AORTIC DISEASES ESC 2024 – what has changed?

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2024 ESC Guidelines for the management of peripheral arterial and aortic diseases

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(European Heart Journal; 2024 – doi: 10.1093/eurheartj/ehae179)

Revised recommendations (1)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for abdominal aortic aneurysm screening					
Screening for AAA with DUS					
Is recommended in all men >65 years of age.	I	A	Is recommended in men aged ≥65 years with a history of smoking to reduce the risk of death from ruptured AAA.	I	A
(i) May be considered in women >65 years of age with history of current/past smoking.	IIb	C	May be considered in men aged ≥75 years (irrespective of smoking history) or in women aged ≥75 years who are current smokers, hypertensive, or both.	IIb	C
(ii) Is not recommended in female non-smokers without familial history.	III	C			
Family AAA screening with DUS					
Targeted screening for AAA with ultrasound should be considered in first-degree siblings of a patient with AAA.	IIa	B	Is recommended for FDRs of patients with AAA aged ≥50, unless an acquired cause can be clearly identified.	I	C

Revised recommendations (2)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for abdominal aortic aneurysm screening cont.					
Opportunistic AAA screening with DUS					
Targeted screening for AAA with ultrasound should be considered in first-degree siblings of patients with AAA.	**IIa**	**B**	Should be considered in men ≥65 years and in women aged ≥75 years during TTE.	**IIa**	**B**
Recommendations for antihypertensive therapy in patients with peripheral and aortic disease					
In patients with PAD and hypertension, it is recommended to control blood pressure at <140/90 mmHg	**I**	**A**	In patients with PAAD and hypertension an SBP target towards 120–129 mmHg, if tolerated, is recommended.	**I**	**A**
ACEIs or ARBs should be considered as first-line therapy in patients with PAD and hypertension.	**IIa**	**B**	ACEIs/ARBs may be considered in all patients with PAD, regardless of BP levels, in the absence of contraindications.	**IIb**	**B**

Revised recommendations (3)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for lipid-lowering therapy for patients with peripheral arterial and aortic diseases					
In patients with PAD, it is recommended to reduce LDL-C to <1.8 mmol/L (70 mg/dL) or decrease it by >50% if baseline values are 1.8–3.5 mmol/L (70–135 mg/dL).	I	C	An ultimate LDL-C goal of <1.4 mmol/L (55 mg/dL) and a >50% reduction in LDL-C vs. baseline are recommended in patients with atherosclerotic PAAD.	I	A
Recommendations for carotid artery stenosis assessment					
DUS (as first-line imaging), CTA, and/or MRA are recommended for evaluating the extent and severity of extracranial carotid stenosis.	I	B	It is recommended to use DUS as first-line imaging to diagnose ICA stenosis.	I	C

Revised recommendations (4)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations in patients with visceral artery stenosis					
In patients with acute embolic occlusion of the SMA, both endovascular and open surgery therapy should be considered.	IIa	B	In patients with acute mesenteric ischaemia due to acute occlusion of the SMA, endovascular revascularization is recommended.	I	B
Recommendations for surveillance of patients with abdominal aorta aneurysm					
In patients with small (30–55 mm) AAA, the following time interval should be considered: •every 3 years for AAA of 30–39 mm diameter •every 2 years for AAA of 40–44 mm diameter •every year for AAA >45 mm diameter.	IIa	B	DUS surveillance should be considered annually in women with AAA of 40–45 mm and in men with AAA of 40–49 mm.	IIa	B

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Revised recommendations (5)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for surgery in aortic root and ascending aorta dilatation associated with tricuspid aortic valve					
Surgery should be considered in patients who have isolated aortic arch aneurysm with a maximal diameter ≥55 mm.	**IIa**	**C**	Surgery is recommended in patients with dilatation of the aortic root or ascending aorta with a tricuspid aortic valve and a maximum diameter of ≥55 mm.	**I**	**B**
Aortic valve repair using the reimplantation technique or remodelling with aortic annuloplasty is recommended in young patients with aortic root dilation and tricuspid aortic valves.	**I**	**C**	Valve-sparing aortic root replacement is recommended in patients with aortic root dilatation if performed in experienced centres and durable results are expected.	**I**	**B**

Revised recommendations (6)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for surgery in aortic root and ascending aorta dilatation associated with tricuspid aortic valve cont.					
Lower thresholds for intervention may be considered according to BSA in patients with small stature or in the case of rapid progression, aortic valve regurgitation, planned pregnancy, and patient's preference.	**IIb**	**C**	Ascending aortic or root replacement may be considered at a maximum diameter of ≥50 mm in patients with proximal aorta dilatation who can be offered surgery with low predicted risk and present with any of the following: •Growth of the aortic diameter ≥3 mm per year •Resistant hypertension •Short stature (<1.69 m) •Root phenotype •Aortic length >11 cm •Age <50 years •Desire for pregnancy •Aortic coarctation.	**IIb**	**B**

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Revised recommendations (7)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for surgery in aortic arch aneurysms					
Aortic arch repair may be considered in patients with aortic arch aneurysm who already have an indication for surgery of an adjacent aneurysm located in the ascending or descending aorta.	IIb	C	In patients undergoing open surgical repair of an ascending aortic aneurysm, concomitant hemi-arch replacement should be considered if the dilatation extends into the proximal aortic arch (>50 mm).	IIa	C
Recommendations for follow-up after treatment of aortic aneurysms					
After TEVAR or EVAR, surveillance is recommended after 1, 6, and 12 months and then yearly. Shorter intervals can be proposed in the event of abnormal findings requiring closer surveillance.	I	C	After TEVAR, follow-up imaging is recommended at 1 and 12 months post-operatively, then yearly until the fifth post-operative year if no abnormalities are documented.	I	B

Revised recommendations (8)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for follow-up after treatment of aortic aneurysms cont.					
Long-term surveillance of open abdominal aortic repair may be considered at loose (5-year) intervals using colour DUS or CCT imaging.	IIb	C	After open repair of AAA, first follow-up imaging is recommended within 1 post-operative year, and every 5 years thereafter if findings are stable.	I	A
If neither endoleak nor AAA sac enlargement is documented during first year after EVAR, then colour DUS, with or without contrast agents, should be considered for annual post-operative surveillance, with non-contrast CT imaging every 5 years.	IIa	C	After EVAR, follow-up imaging is recommended with CCT (or CMR) and DUS/CEUS at 1 month and 12 months post-operatively, then, if no abnormalities are documented, DUS/CEUS is recommended every year, repeating CCT or CMR (based on potential artefacts) every 5 years.	I	A

Revised recommendations (9)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for diagnostic work-up of acute aortic syndrome					
TTE is recommended as an initial imaging investigation. In stable patients with a suspicion of AAS, the following imaging modalities are recommended (or should be considered according to local availability and expertise):	**I**	**C**	In patients with suspected AAS, focused TTE (with use of contrast if feasible) is recommended during the initial evaluation.	**I**	**C**
MRI	**I**	**C**	In patients with suspected AAS, CMR should be considered as an alternative imaging technique if CCT is not available.	**IIa**	**C**
TOE	**IIa**	**C**	In patients with suspected AAS, TOE is recommended to guide peri-operative management and detect complications.	**I**	**C**

Revised recommendations (10)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for medical treatment in acute aortic syndromes					
In all patients with AD, medical therapy, including pain relief and blood pressure control, is recommended.	I	C	Invasive monitoring with an arterial line and continuous three-lead ECG recording, as well as admission to an intensive care unit, is recommended.	I	B
Recommendations for the management of patients presenting with acute type B aortic dissection					
In complicated TBAD, TEVAR is recommended.	I	C	In patients with complicated acute TBAD, emergency intervention is recommended.	I	B
In complicated TBAD, surgery may be considered.	IIb	C			
In complicated TBAD, TEVAR may be recommended.	IIb	C	In patients with complicated acute TBAD, TEVAR is recommended as the first-line therapy.	I	B
In complicated TBAD, surgery may be considered.	IIb	C			

Revised recommendations (11)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for the management of intramural haematoma					
In complicated type B IMH, TEVAR should be considered.	IIa	C	In complicated type B IMH, TEVAR is recommended.	I	C
Recommendations for the management of penetrating atherosclerotic ulcer					
In the case of type A PAU, surgery should be considered.	IIa	C	In the case of type A PAU, surgery is recommended.	I	C
In complicated type B PAU, TEVAR should be considered.	IIa	C	In complicated type B PAU, endovascular treatment is recommended.	I	C
Recommendations for traumatic aortic injury					
In cases of TAI with suitable anatomy requiring intervention, TEVAR should be preferred to surgery.	IIa	C	In cases of TAI with suitable anatomy requiring intervention, TEVAR is recommended over open surgery.	I	A

Revised recommendations (12)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for genetic testing and aortic screening in aortic disease					
It is recommended to investigate FDRs (siblings and parents) of a subject with TAAD to identify a familial form in which relatives all have a 50% chance of carrying the family mutation/disease.	I	C	Imaging screening of family members of patients with TAD with risk factors for HTAD in whom no (likely) pathogenic variant is identified should be considered starting at age 25, or 10 years below the youngest case, whichever is younger. If the initial screening is normal, continued screening every 5 years until the age of 60 should be considered.	IIa	C

Revised recommendations (13)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for bicuspid aortic valve-associated aortopathy management					
Cardiac MRI or CT is indicated in patients with BAV when the morphology of the aortic root and the ascending aorta cannot be accurately assessed by TTE.	I	C	CCT or CMR of the entire thoracic aorta is recommended at first diagnosis and when important discrepancies in measurements are found between subsequent TTE controls during surveillance, or when the diameter of the aorta exceeds 45 mm.	I	C
In the case of aortic diameter >50 mm or an increase of >3 mm per year measured by echocardiography, confirmation of the measurement is indicated, using another imaging modality (CT or MRI).	I	C			

Revised recommendations (14)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for bicuspid aortic valve-associated aortopathy management cont.					
In the case of a diameter of the aortic root or the ascending aorta >45 mm or an increase of >3 mm per year measured by echocardiography, annual measurement of aortic diameter is indicated.	**I**	**C**	Surveillance serial imaging by TTE is recommended in BAV patients with a maximum aortic diameter >40 mm, either with no indication for surgery or after isolated aortic valve surgery, after 1 year, then if stability is observed, every 2–3 years.	**I**	**C**

Revised recommendations (15)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for bicuspid aortic valve-associated aortopathy management cont.					
In cases of BAV, surgery of the ascending aorta is indicated in the case of: •Aortic root or ascending aortic diameter >50 mm in the presence of other risk factors (coarctation of the aorta, systemic hypertension, family history of dissection, or increase in aortic diameter of >3 mm per year).	I	C	In patients with low surgical risk and ascending phenotype bicuspid aortopathy, surgery should be considered at a maximum diameter ≥50 mm if any of the following is the case: •Age <50 years •Short stature •Ascending aortic length ≥11 cm •Aortic diameter growth rate >3 mm per year •Family history of acute aortic syndrome •Aortic coarctation •Resistant hypertension •Concomitant non-aortic-valve cardiac surgery •Desire for pregnancy	IIa	C

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Revised recommendations (16)

2017 PAD and 2014 Aortic Guidelines	Class	Level	2024 PAAD Guidelines	Class	Level
Recommendations for bicuspid aortic valve-associated aortopathy management cont.					
In cases of BAV, surgery of the ascending aorta is indicated in the case of: •Aortic root or ascending aortic diameter >45 mm when surgical aortic valve replacement is scheduled.	**I**	**C**	Surgery for bicuspid aortopathy in patients undergoing aortic valve surgery should be considered at a root or ascending diameter ≥45 mm.	**IIa**	**C**
Recommendations for screening and management of polyvascular disease and peripheral arterial disease with cardiac diseases					
In patients undergoing CABG, DUS is recommended in patients with a recent (<6 months) history of TIA/stroke.	**I**	**B**	Carotid DUS should be considered for stable patients scheduled for CABG with TIA/stroke within the past 6 months without carotid revascularization.	**IIa**	**B**

Main aortic imaging techniques

	TTE/DUS	TOE	CCT	CMR
Availability	++++	+++	++	+
Cost	+	++	+++	++++
Time requirement	+	+++	+++	++++
Radiation	0	0	+++	0
Spatial resolution	1 mm	1 mm	0.6 mm	1–2 mm
Temporal resolution	20 msec	20 msec	80 msec	30 msec
Nephrotoxicity	0	0	+++	+
Accuracy	++	++++	++++	++++
Serial examination	++++	++	++	++++
Aortic wall visualization	++	+++	++++	++++
Aortic valve function	+++	++++	+	++++
RV/LV function	+++	+++	+++	++++
Aortic root assessment	+++	+++	++++	++++
Aortic arch assessment	++	+++	++++	++++
Thoracic aorta assessment	+	++	++++	++++
Abdominal aorta assessment	+++	-	++++	++++

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WHAT IS NEW IN THE GUIDELINES?

- Evaluation of peripheral arteries and aorta
- Recommended comprehensive approach for the entire arterial circulation
- Specific questionnaires or tests to evaluate functional capacity and depression
- Review various imaging modalities for assessing Thoracic and Abdominal aorta
- Measurements with different techniques

Screening for PAD

- **Not systematically recommended, except in pts >65 years with risk factors**
- **Diabetic or CKD with normal ABI at rest should have a Toe-Brachial index test**
- **Multisite artery dis: Aatherosclerosis in 2 or more vascular beds , added to intermediate to high risk: Antiplatelets and Low-dose anticoagulation th**

- **AAA: DUS for men >65y who smoke and for first-degree relatives >50y**
- **Opportunistic AAA screening is considered in PAD who undergo DUS**
- **Screening men >65y and women >75y even in the absence of risk factors**

Abdominal aortic aneurysm Recommendations

- **Surveillance and treatment of patients with AAA establish either a long or limited life expectancy at 2 years**

- **Another novelty is the recommendation for elective repair in patients with saccular aneurysms measuring ≥ 45mm**

Thoracic aortic aneurysm

- Dilatation of the tubular ascending aorta, tricuspid aortic valve, and low predicted surgical risk should be considered for ascending aortic replacement when the maximum diameter exceeds 52mm
- Surgery for diameters of ≥ 55mm
- In pts undergoing surgery for tricuspid aortic valve disease who also have concomitant dilatation of the aortic root or ascending tubular aorta and low predicted surgical risk, ascending aorta or root replacement should be considered when the maximum diameter is at least 45mm; otherwise, the threshold is 50mm

Aortic arch

- **Open repair: Gold standard for symptomatic pts with aortic arch aneurysms or asymptomatic pts with low operative risk and arch diameter≥ 55mm**
- **Hybrid or endovascular treatment at high surgical risk**
- **Endovascular treatment preferred over open repair without hereditary TAD with unruptured descending thoracic aorta aneurysms in diameter >55mm**
- **Degenerative thoracoabdominal aortic aneurysms ≥ 60mm, endovascular repair using fenestrated and/or branched endografts should be considered**
- **Acute aortic syndrome with complicated type B aortic dissection: Emergency intervention and for the choice of endovascular repair as first-line therapy**

Genetic and congenital disease of the aorta

- Specialized centers in assessing pts and their first-degree relatives for genetic testing
- Specific screening algorithm for TAD
- Comprehensive evaluation of entire aorta and other vascular regions in hereditary TAD
- Both genetic testing and imaging: TTE, CMRI, or CCT
- Suspicion of genetic defect but no identified genetic cause, a genetic reassessment in 3 to 5 years
- Specific recommendations for imaging or surgery in Turner sy, Ehlers-Danlos sy, and Loeys-Dietz sy
- Marfan sy: Imaging follow-up, BB or ARB maximum doses, exercise prescription, and pregnancy care
- Bicuspid aortic valve and aortopathy: Surgery when the maximum aortic diameter is ≥ 55mm.
- New recommendation: Surgery for Root phenotype (IB) of bicuspid aortopathy in diameter ≥ 50mm

ADVANTAGES of the ESC 2024 Guidelines

- Cover PAD and aortic diseases, highlighting greater prevalence in women
- Recommend the entire arterial circulation and include specific questionnaires or tests for functional capacity and depressive disorders
- Optimal management involves risk factor control, pharmacological therapy, lifestyle modifications, patient education, and exercise
- In symptomatic PAD, SET is recommended
- Surgical recommendations for AAA and TAA and for screening

DISADVANTAGES

- **Care coordination is not included,**
- **Role of general practitioners**
- **Advanced practice nurses are not mentioned**
- **Recommendations on the urgency of referrals for surgery are not explained**
- **Suggestion that e-cigarettes may aid in smoking cessation.**
- **However, it is advisable to limit their use and avoid simultaneous use with conventional cigarettes. Their use associated with adverse effects on CV, respiratory, immunological, and periodontal health vs with nonuse**
- **This controversial guideline recommendation**


THANK YOU