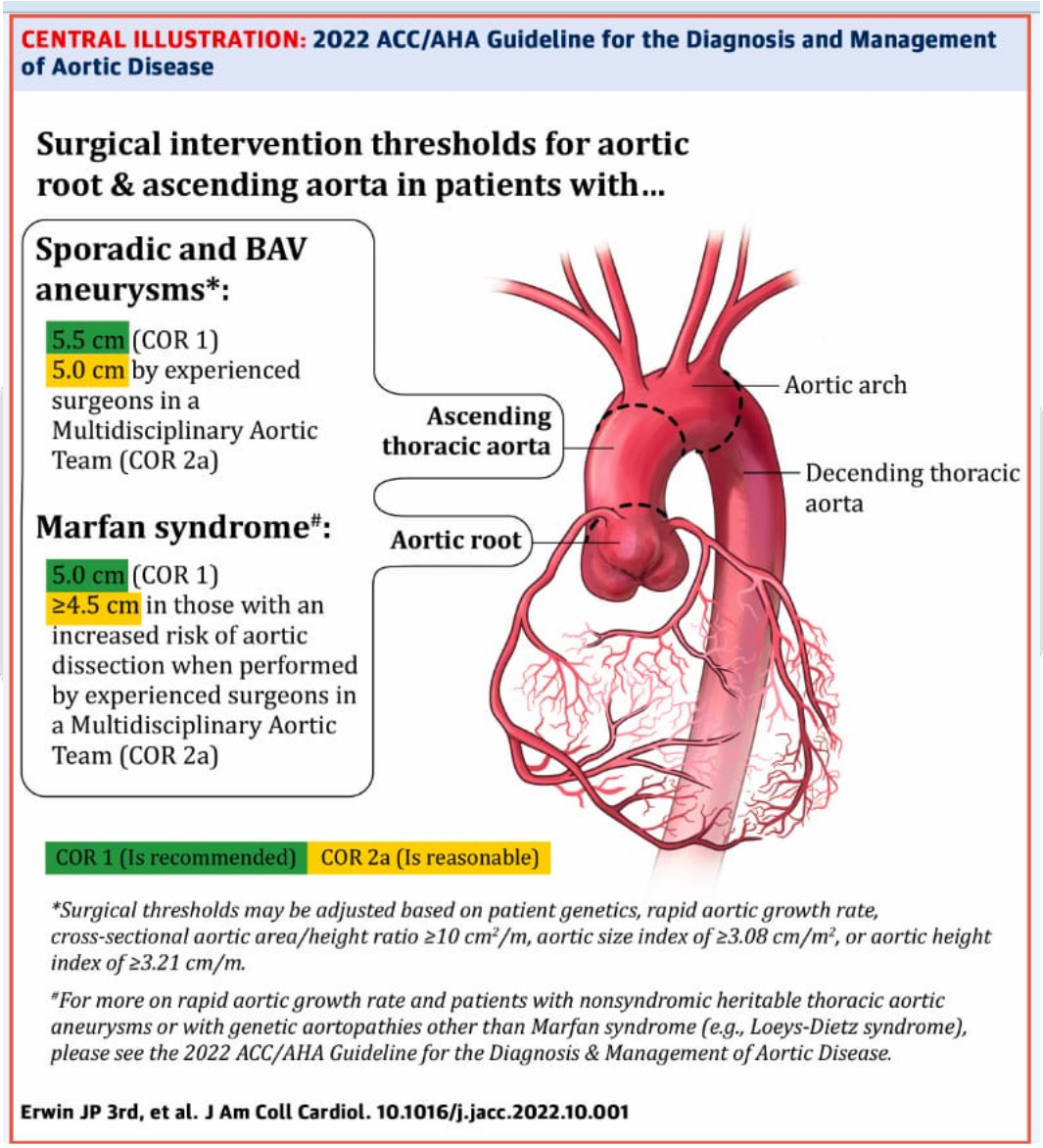
2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

A sociedade americana de cardiologia ACC/AHA publicou um novo guidelines para manejo das doenças da aorta. Confira abaixo um resumo de alguns tópicos interessantes.



Anatomia da aorta

A aorta pode ser dividida sem 5 principais segmentos:

- raiz da aorta ou segmentos dos seios: estende-se a partir do anel da valva aórtica até a junção sinotubular
- aorta torácica ascendente: estende-se da junção sinotubular até a artéria inominada
- arco aórtico: estende-se da artéria inominada até a artéria subclávia esquerda
- aorta torácica descendente: estende-se da artéria subclávia esquerda até o diafragma

- aorta abdominal: estende-se a partir do diafragma até a bifurcação aórtica

A parede da aorta é composta de 3 camadas:

- Íntima: interna, fina. Camada de células endoteliais com uma matriz de tecido conectivo
- Média: central, mais espessa. Camada de células musculares lisas, fibras elásticas, proteínas colágenas e polissacarídeos. Provê força e distensibilidade à aorta.
- Adventícia: externa, fina. Composta de tecido conectivo, fibroblastos, nervos, vasa vasorum, que perfunde a parede externa da aorta e uma porção substancial da média.

Zonas de ancoragem:

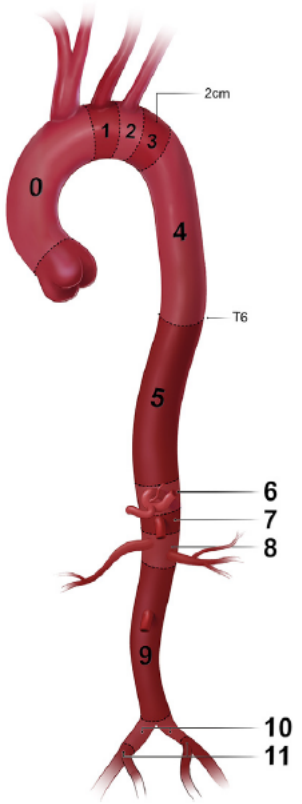
A aorta torácica e abdominal pode ser dividida em 11 zonas de ancoragem. Roselli propôs uma modificação da zona 0, dividindo-a em 3 subsegmentos.

Zona 0A: estende-se a partir do anel até a margem distal da coronária mais alta

Zona 0B: estende-se acima da coronária até a margem distal da artéria pulmonar direita

Zona 0C: estende-se a partir da artéria pulmonar direita até a margem distal da origem da artéria inominada

FIGURE 3 Classification of Aortic Anatomic Segments by 11 Landing Zones



Zone 0 (involves the ascending to distal end of the origin of the innominate artery); Zone 1 (involves the origin of the left common carotid; between the innominate and the left carotid); Zone 2 (involves the origin of the left subclavian; between the left carotid and the left subclavian); Zone 3 (involves the proximal descending thoracic aorta down to the T4 vertebral body; the first 2 cm distal to the left subclavian); Zone 4 (the end of zone 3 to the mid-descending aorta – T6); Zone 5 (the mid-descending aorta to the celiac); Zone 6 (involves the origin of the celiac; the celiac to the superior mesenteric); Zone 7 (involves the origin of the superior mesenteric artery; the superior mesenteric to the renals); Zone 8 (involves the origin of the renal arteries; the renal to the infrarenal abdominal aorta); Zone 9 (the infrarenal abdominal aorta to the level of aortic bifurcation); Zone 10 (the common iliac); Zone 11 (involves the origin of the external iliac arteries). From Czerny et al.[1]

Definições de dilatação e aneurisma de aorta

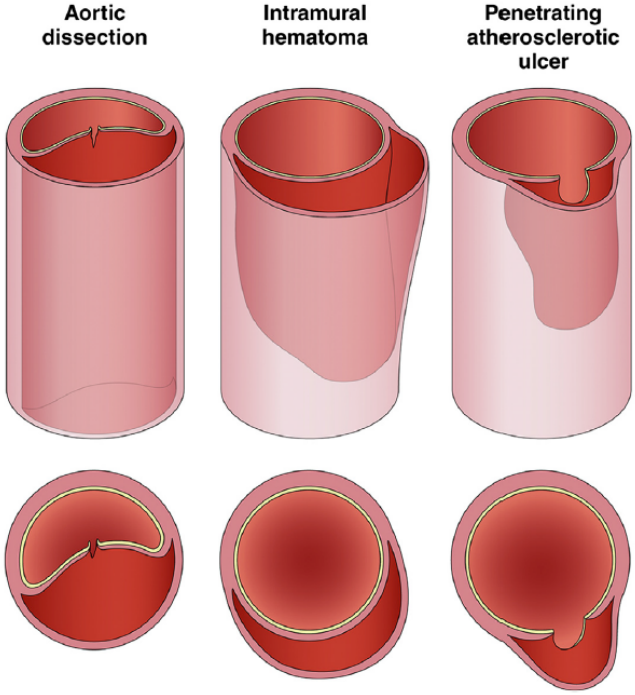
A definição convencional de aneurisma é qualquer artéria que dilate pelo menos 1.5 x o diâmetro esperado normal. A definição de aorta ascendente dilatada é um diâmetro > 4,0 cm.

Em 2006, Davies e colaboradores demonstraram que o índice do tamanho da aorta (ASI), que é definido como diâmetro da aorta (cm)/área de superfície corporal (m^2), é um melhor preditor de eventos adversos que o diâmetro da aorta isolado. Outro índice importante é o índice de altura: diâmetro da aorta (cm)/ altura do paciente (m). Tem sido proposto que o ponto de corte para o índice altura seja >10 cm^2/m como limite para intervenção.

Síndrome aórtica aguda:

SAA é definida como uma condição ameaçadora à vida em que há uma ruptura da integridade da parede da aorta.

FIGURE 6 Acute Aortic Syndromes



In aortic dissection, a tear in the aortic intima allows blood to penetrate the aortic media, pushing the dissection flap into the middle of the aorta, separating the true from the false lumen. In intramural hematoma, blood leaks into the aortic media at low pressure, forming a thrombus that pushes the outer wall of the aorta outward, leaving a relatively normal appearing aortic lumen. A penetrating atherosclerotic ulcer allows blood to enter the aortic media, but atherosclerotic scarring of the aorta typically confines the blood collection, often resulting in a localized dissection or pseudoaneurysm. Adapted with permission from Springer Nature Customer Service Centre GmbH: Springer Nature, Clough et al[1] Copyright 2015.

Dissecção de aorta:

É a SAA mais comum. Ocorre quando há ruptura da íntima que permite passagem de sangue através do rasgo para dentro da média, separando a íntima em duas longitudinalmente, criando um flap de dissecção que divide o lúmen verdadeiro do falso lúmen.

Incidência estimada de 5-30 casos/milhão de pessoas/ano, com homens mais afetados que mulheres e uma faixa etária de 50-70 anos.

Definição temporal:

- Aguda: primeiras duas semanas após o início dos sintomas
- Crônica: além de duas semanas

Nova classificação proposta pelo IRAD:

- Hiperaguda: < 24h
- Acuda: 2-7 dias
- Subaguda: 8-30 dias
- Crônica: > 30 dias

TABLE 3 Classification of Aortic Dissection Chronicity Based on the 2020 SVS/STS Reporting Standards

Chronicity	Time From Onset of Symptoms
Hyperacute	<24 h
Acute	1-14 d
Subacute	15-90 d
Chronic	>90 d

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STS indicates Society of Thoracic Surgeons; and SVS, Society for Vascular Surgery.

Dissecção aguda da aorta torácica ascendente é uma condição altamente letal em pacientes sintomáticos não tratados, com uma mortalidade inicial de 1-2%/hora após o início dos sintomas.

Pacientes com dissecção tipo B não complicada têm uma mortalidade em 30 dias de 10%. Já pacientes com dissecção tipo B complicada têm mortalidade de 20% no segundo dia e até 25% até o 30º dia.

Classificação:

DeBakey e Stanford são as duas classificações mais comuns.

DeBakey divide em tipos I, II, III, baseado na origem do rasgo intimal e extensão da dissecção.

- Tipo I: rasgo origina-se na aorta ascendente e propaga-se distalmente incluindo arco e tipicamente aorta descendente

- Tipo II: rasgo confinado somente na aorta ascendente
- Tipo III: rasgo inicia-se na aorta descendente e propaga-se mais frequentemente distalmente

  IIIa: confinada somente a aorta torácica descendente

  IIIb: rasgo inicia na descendente e estende-se abaixo do diagrama

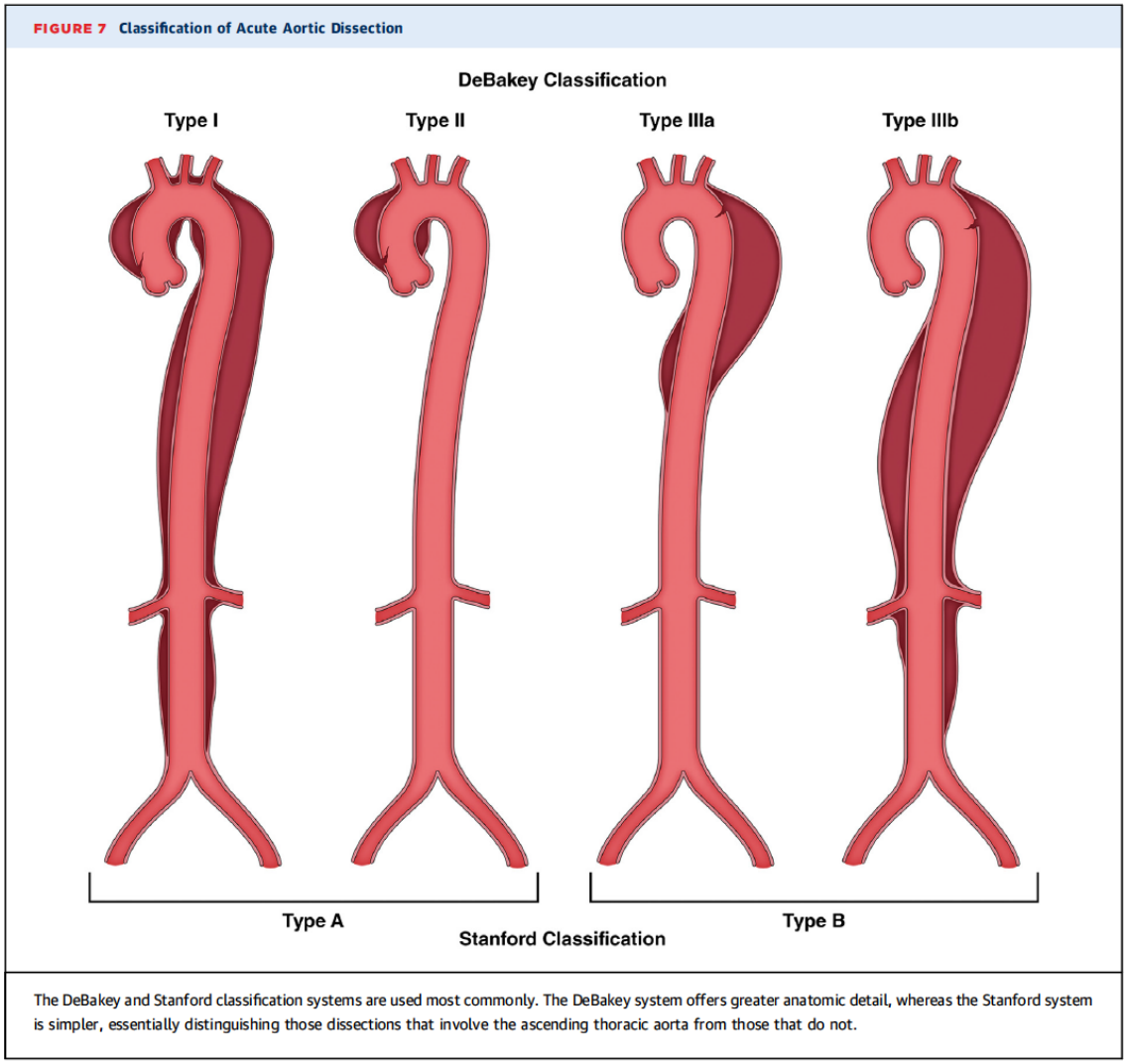


FIGURE 7 Classification of Acute Aortic Dissection

The DeBakey and Stanford classification systems are used most commonly. The DeBakey system offers greater anatomic detail, whereas the Stanford system is simpler, essentially distinguishing those dissections that involve the ascending thoracic aorta from those that do not.

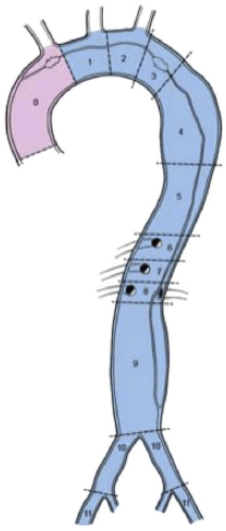
Stanford divide em duas categorias considerando se aorta ascendente está envolvida ou não, independente do sítio de origem:

- Tipo A: envolve aorta ascendente, independente do sítio de ruptura
- Tipo B: não envolve aorta ascendente (incluindo disseção que envolvem o arco, mas poupam a aorta ascendente)

Em 2019 uma categoria chamada “non-A-non-B dissection” foi sugerida para pacientes cujo flap proximal inicia no arco aórtico.

Uma nova classificação propõe que AD indique o tipo A de disseção para qualquer dissecção cujo sítio de ruptura está na zona 0 e estende-se distalmente para zona denotada pela letra D.
BPD é usado para dissecção tipo B cujo sítio de ruptura está na zona 1 ou além, a extensão proximal e distal é indicada pelas letras P e D.
ID é usado quando a disseção inicia na zona 0, mas a localização do rasgo não é identificada.

FIGURE 8 Anatomic Reporting of Aortic Dissection Based on the 2020 SVS/STS Reporting Standards



Type	Proximal Extent	Distal Extent
A_D Entry tear: **Zone 0**	0	0
	1	1
	2	2
	3	3
B_{PD} Entry tear: **≥Zone 1**	4	4
	5	5
	6	6
	7	7
	8	8
I_D Unidentified entry tear involving **Zone 0**	9	9
	10	10
	11	11
	12	12

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Hematoma intramural:

IMH descreve a presença de sangue dentro da média na ausência de rasgo na íntima ou falso lúmen patente.

O sangue origina-se a partir de uma ruptura de vasa vasorum causando sangramento na média ou pequenas rupturas da íntima que não são visualizadas em exames convencionais.

É diagnosticado em exames de imagem pela presença de um espessamento circular ou crescente da parede da aorta >5 mm na ausência de fluxo sanguíneo detectável. Cerca de 5% a 25% dos pacientes com SAA têm IMH. Menos que 10% dos IMH resolvem-se espontaneamente, 16%-47% progridem para dissecação.

Úlcera aórtica penetrante

Inicia-se como uma ulceração de uma placa aterosclerótica, que leve a uma ruptura focal na íntima da aorta que permite que o sangue penetre na camada média e frequentemente associa-se a IMH.

Frequentemente ocorre na aorta torácica descendente distal ou média e menos frequentemente no arco e aorta abdominal. É estimado ocorrer em 2% - 7% dos casos de SAA. Tipicamente pacientes são idosos (> 70 anos) e mais frequentemente com doença aterosclerótica difusa e extensa envolvendo aorta e coronárias. Pode permanecer estável ou progredir para dissecção, IMH, pseudoaneurisma ou ruptura aórtica. O risco de ruptura é reportado em até 40%.

Indicação de intervenção:

- Aneurisma de aorta torácica hereditário não sindrômico: diâmetro ≥ 5,0 cm
    - Fatores de risco em paciente com AAT hereditário: história familiar de dissecção de aorta com diâmetro <5,0 cm; história familiar de morte súbita inexplicada em <50 anos; rápido crescimento (≥ 0,5 cm em 1 ano ou ≥ 0,3 cm/ano em 2 anos consecutivos)

Recommendations for Surgical Considerations for Nonsyndromic Heritable TAA and No Identified Genetic Cause

COR	LOE	RECOMMENDATIONS
1	C-LD	1. In asymptomatic patients with aneurysms of the aortic root or ascending aorta with nonsyndromic heritable thoracic aortic disease (nsHTAD) and no identified genetic cause, determining the timing of surgical repair requires shared decision-making and is informed by known aortic diameters at the time of aortic dissection, TAA repair, or both in affected family members.[1-4]
1	C-LD	2. In asymptomatic patients with aneurysms of the aortic root or ascending aorta with nsHTAD and no identified genetic cause but no information on aortic diameters at the time of dissection or aneurysm repair in affected family members and who have no high-risk features for adverse aortic events (Table 9) it is recommended to repair the aorta when the maximal diameter reaches ≥5.0 cm.[1]
2a	C-LD	3. In patients with aneurysms of the aortic root or ascending aorta with nsHTAD and no identified genetic cause and a maximal aortic diameter of ≥4.5 cm, who have high-risk features for adverse aortic events (Table 9), or who are undergoing cardiac surgery for other indications, aortic repair is reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[5]

- S. Marfan: diâmetro ≥ 5,0 cm
    - Fatores de risco em S. Marfan: história familiar de dissecção; crescimento rápido (≥0,3cm/ano); dilatação difusa da raiz da aorta e aorta ascendente; marcada tortuosidade arterial vertebral

Recommendations for Marfan Syndrome Interventions: Replacement of the Aortic Root in Patients With Marfan Syndrome
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with Marfan syndrome and an aortic root diameter of ≥5.0 cm, surgery to replace the aortic root and ascending aorta is recommended.[1-4]
2a	B-NR	2. In patients with Marfan syndrome, an aortic root diameter of ≥4.5 cm, and features associated with an increased risk of aortic dissection (Table 10), surgery to replace the aortic root and ascending aorta is reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[1,3,4]

2a	C-LD	3. In patients with Marfan syndrome and a maximal cross-sectional aortic root area (cm^2) to patient height (m) ratio of ≥10, surgery to replace the aortic root and ascending aorta is reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[5]
2b	C-LD	4. In patients with Marfan syndrome and an aortic diameter approaching surgical threshold, who are candidates for valve-sparing root replacement (VSRR) and have a very low surgical risk, surgery to replace the aortic root and ascending aorta may be reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[2-4]

Recommendation for Replacement of Primary (Nondissected) Aneurysms of the Aortic Arch, Descending, and Abdominal Aorta in Patients With Marfan Syndrome

COR	LOE	RECOMMENDATION
2a	C-EO	1. In patients with Marfan syndrome and a nondissected aneurysm of the aortic arch, descending thoracic aorta, or abdominal aorta of ≥5.0 cm, surgical intervention to replace the aneurysmal segment is reasonable.

- Loeys-Dietz Syndrome: diâmetro ≥ 4,5 cm.

Recommendations for Replacement of the Aorta in Patients With Loeys-Dietz Syndrome

COR	LOE	RECOMMENDATIONS
1	C-LD	1. In patients with Loeys-Dietz syndrome and aortic dilation, the surgical threshold for prophylactic aortic root and ascending aortic replacement should be informed by the specific genetic variant, aortic diameter, aortic growth rate, extra-aortic features, family history, patient age and sex, and physician and patient preferences (Table 11).[1-9]
2b	C-EO	2. In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in *TGFBR1*, *TGFBR2*, or *SMAD3*, surgery to replace the intact aortic arch, descending aorta, or abdominal aorta at a diameter of ≥4.5 cm may be considered, with the specific genetic variant, patient age, aortic growth rate, family history, presence of high-risk features (Table 11), and surgical risk informing the decision.

TABLE 11 Surgical Thresholds for Prophylactic Aortic Root and Ascending Aortic Replacement in Loeys-Dietz Syndrome Based on Genetic Variant

COR	LOE (references)	Genetic Variant	Presence of High-Risk Features*	Aortic Diameter (cm)
1	C-LD[2]	*TGFBR1*	No	≥4.5
1	C-LD[2]	*TGFBR2*	No	≥4.5
2b	C-EO[2]	*TGFBR1*	Yes	≥4.0
2a	C-LD[1,2]	*TGFBR2*	Yes	≥4.0
2a	C-EO[13,16]	*SMAD3*	-	≥4.5†
2b	C-EO[5-7]	*TGFB2*‡	-	≥4.5†
2b	C-EO[9,23]	*TGFB3*	-	≥5.0†

- S. Turner: ASI ≥ 2,5 cm/m^2
    - Fatores de risco em S. Turner: coarctação da aorta, dilatação da aorta, valva aórtica bicúspide, hipertensão.

Recommendations for Diagnostic Testing, Surveillance, and Surgical Intervention for Aortic Dilation in Turner Syndrome
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with Turner syndrome, TTE and cardiac MRI are recommended at the time of diagnosis to evaluate for BAV, aortic root and ascending aortic dilation, aortic coarctation, and other congenital heart defects.[1-9]
1	B-NR	2. In patients with Turner syndrome who are ≥15 years old, the use of the ASI (ratio of aortic diameter [cm] to BSA [m^2]) is recommended to define the degree of aortic dilation and assess the risk of aortic dissection.[9,10,11]
1	C-LD	3. In patients with Turner syndrome without risk factors for aortic dissection (Table 12), surveillance imaging with TTE or MRI to evaluate the aorta is recommended every 5 years in children and every 10 years in adults, as well as before planning a pregnancy.[9,10,11]
1	C-EO	4. In patients with Turner syndrome and an ASI >2.3 cm/m^2, surveillance imaging of the aorta is recommended at least annually.[9]
1	C-EO	5. In patients with Turner syndrome and risk factors for aortic dissection (Table 12), surveillance aortic imaging at an interval depending on the aortic diameter, ASI, and aortic growth rate is recommended (Figure 18).[9]
2a	C-LD	6. In patients with Turnery syndrome who are ≥15 years old and have an ASI of ≥2.5 cm/m^2 plus risk factors for aortic dissection (Table 12), surgical intervention to replace the aortic root, ascending aorta, or both is reasonable.[9,10]
2b	C-EO	In those without risk factors for aortic dissection, surgical intervention to replace the aortic root, ascending aorta, or both may be considered.

- Valva aórtica bicúspide: diâmetro ≥ 5,5 cm
  - Fatores de risco: história familiar de dissecção; crescimento ≥ 0,3 cm/ano; coarctação; fenótipo "raiz" (dilatação predominante da raiz da aorta).

Recommendations for BAV Aortopathy Interventions: Replacement of the Aorta in Patients With BAV
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with a BAV and a diameter of the aortic root, ascending aorta, or both of ≥5.5 cm, surgery to replace the aortic root, ascending aorta, or both is recommended.[1-3]
2a	B-NR	2. In patients with a BAV and a cross-sectional aortic root or ascending aortic area (cm^2) to height (m) ratio of ≥10 cm^2/m, surgery to replace the aortic root, ascending aorta, or both is reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[3,4]
2a	B-NR	3. In patients with a BAV, a diameter of the aortic root or ascending aorta of 5.0 cm to 5.4 cm, and an additional risk factor for aortic dissection (Table 14), surgery to replace the aortic root, ascending aorta, or both is reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[1,5]
2a	B-NR	4. In patients with a BAV who are undergoing surgical aortic valve repair or replacement, and who have a diameter of the aortic root or ascending aorta of ≥4.5 cm, concomitant replacement of the aortic root, ascending aorta, or both is reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[1,6]
2b	B-NR	5. In patients with a BAV, a diameter of the aortic root or ascending aorta of 5.0 cm to 5.4 cm, no other risk factors for aortic dissection (Table 14), and at low surgical risk, surgery to replace the aortic root, ascending aorta, or both may be reasonable, when performed by experienced surgeons in a Multidisciplinary Aortic Team.[1,2,5]

- Aneurisma esporádico da raiz e ascendente: ≥ 5,5 cm

Recommendations for Surgery for Sporadic Aneurysms of the Aortic Root and Ascending Aorta
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	C-LD	1. In patients with aneurysms of the aortic root and ascending aorta who have symptoms attributable to the aneurysm, surgery is indicated.[1,2]
1	B-NR	2. In asymptomatic patients with aneurysms of the aortic root or ascending aorta who have a maximum diameter of ≥5.5 cm, surgery is indicated.[3-9]
1	C-LD	3. In patients with an aneurysm of the aortic root or ascending aorta of <5.5 cm, whose growth rate confirmed by tomographic imaging is ≥0.3 cm/y in 2 consecutive years, or ≥0.5 cm in 1 year, surgery is indicated.[10-13]
2a	B-NR	4. In asymptomatic patients with aneurysms of the aortic root or ascending aorta who have a maximum diameter of ≥5.0 cm, surgery is reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[14-17]
2a	B-NR	5. In patients undergoing repair or replacement of a tricuspid aortic valve who have a concomitant aneurysm of the ascending aorta with a maximum diameter of ≥4.5 cm, ascending aortic replacement is reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[18-21]
2a	B-NR	In patients undergoing repair or replacement of a tricuspid aortic valve who have a concomitant aneurysm of the ascending aorta with a maximum diameter of ≥5.0 cm, ascending aortic replacement is reasonable.[18-21]
2b	C-LD	In patients undergoing cardiac surgery for indications other than aortic valve repair or replacement who have a concomitant aneurysm of ascending aorta with a maximum diameter of ≥5.0 cm, ascending aortic replacement may be reasonable.[18]
2a	C-LD	6. In patients with a height >1 standard deviation above or below the mean who have an asymptomatic aneurysm of the aortic root or ascending aorta and a maximal cross-sectional aortic area/height ratio of ≥10 cm^2/m, surgery is reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[14,15,22]
2b	C-LD	7. In asymptomatic patients with aneurysms of the aortic root or ascending aorta who have either an ASI of ≥3.08 cm/m^2 or AHI of ≥3.21 cm/m, surgery may be reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.[23]

- Arco: ≥ 5,5 cm

Recommendations for Aortic Arch Aneurysms
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	C-EO	1. In patients with an aortic arch aneurysm who have symptoms attributable to the aneurysm and are at low or intermediate operative risk, open surgical replacement is recommended.
2a	B-NR	2. In patients with an isolated aortic arch aneurysm who are asymptomatic and have a low operative risk, open surgical replacement at an arch diameter of ≥5.5 cm is reasonable.[1-3]
2a	C-LD	3. In patients undergoing open surgical repair of an ascending aortic aneurysm, if the aneurysmal disease extends into the proximal aortic arch, it is reasonable to extend the repair with a hemiarch replacement.[4,5]
2b	C-LD	4. In patients undergoing open surgical repair of an aortic arch aneurysm, if the aneurysmal disease extends into the proximal descending thoracic aorta, an elephant trunk procedure may be considered.[6,7]
2b	C-EO	5. In patients with an aortic arch aneurysm who are asymptomatic but meet criteria for intervention, but have a high risk from open surgical repair, a hybrid or endovascular approach may be reasonable.

- Aorta descendente: ≥ 5,5cm

Recommendations for Size Thresholds for Repair of Descending TAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients with intact descending TAA, repair is recommended when the diameter is ≥5.5 cm.[1,2]
2b	B-NR	2. In patients with intact descending TAA and risk factors for rupture (Table 17), repair may be considered at a diameter of <5.5 cm.[2-6]
2b	B-NR	3. In patients at increased risk for perioperative morbidity and mortality (Table 18), it may be reasonable to increase the size threshold for surgery accordingly.[7]

- Aorta abdominal: diâmetro ≥ 5,5 cm homens; ≥ 5,0 cm mulheres

Recommendations for the Threshold for AAA Repair
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	A	1. In patients with unruptured AAA, repair is recommended in those with a maximal aneurysm diameter of ≥5.5 cm in men or ≥5.0 cm in women.[1-6]
1	B-NR	2. In patients with unruptured AAA who have symptoms that are attributable to the aneurysm, repair is recommended to reduce the risk of rupture.[7,8]
2b	C-LD	3. In patients with unruptured saccular AAA, intervention to reduce the risk of rupture may be reasonable.[9]
2b	C-LD	4. In patients with unruptured AAA and aneurysm growth of ≥0.5 cm in 6 months, repair to reduce the risk of rupture may be reasonable.[1-5]

- Tipo de reparo:

Recommendations for Endovascular Versus Open Repair of Descending TAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	B-NR	1. In patients without Marfan syndrome, Loeys-Dietz syndrome, or vascular Ehlers-Danlos syndrome, who have a descending TAA that meets criteria for intervention and anatomy suitable for endovascular repair, TEVAR is recommended over open surgery.[1-4]
1	B-NR	2. In patients with a descending TAA that meets criteria for repair with TEVAR, who have smaller or diseased access vessels, considerations for alternative vascular access are recommended.[5]
2a	B-NR	3. In patients with a descending TAA that meets criteria for intervention, who have anatomy unsuitable for endovascular repair, and who are without significant comorbidities and have a life expectancy of at least 10 years, open surgical repair is reasonable.[6-9]

Recommendations for Open Versus Endovascular Repair of AAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	RECOMMENDATIONS
1	A	1. In patients with nonruptured AAA with low to moderate operative risk and who have anatomy suitable for either open or EVAR, a shared decision-making process weighing the risks and benefits of each approach is recommended.[1-11]
1	B-NR	2. In patients undergoing elective endovascular repair for nonruptured AAA, adherence to manufacturer's instructions for use is recommended.[12-16]
2a	B-NR	3. In patients with nonruptured AAA and a high perioperative risk, EVAR is reasonable to reduce the risk of 30-day morbidity, mortality, or both.[9,10]
2a	B-NR	4. For patients with nonruptured AAA, a moderate to high perioperative risk, and anatomy suitable for an FDA-approved fenestrated endovascular device, endovascular repair is reasonable over open repair to reduce the risk of perioperative complications.[10,11,17,18]