

AAA
Small Talk
October 5, 2009

1. A 75-year-old asymptomatic man undergoes his annual examination. He is obese and has a long history of smoking, hypertension, and chronic kidney disease (creatinine level, 2.7 mg/dL [238.73 μ mol/L]). His medications are furosemide, ramipril, atorvastatin, and aspirin.

On physical examination, the blood pressure is 170/78 mm Hg bilaterally, and pulse rate is 70/min and regular. There is a 2/6 holosystolic murmur heard at the apex with radiation to the axilla. There is a soft systolic abdominal bruit and a mildly tender midline pulsatile mass. There are bilateral femoral bruits with absent distal pulses. Laboratory studies show a total cholesterol level of 200 mg/dL (5.17 mmol/L), HDL cholesterol level of 32 mg/dL (0.83 mmol/L), and LDL cholesterol level of 132 mg/dL (3.41 mmol/L). The patient is encouraged to stop smoking.

In addition to increasing the antihypertensive medications, what is the most appropriate next step in this patient's management?

- A. Abdominal radiography
 - B. Abdominal computed tomography scan with contrast
 - C. Abdominal ultrasonography
 - D. Contrast aortography
2. A 74-year-old woman undergoes a routine evaluation. She is a smoker and has hypertension, hypercholesterolemia, and type 2 diabetes mellitus. Last year, she had an asymptomatic 4.4-cm infrarenal abdominal aortic aneurysm diagnosed during an ultrasonography for suspected gallstones, at which time she was encouraged to stop smoking. She is petite, active, asymptomatic, and compliant with her medications, which include atenolol, glyburide, metformin, lisinopril, and aspirin.

On physical examination, her blood pressure is 125/78 mm Hg, and her pulse rate is 70/min and regular. Her lungs are clear; cardiac examination shows an S4, and abdominal examination shows a nontender abdomen with a pulsatile mass. A follow-up ultrasonography shows a 5.1-cm aneurysm with thrombus. The patient is again encouraged to stop smoking.

What is the most appropriate next step in this patient's management?

- A. Repeat ultrasonography in 6 months
 - B. Increase atenolol, repeat ultrasonography in 6 months
 - C. Elective repair aneurysm
 - D. Start warfarin (INR 2-3), repeat ultrasonography in 6 months
3. A 67-year-old woman comes to your office because of intermittent lower back pain of 4 days' duration. The pain is dull, nonradiating, and nonpositional, and is unrelated to meals or exertion. She has no dyspnea, chest pain, or dysuria, and no history of trauma. She has a history of hypercholesterolemia and underwent cholecystectomy at age 45 years. She also has a history of recurrent urinary tract infections. She stopped smoking 10 years ago. Her only medication is simvastatin, 20 mg every night orally.

On physical examination, blood pressure is 145/85 mm Hg and heart rate is 86 beats/min and regular. The patient is afebrile. Jugular venous pressure is normal. Carotid pulses are 2+ bilaterally, without bruits. Cardiac examination shows S4; the findings are otherwise normal. The lungs are clear to auscultation. Abdominal examination shows a midline pulsatile mass. No spinal or costovertebral angle tenderness is noted. Distal pulses are normal.

Laboratory findings include hematocrit of 36%, leukocyte count of 9.5×10^9 cells/L, platelet count of 290×10^9 cells/L, and serum creatinine level of 1.5 mg/dL (114.38 μ mol/L). Results of urinalysis are normal. The LDL cholesterol level is 115 mg/dL (2.98 mmol/L). Abdominal ultrasonography shows a 5.8-cm abdominal aortic aneurysm that originates from the celiac trunk and extends below the renal arteries.

Which of the following is the most appropriate next step?

- A. Initiate treatment with metoprolol, 25 mg BID orally, and schedule a follow-up visit with ultrasonography in 6 months
 - B. Increase the dose of simvastatin to 40 mg/d and schedule a follow-up visit with ultrasonography in 3 months
 - C. Hospitalize the patient, order a high-resolution computed tomography scan, and obtain a vascular surgery consultation
 - D. Hospitalize the patient; initiate treatment with metoprolol, 25 mg BID; and refer the patient to a vascular surgeon
 - E. Initiate treatment with metoprolol, 25 mg BID orally, and order MRI of the spine
4. A 72-year-old man is evaluated during a routine examination. He has a 45-pack-year history of smoking but quit 10 years ago. He is fit and exercises aggressively. He has no known coronary artery disease and no medical problems.

On physical examination, BMI is 26.4 kg/m². Pulse rate is 62/min, and blood pressure is 118/64 mm Hg. Serum total cholesterol level is 175 mg/dL (4.53 mmol/L), serum high-density lipoprotein cholesterol level is 52 mg/dL (1.34 mmol/L), serum low-density lipoprotein cholesterol level is 102 mg/dL (2.64 mmol/L), serum triglyceride level is 105 mg/dL (1.19 mmol/L).

Which of the following is the most appropriate next step in the management of this patient?

- A. Electron-beam CT for calcium score
- B. Carotid artery ultrasonography
- C. Ultrasonography to evaluate for abdominal aortic aneurysm
- D. Statin therapy

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1. C. Abdominal ultrasonography.

This man is at high risk for abdominal aortic aneurysm, which should be suspected in patients with a bruit and tender pulsatile abdominal mass. Although increasing antihypertensive medication is appropriate in this patient, urgent evaluation for a suspected abdominal aortic aneurysm is indicated. The physical examination is not highly sensitive for the detection or sizing of abdominal aortic aneurysms. Because of the patient's renal insufficiency, abdominal computed tomography with contrast should be avoided. Abdominal radiograph may show aortic calcification but is not sensitive for aneurysm. Abdominal ultrasonography is the preferred initial evaluation of patients with suspected abdominal aortic aneurysm. For this patient, abdominal magnetic resonance angiography would also be an acceptable alternative. Tenderness may be a sign of inflammation or increase in aneurysm size. The 3rd National Cholesterol Education Program considers abdominal aortic aneurysm to be a coronary heart disease equivalent with target LDL cholesterol level <100 mg/dL (2.59 mmol/L).

2. C. Electively repair aneurysm.

Patients with asymptomatic abdominal aortic aneurysms can be followed by serial ultrasonography (or computed tomography or magnetic resonance imaging) examinations. For aneurysms 3 to 3.9 cm in diameter, follow-up studies every 2 to 3 years are suggested, whereas annual examinations are recommended for patients with aneurysms exceeding 4.0 cm and every 6 months for those larger than 4.5 cm. Smoking cessation, aggressive antihypertensive therapy, and lipid management are indicated for all. Although abdominal aortic aneurysms are less prevalent among women, there is an increased risk for rupture and at a smaller diameter, especially among current smokers. Referral for surgical repair is indicated when the aneurysm exceeds 5.5 cm in diameter in men and 4.5 to 5.0 cm in women, or if there is a marked increase (>0.5 cm/y) between surveillance imaging studies. Due to the increased risk for rupture, warfarin prophylaxis is generally not indicated. A family history of abdominal aortic aneurysm is also a risk factor for aneurysm and rupture.

3. D. Hospitalize the patient; initiate treatment with metoprolol, 25 mg BID; and refer the patient to a vascular surgeon.

Initiating treatment with a β -blocker is a reasonable approach, because of this patient's mildly elevated blood pressure and the presence of an aneurysm. β -Blocker therapy will also reduce sheer stress on the aortic wall. The presence of symptoms without another reasonable cause suggests that the aneurysm may be expanding or that subacute rupture may have occurred. The UK Small Aneurysm study showed a slightly increased risk for rupture in women. Therefore, the patient should be hospitalized and referred to a vascular surgeon.

Confirmation of the diagnosis is warranted, and more immediate intervention may be required.

Ultrasonography is an effective screening technique, and in this case, it showed an aneurysm with a diameter approaching 5 cm. Computed tomography or magnetic resonance angiography would provide more precise information about the size and extent of the aneurysm. High-resolution computed tomography is an inappropriate test. It is used to evaluate pulmonary parenchyma for intestinal fibrosis or pulmonary masses. Helical (spiral) computed tomography angiography is used to evaluate the aorta. Magnetic resonance imaging of the spine is not needed at this time because the most worrisome cause of this patient's pain is the potentially life-threatening abdominal aortic aneurysm.

The dose of simvastatin should be increased because the patient has a coronary artery disease risk equivalent, as defined by the NCEP-ATP III guidelines. As with known coronary artery disease, in a patient with an abdominal aortic aneurysm, the 10-year risk for cardiovascular events is >20%. According to current guidelines, this profile warrants treatment to lower the low-density lipoprotein cholesterol level to <100 mg/dL (2.59 mmol/L).

4. C. Ultrasonography to evaluate for abdominal aortic aneurysm.

The U.S. Preventive Services Task Force (USPSTF) has found sufficient evidence of benefit to recommend screening for abdominal aortic aneurysm (AAA) in men age 65 to 75 years who have ever smoked.

Ultrasonography is highly sensitive and specific in detecting AAA of all sizes (sensitivity approaches 100%). Although there is good evidence on the harms of both screening and early treatment (increased surgeries with clinically significant morbidity and mortality, as well as short-term psychological harm), overall, the net benefit seems to outweigh the harm. Almost all deaths from AAA occur in men between 65 and 80 years old, supporting the age bracket for this one-time screening test. The USPSTF does not recommend for or against screening in men who have never smoked, as the benefits and harms are too close for recommendation. The prevalence of AAA in men who have never smoked is low, so the benefit from screening in this population is small. The USPSTF recommends against routine screening for women because of evidence that it is ineffective and that associated harms outweigh any benefit. Few deaths would be prevented by screening women, because this population has a low prevalence of large AAAs. There are negligible health benefits of rescreening in persons with a past study showing normal aortic diameter.

Carotid ultrasonography is not recommended as a screening test but as a diagnostic evaluation for persons with symptoms of cerebrovascular disease, such as transient ischemic attack. There are no other good indicators for impending atherosclerosis in the cerebral circulation, because evidence suggests that bruits may be absent in high-grade stenosis. Further, medical and surgical therapies are equivalent unless the patient is at very low risk for surgical complications. This patient has no indication for a study of his carotid arteries.

Using the Framingham Risk Index, this patient is at moderate risk for developing coronary artery disease (CAD) (12% in 10 years). There is no evidence about the prognostic value of electron-beam computed tomography as an indicator of disease. It has been correlated to other markers for CAD, including C-reactive protein, but evidence about its relationship to clinical coronary events is insufficient. The patient's cholesterol levels do not support treatment with statin therapy.