100; $P=0.002$). Mortality (27% of patients) was not related to aortic size.

CONCLUSIONS: The majority of patients with acute type A acute aortic dissection present with aortic diameters <5.5 cm and thus do not fall within current guidelines for elective aneurysm surgery. Methods other than size measurement of the ascending aorta are needed to identify patients at risk for dissection.



59 % < 55mm
40 % < 50mm

Figure 1. Distribution of aortic sizes at the time of presentation with acute Type A aortic dissection (cm). Purple bars indicate patients with diameters ≤ 5.5 cm. Data from IRAD by Pape et al.¹³ (Adapted with permission from Elefteriades and Farkas.¹²) (Col...

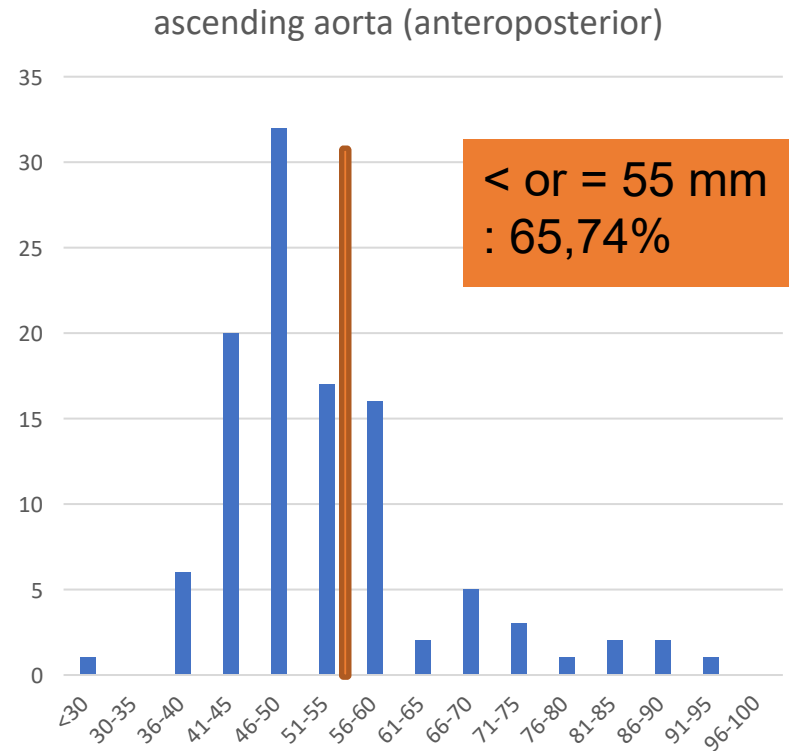
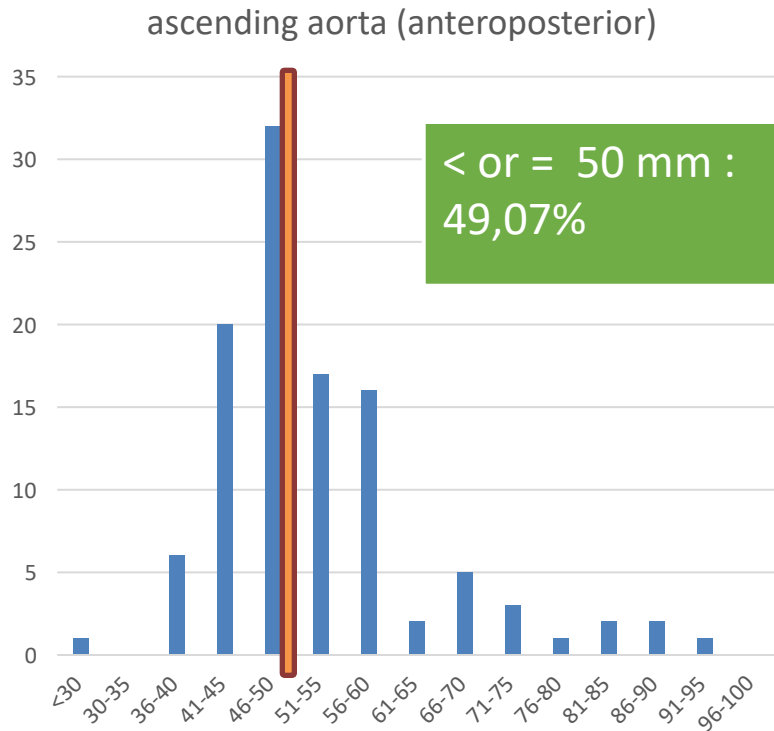
Bulat A. Ziganshin, John A. Elefteriades

Treatment of Thoracic Aortic Aneurysm: Role of Earlier Intervention

Seminars in Thoracic and Cardiovascular Surgery, Volume 27, Issue 2, 2015, 135–143

<http://dx.doi.org/10.1053/j.semtcvs.2015.07.006>

Diameter at admission (Liege TAD study 2018)



Modeling of predissection aortic size in acute type A dissection: More than 90% fail to meet the guidelines for elective ascending replacement

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Objectives: The current guidelines for ascending aortic replacement were determined from already dissected aorta diameters. Previous computed tomography-based work on humans who underwent imaging before and directly after aortic dissection onset has shown an average 30% increase in the ascending aortic diameter with acute dissection. The present investigation evaluated the incidence of predissection ascending aortic dilatation in acute type A dissection.

Methods: From 2002 to 2013, 495 patients presented with acute type A aortic dissection to 1 center. Of these cases, 343 were non-Marfan, nonbicuspid with spontaneous dissection etiology. In those with available preoperative computed tomography angiograms (n = 83) or transesophageal echocardiograms (n = 260), the predissection ascending aorta diameters were modeled from the dissected aorta diameters by subtraction of the average diameter increase rate.

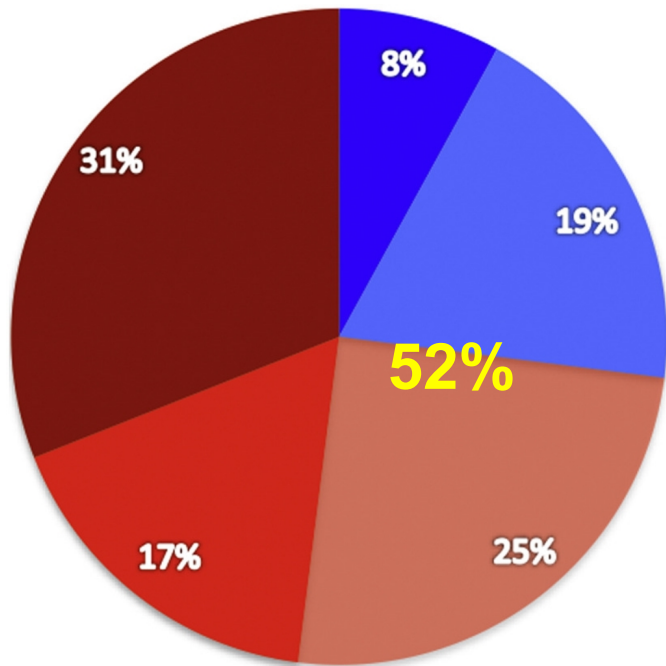
Results: Altogether 343 patients were included (age, 62 years; range, 53-73; 64% men). The median modeled predissection ascending diameter was 3.7 cm (first quartile, 3.3; third quartile, 4.1). Of the 343 patients, 334 (97%) and 315 (92%) had an ascending diameter before dissection onset of <5.5 cm and <5.0 cm, respectively. More than 60% of women and 70% of men had a nondilated ascending aorta before type A dissection onset. The median predissection ascending aortic diameter did not differ between women and men (3.7 cm; first quartile, 3.4; third quartile, 4.2; vs 3.7 cm; first quartile, 3.3; third quartile, 4.1; $P = .810$).

Conclusions: More than 60% of patients with spontaneous, non-Marfan, nonbicuspid, type A dissection will have a nondilated ascending aorta before dissection onset. Only 3% would meet the criteria for elective ascending replacement to prevent aortic dissection. Additional research on the genetic and biochemical predictors of aortic dissection is essential. (J Thorac Cardiovasc Surg 2014;148:944-8)

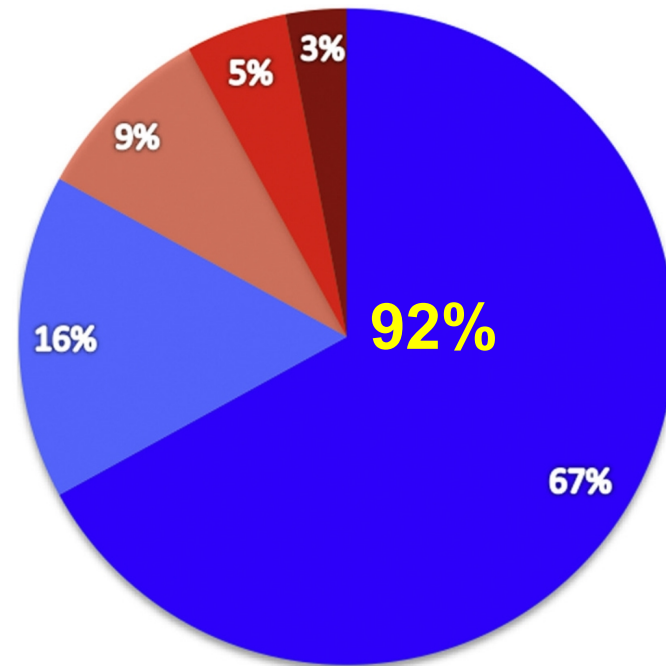
Modeling of predissection aortic size in acute type A dissection: More than 90% fail to meet the guidelines for elective ascending replacement

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Post-dissection diameter
n=343








Modeled pre-dissection diameter
n=343

Ascending Aorta

- <40 mm
- 40-44 mm
- 45-49 mm
- 50-54 mm
- ≥55 mm

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Type A aortic dissection in aneurysms having modelled pre-dissection maximum diameter below 45 mm: should we implement current guidelines to improve the survival benefit of prophylactic surgery?

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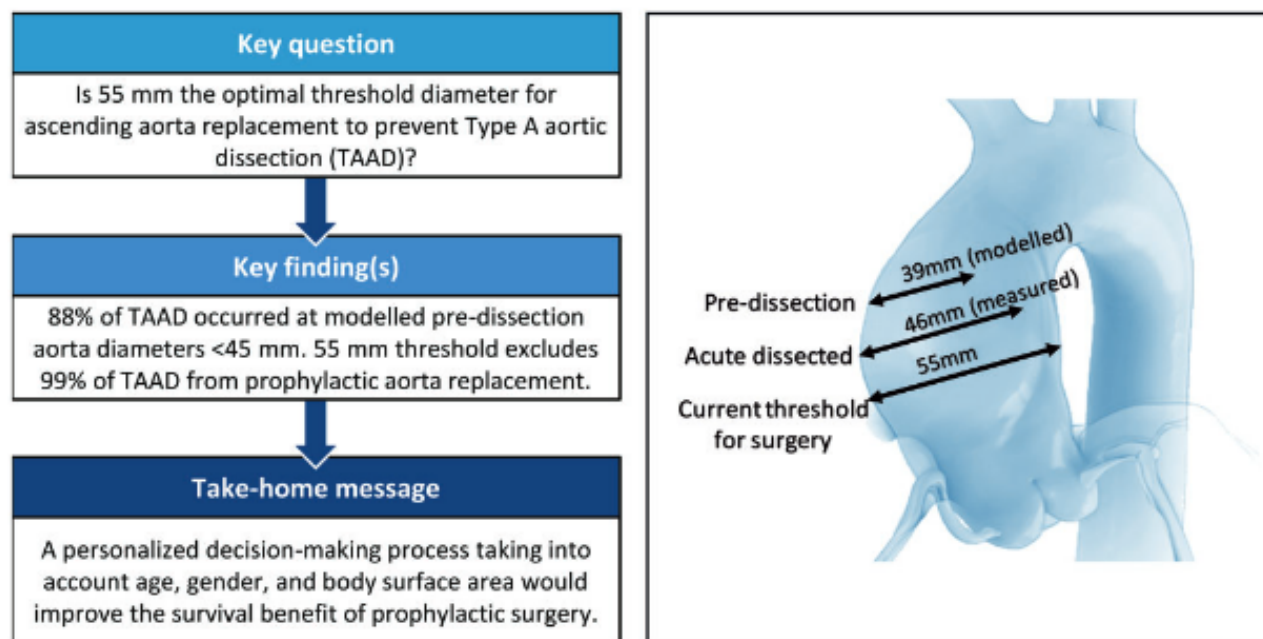
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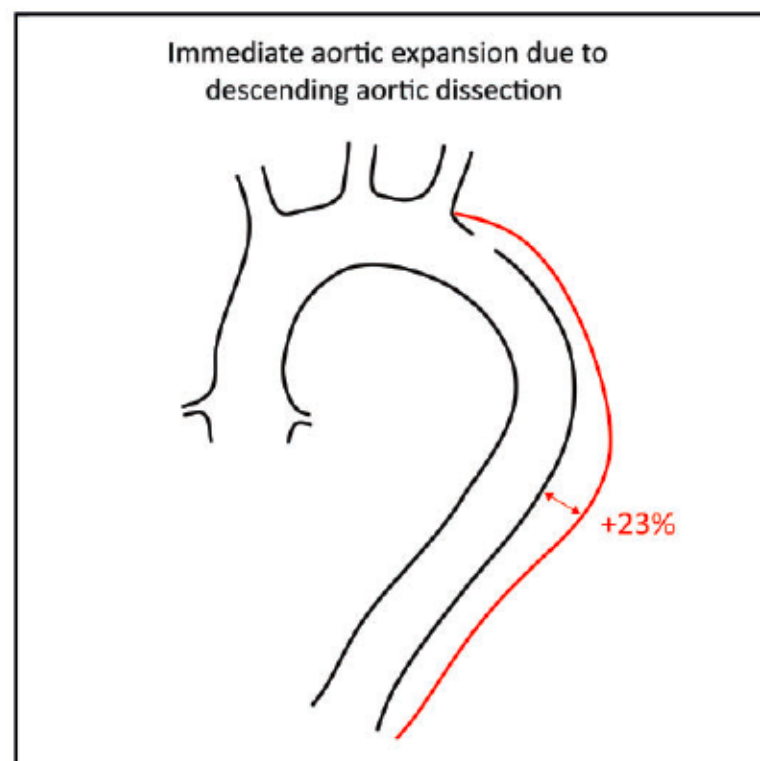
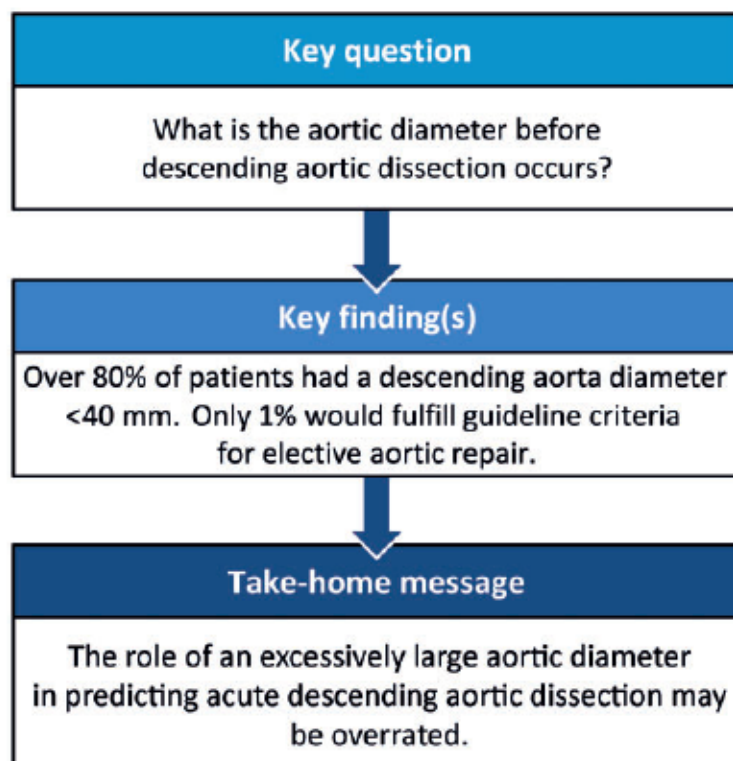
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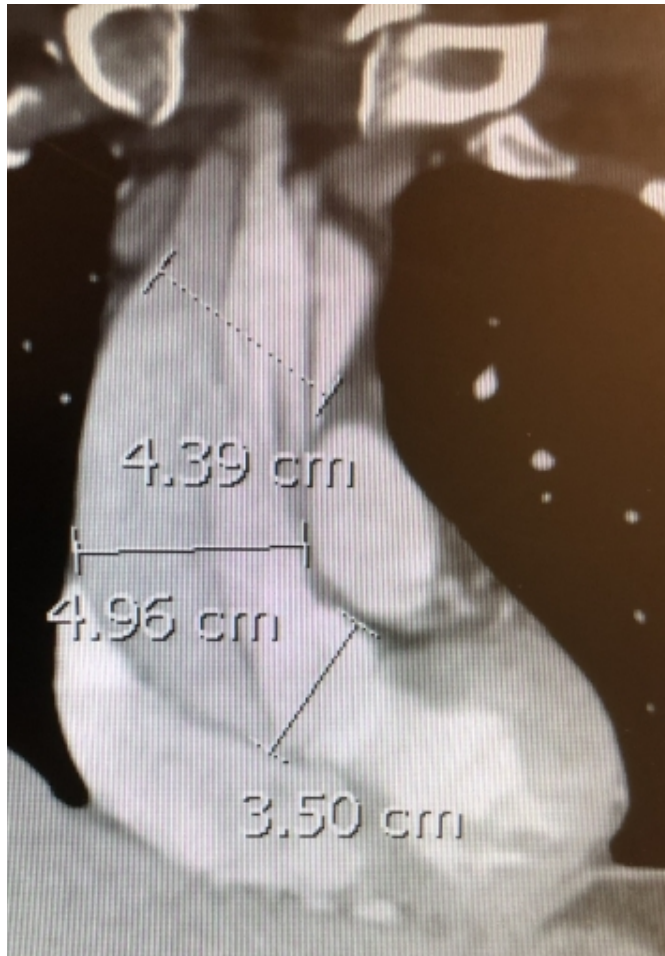
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Modelling of predissection aortic size in acute descending aortic dissection

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Case: Female ,65 Y, with known TAAA (40mm)

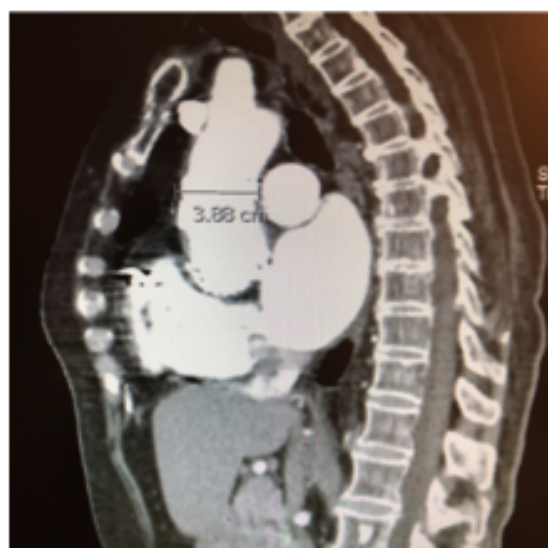
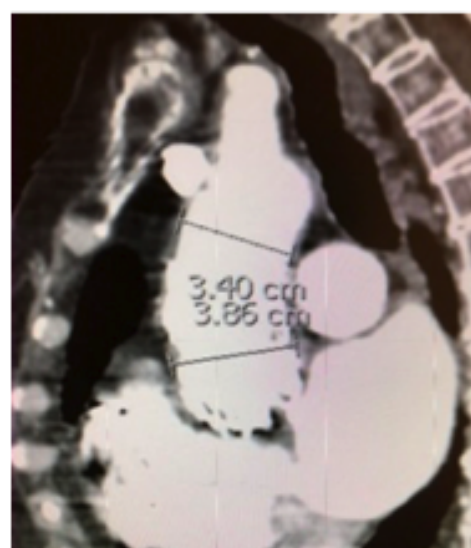
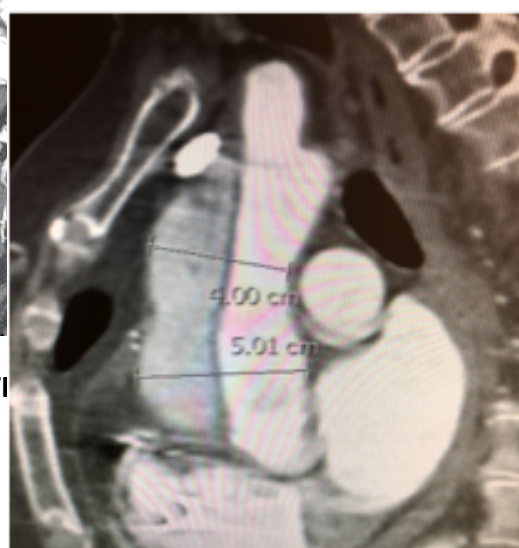
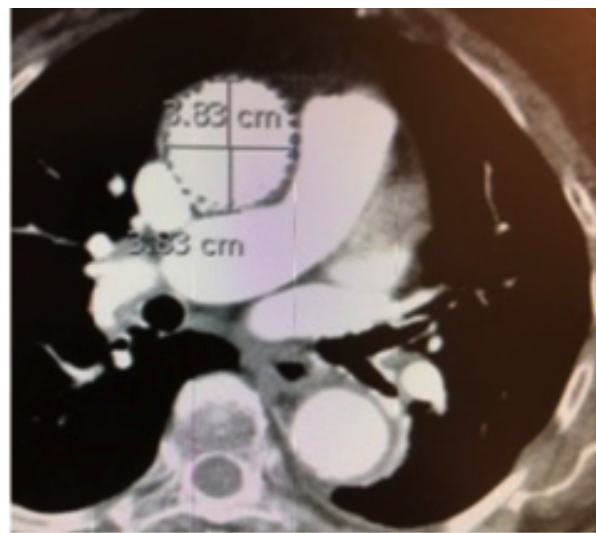
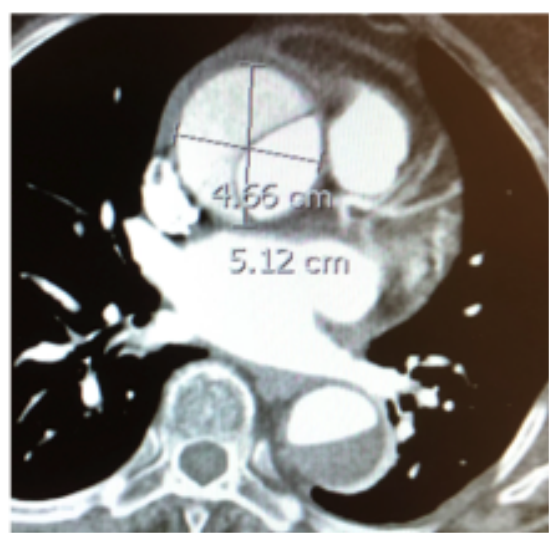
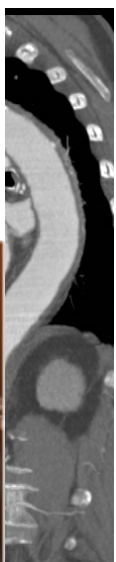
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Pre-TI



Sakalihasan N, Defraigne JO, Moise M, Nienaber CA
Eur Heart J. 2019 Jan 2. doi: 10.1093/eurheartj/ehy890.

Experts panels

What is the aortic size threshold for TAA intervention?

Natzi Sakalihasan

Panelists: John Elefteriades, Nicholas Kouchoukos, Patrizio Lancellotti, Dianna Milewicz, Christoph Nienaber

Should the criterion for surgical intervention for thoracic aortic aneurysm be moved "leftward" (earlier)?

John Elefteriades 📄

Lesson learned from local experiences in Liège with type A dissection, Natzi Sakalihasan 📄



Indication for surgery in men and men is different?

Can « Z – score » help us to take a decision?

Do we need a new guideline?

YES



DO WE NEED NEW THRESHOLD FOR AORTIC ROOT AND ASCENDING AORTA SURGERY ?

- . Indication for surgery in men and women is different?**
- . Can « Z – score » help us to take a decision?**
- . Is the optimal threshold for Aortic root and Ascending Aortic Aneurysms is similar ?**
- . Do we need a new guideline?**
- . On Behalf of ESCVS “Liege-ESCVS guidelines” ?**