

## Update on Management of Aneurysms of the Abdominal Aorta, its Branch Vessels, and the Lower Extremities

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### Editorial

Risk factors for abdominal aortic aneurysm (AAA) are older age, smoking, hypercholesterolemia, hypertension, male sex, and family history [1-3]. Of 96 patients, mean age 77 years (80% men) with an AAA, 32% were current smokers, 89% had hypertension, 81% had hypercholesterolemia, and 25% were diabetics [2].

Most patients with AAA are asymptomatic. Of 96 patients with AAA, 74% had coronary artery disease (CAD), 18% had prior stroke, 20% had carotid arterial disease, and 39% had lower extremity peripheral arterial disease (LE PAD) [2]. Of 110 men with AAA, 71% had CAD, 46% had LE PAD, and 27% had cerebrovascular disease [4]. Women with AAA have a worse prognosis than men [5].

The American College of Cardiology Foundation (ACCF)/American Heart Association (AHA) 2013 peripheral artery guidelines recommend that patients with an AAA should undergo intensive risk factor modification [6]. Blood pressure and fasting serum lipid values should be monitored and controlled as recommended for patients with atherosclerotic vascular disease (class I indication) [6]. The blood pressure should be reduced to less than 140/90 mm Hg [7]. Patients should be treated with high-dose statins with either atorvastatin 40 mg to 80 mg daily or with rosuvastatin 20 mg to 40 mg daily [8]. Patients with aneurysms or a family history of aneurysms should be advised to stop smoking and undergo smoking cessation interventions including behavior modification, nicotine replacement, or bupropion therapy (class I indication) [6].

Angiotensin-converting enzyme inhibitors have been reported to reduce the risk of ruptured AAA [9]. Of 130 patients with AAAs not treated surgically, statin-treated patients had a lower mortality (5% compared to 16% for non-statin-treated patients) at 45-month follow-up [10]. The size of the AAA was 4.6 cm at baseline versus 4.5 cm at 23-month follow-up in statin-treated patients [10]. The size of the AAA was 4.5 cm at baseline and 5.3 cm at 24-month follow-up in non-statin-treated patients [10].

Statins decreased 1 perioperative and 2-year mortality in patients having surgical repair of their AAA [11,12]. Of 577 patients having noncardiac vascular surgery (98 having AAA repair), 52% were treated with statins [12]. The incidence of perioperative mortality or 2-year mortality was 11% of 302 statin-treated patients and in 27% of 275 non-statin-treated patients ( $p < 0.0001$ ) [12]. Long-term statin use also reduced all-cause mortality and cardiovascular mortality after successful AAA surgery in 570 patients, irrespective of risk factors and beta blocker use [13]. At 4.7-year follow-up, statins reduced all-cause

mortality 60% ( $p < 0.001$ ) and cardiovascular mortality 70% ( $p < 0.0001$ ) [13]. Beta blockers reduced all-cause mortality 40% ( $p = 0.003$ ) and cardiovascular mortality 30% ( $p = 0.03$ ) [13].

The aorta needs to be evaluated as soon as possible, preferably with computed tomographic scanning, in patients with back, abdominal, or groin pain and a pulsatile abdominal mass. Mortality rates were reported to be 35% for ruptured AAAs, 26% for symptomatic AAAs, and 5% for asymptomatic AAAs undergoing repair [14]. Treatment of 96 high-risk patients, mean age 72 years, with AAA with an endovascular stent-graft prosthesis was reported to have a 100% survival at 90-day follow-up [15].

The ACCF/AHA 2013 peripheral artery guidelines recommend that patients with infrarenal or juxtarenal AAAs measuring 5.5 cm or larger in diameter should undergo repair to eliminate the risk of rupture (class I indication) [6]. Patients with infrarenal or juxtarenal AAAs measuring 4.0 to 5.4 cm in diameter should be monitored by ultrasound or computed tomographic scans every 6 to 12 months to detect expansion (class I indication) [6]. Repair of an AAA can be beneficial in patients with infrarenal or juxtarenal AAAs measuring 5.0 cm to 5.4 cm in diameter (class IIa indication) [6]. Repair is probably indicated in patients with suprarenal or type IV thoracoabdominal AAAs aortic aneurysms larger than 5.5 to 6.0 cm (class IIa indication) [6]. AAAs smaller than 4.0 cm in diameter should be monitored by ultrasound examination every 2 to 3 years (class IIa indication) [6]. Intervention is not recommended for asymptomatic infrarenal or juxtarenal AAAs if they measure less than 5.0 cm in diameter in men or less than 4.5 cm in diameter in women (class III indication) [6].

In patients with abdominal and/or back pain, a pulsatile abdominal mass, and hypotension, immediate surgical evaluation is indicated (class I indication) [6]. In patients with symptomatic AAAs, repair is indicated regardless of AAA diameter (class I indication) [6].

Men aged 60 years and older who are siblings or offspring of patients with an AAA should undergo physical examination and ultrasound screening for detection of aortic aneurysms (class I indication) [6]. Men who are 65 to 75 years of age who have ever smoked should undergo a physical examination and a 1-time ultrasound screening for detection of aortic aneurysms (class IIa indication) [6]. The US Preventive Services Task Force 2014 guidelines recommend 1-time screening for an AAA with ultrasonography in men aged 65 to 75 years who have ever smoked (class B recommendation) [16]. These guidelines recommend selective screening for AAA in men aged 65 to 75 years who have never smoked (class C recommendation) [16]. These guidelines state that current evidence is insufficient to assess whether women aged 65 to 75 years who have ever smoked should be screened for AAA [16]. These

guidelines recommend against routine screening for AAA in women who have never smoked (class D recommendation) [16].

Perioperative beta blockers in absence of contraindications should be used in CAD patients having surgical repair of atherosclerotic aortic aneurysms (class I indication) [6]. Beta blockers may be considered to reduce the rate of aneurysm expansion in patients with aortic aneurysms (class IIb indication) [6].

Patients who are good surgical candidates should have open or endovascular repair of infrarenal AAAs and/or common iliac aneurysms (class I indication) [6]. Periodic long-term surveillance imaging is indicated to monitor for endoleak, to detect shrinkage or stability of the excluded aneurysm sac, and to see if further intervention is indicated in patients with endovascular repair of infrarenal aortic and/or iliac aneurysms (class I indication) [6]. Open AAA repair should be considered in good surgical candidates who cannot comply with periodic long-term surveillance after endovascular repair (class IIa indication) [6].

Open repair or catheter-based intervention is indicated for visceral aneurysms measuring 2.0 cm in diameter or larger in women of child bearing age who are not pregnant and in men or women undergoing liver transplantation (class I indication) [6]. Open repair or catheter-based intervention is probably indicated for visceral aneurysms measuring 2.0 cm or larger in diameter in women beyond childbearing age and in men (class IIa indication). [6].

In patients with femoral or popliteal aneurysms, ultrasound or computed tomography or magnetic resonance imaging is recommended to exclude contralateral femoral or popliteal aneurysms and AAA (class I indication) [6]. Patients with a palpable popliteal mass should undergo ultrasound examination to exclude popliteal aneurysm (class I indication) [6]. Patients with popliteal aneurysms 2.0 cm or larger in diameter should undergo repair to decrease the risk of thromboembolic complications and limb loss (class I indication) [6]. Patients with anastomotic pseudoaneurysms or symptomatic femoral artery aneurysms should undergo repair (class I indication) [6].

Annual ultrasound imaging is suggested for patients with asymptomatic femoral artery true aneurysms smaller than 3.0 cm in diameter (class IIa indication) [6]. Patients with popliteal aneurysms, acute ischemia, and absent runoff should have catheter-directed thrombolysis or mechanical thrombectomy or both to restore distal runoff and resolve emboli (class IIa indication) [6]. Annual ultrasound monitoring is suggested in patients with asymptomatic enlargement of the popliteal arteries twice the normal diameter for age and gender (class IIa indication) [6]. Antiplatelet therapy is suggested for patients with femoral or popliteal aneurysms (class IIa indication) [6].

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