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50 Questions and Answers
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Medscape from WebMD Cardiology
50 Questions and Answers

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Q

A 55-year-old man presents with lower extremity edema, orthopnea, and shortness of breath on exertion. On echocardiography, the left ventricular ejection fraction is approximately 15%, and the aortic valve is thickened with restricted leaflet excursion. The mean gradient across the valve is 25 mm Hg with a calculated valve area of 0.8 cm^2.

Which of the following is the next step in managing this patient?

A. Medical therapy
B. Aortic valve replacement
C. Balloon valvuloplasty
D. Assess of the mean gradient across the aortic valve during dobutamine infusion

A

D. Assess the mean gradient across the aortic valve during dobutamine infusion.

This scenario describes low gradient/low output aortic stenosis, and a dobutamine challenge is necessary to differentiate pseudostenosis from true valvular stenosis. In true aortic stenosis, dobutamine would increase the maximum flow velocity across the valve (V2) out of proportion to the increase in the Left Ventricular Outflow Tract velocity (V1). Therefore, by the continuity equation [AVA = (LVOT area)(V1)/(V2)], Aortic Valve Area (AVA) would decrease.

Alipour MS, Shah PM. Diagnosis of aortic stenosis in the elderly: role of echocardiography. Am J Geriatr Cardiol. 2003; 12:201-206. Available at: http://www.medscape.com/viewarticle/456336 Accessed January 14, 2008.

Q

A 44-year-old white woman was recently discharged from the hospital with a new diagnosis of systolic heart failure after presenting with signs and symptoms of volume overload. Two weeks prior to admission she had had a viral upper respiratory infection (URI). On admission, her ECG showed left bundle branch block; serial cardiac biomarker levels were normal; and her transthoracic echocardiogram showed severe left ventricular (LV) dysfunction with an ejection fraction of 30%, a mildly dilated left ventricle, and no pericardial effusion. Subsequently, she underwent cardiac catheterization, which showed no evidence of coronary artery disease. She was discharged on an appropriate medical regimen for heart failure, which included an angiotensin-converting enzyme (ACE) inhibitor and beta-blocker. She then presented to the clinic 2 days later with constant, sharp, pleuritic chest pain for 24 hours that improved while sitting up. On clinical examination, her blood pressure was 110/80 mm Hg, heart rate 80 beats per minute, and she was afebrile. Her examination was significant only for a 3-component pericardial friction rub. ECG showed normal sinus rhythm and left bundle-branch block. She was diagnosed with acute pericarditis secondary to a probable viral myocarditis. Ibuprofen was prescribed, but after a week her symptoms persisted.

Which of the following is the best next therapy?

A. Pericardial stripping
B. Prednisone taper
C. Continue ibuprofen
D. Add colchicine

A

D. Add colchicine.

Use of nonsteroidal anti-inflammatory drugs (NSAIDs) or aspirin usually results in prompt relief of symptoms within days. The use of colchicine for recurrent or persistent pericarditis was studied in the COlchicine for REcurrent pericarditis (CORE) Trial (Imazio M, et al. *Arch Intern Med*. 2005;165:1987-1991). The use of colchicine with aspirin for 6 months vs aspirin alone was shown to have decreased rates of recurrence at 18 months (24.0% vs 50.6%), and decreased symptom persistence at 72 hours (10% vs 31%). Previous corticosteroid use independently increased the risk for further recurrences (odds ratio, 2.89).

Barclay L. Colchicine may decrease recurrent pericarditis. Medscape Medical News. Sept 27, 2005. Available at: http://www.medscape.com/viewarticle/513486 Accessed January 14, 2008.

Q

A patient undergoing assessment for potential cardiac transplantation has a right heart catheterization performed for the evaluation of pulmonary hypertension. The hemodynamic review of his right-sided pressures reveals a pulmonary vascular resistance (PVR) of 4 Wood units (320 dynes-sec/cm^5).

What should be the next step in this patient's evaluation?

A. Proceed with heart transplantation
B. Evaluate for combined heart and lung transplantation
C. Discontinue heart transplant evaluation as the patient is no longer a candidate
D. Vasodilator challenge with nitroprusside

A

D. Vasodilator challenge with nitroprusside.

The next step in this evaluation should be a vasodilator challenge to determine if the patient's PVR can be lowered. The PVR is an important predictor of outcome after heart transplantation. If the PVR is very high (>5 Wood units) and not reversible, the donor right ventricle, which is faced with high pulmonary pressures in patients with fixed severe pulmonary hypertension, will likely fail after transplantation. Vasodilators such as nitroprusside, nitroglycerin, prostaglandin E1, or inhaled nitric oxide may be administered to lower pulmonary pressures.

Dressler DK. Heart transplantation. Organ Transplantation: Concepts, Issues, Practice, and Outcomes. 2002. Available at: http://www.medscape.com/viewarticle/436544 Accessed January 18, 2008.

Q

A 53-year-old African-American man with NYHA class III, stage C heart failure presents to your clinic for further management of his cardiomyopathy. His current medications include aspirin, carvedilol, and enalapril, which are all titrated to goal dose.

In addition to his current regimen, what medication or medications can be added that will improve this patient's outcome?

A. Digoxin
B. Warfarin
C. Hydralazine and isosorbide dinitrate
D. Furosemide

A

C. Hydralazine and isosorbide dinitrate.

The A-HeFT trial enrolled 1050 African-American patients with NYHA class III or IV heart failure who were already on beta-blockers, ACE inhibitors, and diuretics. Compared with placebo, the addition of hydralazine and isosorbide dinitrate demonstrated a 43% improvement in survival (10.2% vs 6.2%). The rate of hospitalization was also decreased by 33%. The other choices (digoxin, warfarin, and furosemide) have never been proven to reduce overall mortality.

Brookes, L. A-HeFT: African-American heart failure trial. Medscape Cardiology conference coverage of the American Heart Association 2004 Annual Scientific Sessions. Available at: http://www.medscape.com/viewarticle/494186 Accessed January 14, 2008.

Q

A 73-year-old man with a medical history significant for diabetes mellitus, hypertension, dyslipidemia, and aortic stenosis presents for follow-up evaluation. He has undergone a 2-vessel bypass and aortic valve replacement with a bioprosthetic valve 4 months ago and has done relatively well since the surgery. He is currently taking metformin (*Glucophage*), 500 mg orally twice daily; enalapril, 5 mg orally twice daily; metoprolol, 50 mg orally twice daily; aspirin, 325 mg orally once daily; and warfarin – 5 mg on Monday, Wednesday, and Friday; and 2.5 mg on Tuesday, Thursday, Saturday, and Sunday. An electrocardiogram (ECG) shows normal sinus rhythm, normal intervals, and no diagnostic ST/T wave changes. Echocardiography shows a normal ejection fraction of 65%, a well-seated bioprosthetic aortic valve, and no wall motion abnormalities. Laboratory values were: sodium, 140 mEq/L; potassium, 4.5 mEq/L; chloride, 100 mEq/L; bicarbonate, 22 mEq/L; blood urea nitrogen/creatine ratio, 22/1.0; glucose, 235 mg/dL; hemoglobin A1c (HgA1c), 7.5 g/dL; and International Normalized Ratio (INR), 2.8.

How would you recommend managing this patient?

A. Continue his current medications and titrate his enalapril and metoprolol as tolerated
B. Discontinue metformin and recommend diet and exercise as the sole means of controlling his diabetes
C. Discontinue both aspirin and warfarin as the patient is 3 months post-aortic valve replacement and no longer needs anticoagulation
D. Recommend an increase in his dose of warfarin to 5mg orally once daily for a target INR of 3-4
E. Discontinue warfarin and decrease the dosage of aspirin to 81 mg orally once daily

A

E. Discontinue warfarin and decrease the dosage of aspirin to 81 mg orally once daily.

After aortic valve or mitral valve replacement with a bioprosthesis and no risk factors (risk factors include atrial fibrillation, previous thromboembolism, left ventricular [LV] dysfunction, and a hypercoagulable condition), aspirin is indicated at 75 to 100 mg per day. After aortic valve replacement with a bioprosthesis AND risk factors, warfarin is indicated to achieve an INR of 2.0 to 3.0. For this reason, answers A, B, C, and D are incorrect. A is incorrect because the patient's blood pressure is relatively well controlled on his current medication regimen. B is incorrect because the patient's glucose was 235 mg/dL with an HgA1c of 7.5%. C is incorrect because the patient should be on ASA (75-100 mg po qd). D is incorrect because the patient has no further need for anticoagulation.

Jacobs, LG. The use of anticoagulants (Warfarin) in older people. Am J Geriatr Cardiol 2003; 12:153-160, 177. Available at: http://www.medscape.com/viewarticle/456330 Accessed January 18, 2008.

Q

A 24-year-old African-American woman with no cardiac history is referred to your clinic for further evaluation of shortness of breath. She had twins 2 months ago and states that she did fine after delivery. Since then, she has noticed progressive shortness of breath with mild exertion, the need for 3 pillows to sleep at night, as well as increased lower extremity swelling. On physical examination, her blood pressure is 145/90 mm Hg, pulse is 95 beats per minute, respiration rate is 20 breaths per minute, and she has oxygen saturation of 93% on room air. She has evidence of jugular venous distention; normal S1, S2; and an S3 is heard on cardiac examination. She has bibasilar crackles and lower extremity edema.

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

A. Order STAT chest computed tomography (CT) to evaluate the patient for pulmonary embolism and start heparin
B. Evaluate the patient for any identifiable causes for heart failure, order an echocardiogram, and start afterload reduction
C. Refer the patient for an echocardiogram to evaluate for pericardial effusion with tamponade physiology
D. Reassure the patient that she is just anxious and start her on a selective serotonin reuptake inhibitor
E. Refer the patient for a cardiac catheterization to evaluate for constrictive or restrictive physiology

A

B. Evaluate the patient for any identifiable causes for heart failure, order an echocardiogram, and start afterload reduction.

Four criteria are needed to meet the definition of peripartum cardiomyopathy: The development of cardiac failure in the last month of pregnancy or within 5 months of delivery, absence of an identifiable cause for the cardiac failure, lack of recognizable heart disease prior to the last month of pregnancy, and LV systolic dysfunction (eg, left ventricular ejection fraction [LVEF] below 45%). A is incorrect because the timing and clinical history are inconsistent with this diagnosis. C is incorrect because the history and physical examination are inconsistent with tamponade physiology. D is incorrect because the physical and history are suggestive of heart failure. E is incorrect because the history is more suggestive of peripartum cardiomyopathy.

Seely E, Ecker J. Medical complications in pregnancy: Cardiovascular disease. ACP Medicine Online. 2002. Available at: http://www.medscape.com/viewarticle/534273 Accessed January 14, 2008.

Q

A 55-year-old man with a medical history significant for diabetes, hypertension, and a history of a heart murmur has recently moved to the area. He is here to establish care. Overall he states that he is generally in good health. He states that his diabetes has been well controlled with a last HgA1c of 6.0 and reports that he has not had any chest pain, shortness of breath, lightheadedness, dizziness, or syncope. He states that in the past he has had to take antibiotics for his heart murmur and would like a prescription prior to seeing the dentist. He denies having any allergies. On clinical examination, his blood pressure is 120/80 mm Hg, heart rate is 70 beats per minute, and his oxygen saturation is 98% on room air. He has a 2/6 mid-systolic click, which is best appreciated at the apex with radiation to the axilla. The rest of the examination is unremarkable.

Which of the following measures do you recommend at this time?

A. Based on the ACC/AHA guidelines, the patient should receive antibiotics prior to dental procedures
B. The patient does not meet indications for antibiotic prophylaxis based on the new ACC/AHA guidelines
C. Recommend that the patient avoid any future dental work because of his heart murmur
D. Recommend an echocardiogram and a left/right heart catheterization for further evaluation of the patient's heart murmur prior to any dental procedures

A

B. The patient does not meet indications for antibiotic prophylaxis based on the new ACC/AHA guidelines.

Patients at the greatest danger of bad outcomes from endocarditis and for whom preventive antibiotics prior to a dental procedure are worth the risks include those with artificial heart valves; a history of endocarditis; serious congenital heart conditions, including unrepaired or incompletely repaired cyanotic congenital heart disease; completely repaired congenital heart defect with prosthetic material or device during the first 6 months after the procedure; any repaired congenital heart defect with a residual defect at the site or adjacent to the site of a prosthetic patch or a prosthetic device; or a cardiac transplantation with valvulopathy.

Baddour, LM. Prevention of infective endocarditis-updated guidelines. Cardiosource. American College of Cardiology. 2007. Available at: http://www.medscape.com/viewarticle/563687 Accessed January 14, 2008.

Q

A 70-year-old man is admitted to the intensive care unit (ICU) in shock. He had been found unconscious in a park and brought to the hospital. No medical history is available. His blood pressure is 72/25 mm Hg with a heart rate of 107 beats per minute. The initial clinical workup is inconclusive, and he is responds marginally to IV fluids and dopamine. The decision is made to place a pulmonary artery catheter. Initial findings are: central venous pressure (CVP) = 2 mm Hg, pulmonary artery (PA) = 20/5 mm Hg, pulmonary capillary wedge pressure (PCWP) = 4 mm Hg, cardiac output (CO) by Fick's equation = 2.5 L/min. Mean arterial pressure (MAP) at the time of the measurements is 47.

What is the cause of this patient's hypotension?

A. Cardiogenic shock
B. Hypovolemic shock
C. Septic (distributive) shock
D. Anaphylactic shock

A

B. Hypovolemic shock.

The CVP and PCWP are both very low, as is his CO. His systemic vascular resistance (SVR) calculates out to 1440 (dyne) (sec/cm5), which is modestly elevated. SVR = (MAP – CVP)(80)/(CO). This I finding is most consistent with hypovolemic shock. Cardiogenic shock also has a low CO and high SVR, although these findings in that setting are usually more extreme and with high CVP and PCWP. Septic shock would have a high CO and low SVR.

Martin GS. Pulmonary artery catheterization. Medscape Pulmonary Medicine 2006. Available at: http://www.medscape.com/viewprogram/4970 Accessed January 18, 2008.

Q

A 25-year-old Hispanic woman presents to her physician after an episode of atrial fibrillation that prompted an emergency department visit. She has recently emigrated to the United States and has no known medical history. On physical examination, she has fixed splitting of S2 and a II/VI systolic ejection murmur noted at the left upper sternal border. An echocardiogram is performed, which demonstrates that the right atrium is moderately enlarged with evidence of a sinus venosus atrial septal defect.

What other congenital anomaly is associated with this finding?

A. Supravalvular aortic stenosis
B. Ventricular septal defect
C. Coarctation of the aorta
D. Partial anomalous pulmonary venous return

A

D. Partial anomalous pulmonary venous return.

The usual sinus venosus defect is located in the upper atrial septum and is contiguous with the superior vena cava. It is commonly associated with anomalous pulmonary drainage from the right upper pulmonary vein into the superior vena cava. The hemodynamics are caused by left-to-right shunting.

McCormick, DJ. Atrial septal defect: Pathophysiology, diagnosis, and treatment. Medscape Cardiology conference coverage of Transcatheter Cardiovascular Therapeutics 2006. Available at: http://www.medscape.com/viewarticle/549944 Accessed January 14, 2008.

Q

A 40-year-old woman with nonischemic cardiomyopathy, ejection fraction (EF) 40% with NYHA class II symptoms is seen in follow-up. She has tolerated lisinopril 40 mg but has not yet started a beta-blocker.

Which of the following beta-blockers is NOT a reasonable choice?

A. Metoprolol succinate
B. Labetolol
C. Carvedilol
D. Bisoprolol

A

B. Labetolol.

Labetolol has not been extensively studied in the heart failure population. In fact, the other 3 beta-blockers, which have been shown to reduce mortality, are the only ones to have been extensively studied in the setting of heart failure.

Yancy C. Evidence-based medical therapy and device therapy for heart failure: Points of emphasis in the new 2005 AHA/ACC Guidelines. Medscape Cardiology 2006. Available at: http://www.medscape.com/viewprogram/4916 Accessed January 14, 2008.

Q

A 60-year-old white woman with nonischemic cardiomyopathy returns to clinic for follow-up. Her EF is 30% and she has NYHA class III symptoms despite therapy with an ACE inhibitor, beta-blocker, and furosemide.

Which of the following agents if added to her regimen could lower mortality?

A. Amlodipine
B. Spironolactone
C. Digoxin
D. Amiodarone

A

B. Spironolactone.

In the Randomised Aldactone Evaluation Study (RALES) (*N Engl J Med*. 1999;341:709-717), Pitt and colleagues showed that after 2 years of follow-up, spironolactone compared to placebo had a 30% reduction in mortality (from both progressive CHF and sudden death) and improvement in symptoms. Patients in the study were similar to this patient in that they had NYHA functional class III or IV and low left ventricular EF, with mean EF of 25%.

Squire I. Aldosterone blockade in heart failure. Br J Cardiol. 2005;12:443-446. Available at: http://www.medscape.com/viewarticle/521164 Accessed January 14, 2008.

Q

A 55-year-old man is hospitalized for an anterior non-ST elevation myocardial infarction. He undergoes percutaneous coronary intervention to his LAD. Prior to discharge, his EF on echocardiography is 30% and he has NYHA class 2 heart failure symptoms. His discharge regimen includes aspirin, clopidogrel, atorvastatin, ramipril, and carvedilol.

Which of the following medications has also been shown to decrease mortality in patients with LV systolic dysfunction post MI?

A. Amiodarone
B. Eplerenone
C. Candesartan
D. Hydralazine

A

B. Eplerenone.

The EPHESUS trial by Pitt and colleagues (*N Engl J Med*. 2003;348:1309-1321) studied 6,642 patients post acute MI with LV systolic dysfunction (ejection fraction </= 40%) and heart failure. In addition to standard therapy with ACE inhibitors and beta-blockers, patients were randomized to eplerenone vs placebo. Eplerenone therapy was associated with a 15% reduction in all-cause mortality. In addition, the incidence of the combined endpoint of cardiovascular death or cardiovascular hospitalization was reduced by 13%.

Brookes, L. EPHESUS: Eplerenone post-acute myocardial infarction heart failure efficacy and survival study. Medscape Cardiology conference coverage of: American College of Cardiology 52nd Annual Scientific Session. 2003. Available at: http://www.medscape.com/viewarticle/461245 Accessed January 14, 2008.

Q

A 34-year-old woman with diabetes mellitus, hypertension, dyslipidemia, a family history of premature coronary artery disease, and ischemic cardiomyopathy with an ejection fraction of 38% by recent radionuclide angiography is contemplating pregnancy and seeks your advice. She is completely asymptomatic and physical examination demonstrates no evidence of hypervolemia. She is taking low-dose aspirin, a beta-blocker, an ACE inhibitor, and a hydroxymethylglutaryl-coenzyme A reductase inhibitor (statin).

Which of the following is the most appropriate statement?

A. Advise the patient to discontinue the ACE inhibitor and pursue pregnancy
B. Advise the patient to discontinue the ACE inhibitor and statin, and pursue pregnancy
C. Advise the patient to discontinue the aspirin and ACE inhibitor and pursue pregnancy
D. Advise the patient to discontinue the beta-blocker and statin and pursue pregnancy
E. Advise the patient not to become pregnant

A

E. Advise the patient not to become pregnant.

ACE inhibitors and statins are known teratogens and should be withheld in all patients who are pregnant. Because this teratogenicity may have an impact even during the first trimester, the most prudent approach would be to withhold both ACE inhibitors and statins during conception. Low-dose aspirin and beta-blockers are thought to be relatively safe for use in pregnant women, although there may be an association between higher doses of beta-blockers and reduced birthweight, as high dose therapy could theoretically contribute to placental hypoperfusion. However, most authorities recommend discouraging pregnancy in patients with significantly compromised ejection fraction (ie, less than 40%). For this reason, E is the correct answer.

Karamermer Y, Roos-Hesselink JW. Coronary heart disease and pregnancy. Future Cardiol. 2007;3:559-567. Available at: http://www.medscape.com/viewarticle/564950 Accessed January 14, 2008.

Q

Emergency medical personnel bring a 59-year-old man to the emergency department of a community hospital 2 hours after the onset of acute chest pain. His medical history includes hypertension and a family history of premature coronary artery disease.

His blood pressure is 99/67 mm Hg, heart rate is 116 beats per minute, respiratory rate is 22 breaths per minute, and his pulse oximetry is 88% on room air (correcting to 92% with 6 L of oxygen by nasal cannula). Physical examination reveals jugular venous distention (JVD), regular S1 and S2 with S3 and a soft mid-systolic murmur, diffuse crackles in all lung fields, and minimal pitting edema in both lower extremities.

ECG reveals sinus tachycardia with 3-mm ST elevations in leads I, aVL, and V1-V4, with ST depressions in leads II and III.

PCI is not available at this community hospital, and transfer to the closest tertiary care hospital with PCI capability would require an estimated 60 minutes of additional delay to PCI.

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

A. Administer morphine, oxygen, nitroglycerin, and aspirin (MONA) and admit the patient to a medical bed
B. Administer MONA and admit the patient to a telemetry bed
C. Administer MONA, heparin, and thrombolytic therapy and transfer the patient to a hospital with PCI capability
D. Administer aspirin and heparin and transfer the patient to the tertiary care hospital for primary PCI

A

D. Administer aspirin and heparin and transfer the patient to the tertiary care hospital for primary PCI.

The patient is suffering from an acute ST-elevation myocardial infarction (STEMI). Reperfusion therapy with either thrombolytic medication or PCI is indicated, so answers A and B are incorrect. While thrombolytic therapy is generally preferred in acute presentations (less than 3 hours); with door-to-balloon delays of greater than 60 minutes, this patient has borderline time criteria (chest pain of at least 3 hours with a PCI delay of 60 minutes). However, because he also has Killip class 3 symptoms (frank pulmonary edema), primary PCI is the preferred strategy. In addition, patients receiving thrombolytic therapy for STEMI should probably be transferred to a PCI-capable facility immediately in case of failed reperfusion.

Boden WE, Eagle K, Granger CB. Reperfusion strategies in acute ST-segment elevation myocardial infarction: a comprehensive review of contemporary management options. J Am Coll Cardiol. 2007;50:917-29. Available at: http://www.medscape.com/viewarticle/560971 Accessed January 14, 2008.

Q

A 56-year-old woman with hypertension, a family history of coronary artery disease, tobacco use, and depression recently underwent menopause and now seeks your advice regarding alcohol consumption. She admits to a few bouts of binge drinking in her 20s but denies having any alcoholic beverages over the past 30 years. Because she has heard that alcohol use can reduce heart disease, she would like to know if she should drink a few glasses of wine every night.

Which of the following is the most appropriate response?

A. Advise the patient not to begin alcohol consumption
B. Advise the patient to consume 1-2 alcoholic beverages daily
C. Advise the patient to consume 3-4 alcoholic beverages daily
D. Advise the patient to consume at least 3 alcoholic beverages at a time, but only on weekends

A

A. Advise the patient not to begin alcohol consumption.

Available data suggest an association between regular, moderate (1-2 drinks/daily) alcohol consumption and lower rates of myocardial infarction, stroke, and all-cause mortality. In addition, regular, moderate alcohol intake may be associated with lower levels of coronary calcification, reduced postprandial glucose, and less incident diabetes mellitus. However, less frequent and higher levels of alcohol use appear to reverse these trends. For this reason, answers C and D are incorrect.

Whether patients who do not currently use alcohol should begin to do so remains controversial. At present, there are insufficient data to justify a universal recommendation for initiating alcohol consumption in nondrinking patients and the latest AHA guidelines discourage this, in part because of the risk of dependence and potential adverse consequences of alcohol intoxication. For this reason, in light of this patient's history of smoking and depression, the most prudent course is probably for her to remain abstinent of alcohol use.

O'Keefe JH, Bybee KA, Lavie CJ. Alcohol and cardiovascular health: the razor-sharp double-edged sword. J Am Coll Cardiol. 2007;50:1009-14. Available at: http://www.medscape.com/viewarticle/562474 Accessed January 14, 2008.

Q

A 69-year-old man with a history of myocardial infarction feels palpitations and has syncope while driving his car. When he awakens, his car had been driven off of the side of the road into a ditch. He has no recollection of the events that transpired.

What is the most likely cause of his syncope?

A. Neurocardiogenic syncope
B. Third-degree AV block
C. Ventricular tachycardia
D. Seizure

A

C. Ventricular tachycardia.

Cardiac syncope is usually abrupt in onset, as opposed to neurologic causes, which are often accompanied by a prodrome or aura. Myocardial infarction leads to scarring of the myocardium, which often results in a focus for ventricular tachycardia. Given this man's history, this is the most likely cause of his syncope. Bradyarrhythmias such as third-degree AV block can cause a sudden drop in cardiac output, which can lead to abrupt syncope. However, there is usually a history of prior conduction abnormality. Neurocardiogenic syncope is a common form of syncope, especially in younger populations. Often a prodrome of nausea, perspiration, and lightheadedness precedes the event, which in many cases is triggered by emotional distress, fear, pain, or simply a decrease in venous return.

Jhanjee R, van Dijk JG, Sakaguchi S, et al. Syncope in adults: Terminology, classification, and diagnostic strategy. Pacing Clin Electrophysiol. 2006;29:1160-1169. Available at: http://www.medscape.com/viewarticle/548657 Accessed January 14, 2008.

Q

A 50-year-old man with a history of hypertension and hyperlipidemia and no significant obstructive coronary artery disease comes to your office for a follow-up visit. At the end of the visit he asks you a question regarding his moderate alcohol use (1-2 drinks per day) and the impact it has on his chronic medical conditions.

Your reply based on recent evidence would be:

A. The consumption of alcohol increases mortality of patients with risk factors for coronary disease and should be avoided

B. In moderate amounts (1-2 drinks per day for men) alcohol reduces the risk of coronary artery disease by one third, lowers fasting and postprandial insulin levels, and increases insulin sensitivity

C. Moderate alcohol consumption reduces the risk of coronary artery disease, but the risk reduction conferred is only related to red wine consumption

D. Moderate alcohol consumption increases the chances of developing fatty infiltration of the liver and elevates low-density lipoprotein (LDL) levels

A

B. In moderate amounts (1-2 drinks per day for men) alcohol reduces the risk of coronary artery disease by one third, lowers fasting and postprandial insulin levels, and increases insulin sensitivity.

Moderate alcohol use reduces CAD by 30%-35%, with beneficial effects extending to reduction in stroke risk, LDL levels, and improved fasting and postprandial glucose levels. The benefits are related to the ethanol itself, rather than the drink choice.

O'Keefe JH, Bybee KA, Lavie CJ. Alcohol and cardiovascular health: the razor-sharp double-edged sword. J Am Coll Cardiol. 2007;50:1009-14. Available at: http://www.medscape.com/viewarticle/562474 Accessed January 14, 2008.

Q

A 25-year-old Asian man is referred to your office for an assessment after a sudden cardiac death that recently occurred in a close relative. The patient has never experienced any syncopal episodes, has no history of arrhythmias, and reports no episodes of palpitations. At present, he has no chest pain. His ECG demonstrates a normal sinus rhythm with right bundle branch block morphology and ST segment elevation in V1-V2.

What is next step in the management of this patient?

A. Holter monitor for 48 hours
B. Stress treadmill
C. Placement of implantable cardioverter-defibrillator (ICD)
D. Electrophysiologic study (EPS)

A

D. Electrophysiologic study (EPS).

In an asymptomatic patient with a possible family history of Brugada syndrome, an EPS study should be performed first (with inducible VT) before ICD implantation.

Antzelevitch C. Brugada syndrome. Pacing Clin Electrophysiol. 2006;29:1130-1159. Available at: http://www.medscape.com/viewarticle/548656 Accessed January 14, 2008.

Q

A 50-year-old man with nonischemic cardiomyopathy secondary to chronic cocaine use and an EF of 15% presents to your office for evaluation. He has been on maximal medical therapy for > 3 months and is now agreeable to have an ICD placed for primary prevention of sudden cardiac death.

What is this patient at risk for during the implantation?

A. Difficulty inducing ventricular fibrillation (VF) during defibrillator testing
B. A high defibrillation threshold and possible need to upgrade to a high output generator or subcutaneous array
C. Increased risk of ventricular lead perforation due to cardiomyopathy
D. More frequent episodes of ICD discharges and need to place on amiodarone therapy

A

B. A high defibrillation threshold and possible need to upgrade to a high output generator or subcutaneous array.

Chronic cocaine use increases the defibrillation threshold and would increase the likelihood of needing a high output generator or subcutaneous array. Chronic cocaine use does not impair induction of VF or make the ventricular wall more prone to perforation. In addition, amiodarone would increase the defibrillation threshold and would not be a good choice in this patient.

Chen J, Naseem RH, Obel O, et al. Habitual cocaine use is associated with high defibrillation threshold during ICD implantation. J Cardiovasc Electrophysiol. 2007;18:722-725. Available at: http://www.medscape.com/viewarticle/561318 Accessed January 14, 2008.

Q

A 17-year-old man presents to your clinic after a routine physical examination prior to starting competitive contact sports at his high school. He feels well overall, but develops bouts of palpitations. A Holter monitor was put in place and showed occasional runs of supraventricular tachycardia (SVT). On clinical examination he has a II/VI systolic heart murmur, heard over the right upper and left lower sternal border, that increases with sudden standing and decreases with squatting. His ECG shows LVH. Upon further questioning, his mother reports that an uncle died suddenly at the age of 22 after a collapse.

How would you counsel him regarding his participation in sports?

A. No competitive sports
B. Continue to play contact sports with close monitoring
C. May continue playing contact sports, but should be started on a beta-blocker and kept well hydrated
D. Discontinue playing competitive contact sports, but continue competitive noncontact sports, such as track

A

A. No competitive sports.

The patient's presentation is consistent with hypertrophic cardiomyopathy. Patients who have high risk factors, such as a previous episode of syncope, arrhythmias, significant outflow gradient, or a history of sudden cardiac death in relatives should not be allowed to participate in competitive sports. Low intensity sports could be allowed if none of these conditions exist.

Barclay L. New guidelines for sports participation in genetic cardiovascular disease. Medscape Medical News. June 10, 2004. Available at: http://www.medscape.com/viewarticle/480548 Accessed January 14, 2008.

Q

A 41-year-old man presents to your clinic after an episode of syncope, which occurred 1 week earlier. This was the first time he has experienced syncope. He has no known history of cardiac disease, but has not seen a physician since childhood. He is a nonsmoker, does not use alcohol or drugs, and does not take any over-the-counter or prescription medications. His sister died suddenly at the age of 32. His cardiac examination reveals an S4 gallop and a harsh crescendo-decrescendo systolic murmur at the apex, which increases with Valsalva maneuver. A transthoracic echocardiogram reveals left ventricular hypertrophy with the septum measuring 2.5 cm and the posterior wall measuring 2.0 cm. There is a 40 mm Hg resting left ventricular outflow tract gradient.

Which of the following factors would not classify this patient as high risk for sudden cardiac death?

A. His family history
B. Left ventricular wall thickness
C. A decrease in blood pressure during exercise
D. Documented episodes of nonsustained ventricular tachycardia on a Holter monitor
E. His history of syncope

A

B. Left ventricular wall thickness.

Sudden cardiac death (SCD) occurs in 2% to 4% of patients with hypertrophic cardiomyopathy. For this reason, primary prevention of sudden cardiac death must be considered in those patients who are at high risk. The factors that should be considered include a history of ventricular arrhythmias (SCD, sustained ventricular tachycardia, or multiple episodes of nonsustained ventricular tachycardia), syncope, abnormal blood pressure response to exercise, severe left ventricular hypertrophy (LV wall thickness > 3.0 cm), and a family history of sudden cardiac death. Patients with 2 or more of these risk factors are considered high risk, and placement of an automatic ICD (AICD) for primary prevention should be considered. This patient's LV wall thickness does not meet the criteria of 3.0 cm or greater. More important, there are exceptions in which patients should receive an AICD as primary prevention with only 1 of the above risk factors including those patients with multiple family members who have had SCD or in young patients with nonsustained ventricular tachycardia. Secondary prevention with an AICD should be considered in all survivors of cardiac arrest regardless of their other risk factors.

Sheharyar A, Antezano ES. Sudden cardiac death. South Med J. 2006;99:502-510. Available at: http://www.medscape.com/viewarticle/533755 Accessed January 14, 2008.

Q

You have been monitoring a 29-year-old woman in your clinic who has a history of mechanical mitral valve replacement. She has been taking warfarin for anticoagulation since her valve was replaced 18 months ago. She now tells you that she is contemplating pregnancy.

What is the most reasonable option for anticoagulation in this patient?

A. Discontinue warfarin and initiate subcutaneous heparin twice daily to goal activated partial thromboplastin time (aPTT) of at least twice the upper limit of the control, restart warfarin at the beginning of the second trimester, then switch back to subcutaneous heparin at around 36 weeks and continue this until delivery

B. Continue warfarin until week 36, keeping her INR between 2.5 and 3.5, then discontinue all anticoagulation and coordinate with her obstetrician to schedule an elective Caesarian section 5 days after the last dose of warfarin

C. Discontinue warfarin and initiate weight-based dose-adjusted low molecular weight heparin until delivery so that there will not be a need to acquire blood work to monitor her anticoagulation

D. None of the above. Pregnancy is contraindicated

A

A. Discontinue warfarin and initiate subcutaneous heparin twice daily to goal aPTT of at least twice the upper limit of the control, restart warfarin at the beginning of the second trimester, then switch back to subcutaneous heparin at around 36 weeks and continue this until delivery.

Warfarin is associated with the lowest rate of valve thrombosis in pregnant women. However, because it crosses the placenta, it can cause birth defects and even spontaneous abortion. The risk is almost exclusively when the fetus is exposed during the first 12 weeks of gestation. After 12 weeks, warfarin is considered safe, but should be discontinued approximately 2-3 weeks before delivery to avoid having the patient fully anticoagulated at the time of delivery. Both unfractionated and low-molecular-weight heparin (LMWH) require close monitoring to ensure adequate anticoagulation. If unfractionated heparin is used, the goal aPTT should be at least twice control. With LMWH, the anti-Xa level should be between 0.7 and 1.2 U/mL 4 hours after administration.

O'Gara PT, Raizner AE. Management of valvular heart disease in pregnancy. Cardiosource. American College of Cardiology. 2007. Available at: http://www.medscape.com/viewarticle/561354 Accessed January 18, 2008.

Q

A 60-year-old man with ischemic cardiomyopathy is planning to undergo a root canal in 2 weeks. He has a history of coronary artery bypass grafting and diabetes. He has no allergies. On his cardiac examination, he has a II/VI holosystolic murmur heard best at the left lower sternal border, which is consistent with mitral regurgitation. An echocardiogram done one year earlier showed mitral valve prolapse with no evidence of mitral regurgitation. His EF at that time was 40%.

Which of the following should be done for endocarditis prophylaxis?

A. Instruct him to take amoxicillin 2 g orally before the procedure and 1.5 g 6 hours after the procedure

B. Instruct him to take clindamycin 300 mg PO before the procedure and 150 mg 6 hours after the procedure

C. Repeat a transthoracic echocardiogram today. With a history of mitral valve prolapse, it is important to document associated regurgitation before recommending antibiotic prophylaxis

D. The patient should proceed with the procedure. There is no need for endocarditis prophylaxis in this instance

A

D. The patient should proceed with the procedure. There is no need for infective endocarditis prophylaxis in this instance.

The most recent ACC/AHA guidelines have simplified the approach to infective endocarditis (IE) prophylaxis. There are 4 groups of patients considered to be at high risk for IE.

They include the following:

1. Patients with prosthetic heart valves.
2. Cardiac transplant recipients with cardiac valvulopathy.
3. Patients with previous infective endocarditis.
4. Patients with unrepaired cyanotic congenital heart disease, including those with palliative shunts/conduits.
5. Patients with completely repaired congenital heart disease with prosthetic material or device, during the first 6 months following the repair AND patients with a residual defect at the site of the patch/prosthetic device or adjacent to the patch/prosthetic device.

In addition, antibiotic prophylaxis is no longer recommended in genitourinary or gastrointestinal procedures, even for high-risk patients. Only dental procedures that involve manipulation of gingival tissue or the periapical portion of teeth and procedures that involve perforation of the oral mucosa require IE prophylaxis.

Baddour LM. Prevention of infective endocarditis-updated guidelines. Cardiosource. American College of Cardiology. 2007. Available at: http://www.medscape.com/viewarticle/563687 Accessed January 14, 2008.

Q

A 50-year-old man is admitted to the coronary care unit post MI. On angiography he was diagnosed with significant proximal LAD artery disease and received a bare metal stent to this lesion. In the unit he is noted to have 10 runs of asymptomatic nonsustained ventricular tachycardia. The physician on call prescribes flecainide; however, this approach has been shown to increase mortality in this setting.

What trial supports this point of view?

A. CAST
B. MUSTT
C. SWORD
D. MADIT

A

A. CAST.

In 1989, the Cardiac Arrhythmia Suppression Trial (CAST) was terminated; it was found that the use of encainide and flecainide after a myocardial infarction was associated not only with a marked suppression in ambient ventricular ectopy, but also a 2- to 3-fold increase in mortality.

Vidaillet HJ. Rate control in the management of atrial fibrillation in elderly persons. Am J Geriatr Cardiol. 2005;14:73-78. Available at: http://www.medscape.com/viewarticle/502405 Accessed January 14, 2008.

Q

A 50-year-old man is admitted to the coronary care unit with his third MI in 2 years. His current LDL is 160. His diabetes is not well controlled and he continues to smoke.

What should his goal LDL be less than?

A. 100
B. 70
C. 120
D. 140

A

B. 70.

The Pravastatin or Atorvastatin Evaluation and Infection Therapy trial was designed to compare the "standard" degree of LDL-C lowering to an on-treatment LDL-C of approximately 100 mg/dL with pravastatin 40 mg vs more intensive LDL-C lowering with atorvastatin 80 mg to an on-treatment LDL-C level of approximately 70 mg/dL. The study's primary endpoint was prevention of death or major cardiovascular events in patients following an ACS event. The results of the more intensive lipid-lowering arm with atorvastatin 80 mg revealed a further reduction in death or major cardiovascular events, with a 16% reduction in the odds of the primary endpoint ($P = .005$).

Cannon CP. Lessons learned (so far) from the PROVE IT-TIMI 22 trial. Landmark statin trials expert column. Medscape Cardiology 2005. Available at: http://www.medscape.com/viewarticle/508990 Accessed January 14, 2008.

Q

A 75-year-old man with a history of ischemic cardiomyopathy and a left ventricular ejection fraction of 30% presents with new onset of atrial fibrillation, which is associated with fatigue and palpitations despite good ventricular rate control with metoprolol. A transesophageal echocardiographic (TEE) study shows no thrombus in the left atrial appendage. Direct current (DC) cardioversion is performed with successful conversion to normal sinus rhythm.

In this instance, which of the following medications is the best therapy to maintain normal sinus rhythm?

A. Propafenone
B. Sotalol
C. Flecainide
D. Dofetilide

A

D. Dofetilide.

The other antiarrhythmic medications listed are contraindicated in patients with a LVEF less than 35%. Amiodarone could alternatively be used in patients with a LVEF less than 35%. Sotalol is indicated in patients with coronary artery disease, and propafenone and flecainide can be used in patients with no other heart disease.

Epstein AE, Naccarelli GV. Antiarrhythmic drug use before and after atrial fibrillation ablation (slides with video). Selection from: Role of nonpharmacologic treatments in the management of atrial fibrillation. Medscape Cardiology 2007. Available at: http://www.medscape.com/viewarticle/560642 Accessed January 18, 2008.

Q

A 76-year-old woman with a history of hypertension presents with recurrent paroxysmal atrial fibrillation. She is currently taking aspirin, 81 mg daily; and atenolol, 100 mg daily. An echocardiographic study shows a normal left ventricular ejection fraction, mild left ventricular hypertrophy, and is otherwise unremarkable.

The best medical regimen to reduce thromboembolic risk for this patient is:

A. Continue aspirin 81 mg daily
B. Increase aspirin to 325 mg daily
C. Stop aspirin and initiate warfarin with a goal INR of 2.0-3.0
D. Continue aspirin and add warfarin with a goal INR of 2.0-3.0

A

C. Stop aspirin and initiate warfarin with a goal INR of 2.0-3.0.

Thromboembolic risk in chronic or recurrent paroxysmal atrial fibrillation can be assessed using the CHADS2 risk scoring system. This patient has 2 moderate risk factors (age older than 75 years and a history of hypertension), which places her in the high-risk category. Warfarin therapy with a goal INR of 2.0-3.0 is recommended.

Calkins H, Cannom DS, Epstein AE, et al. Thromboembolism prevention before and after nonpharmacologic treatments. Selection from: Role of nonpharmacologic treatments in the management of atrial fibrillation. Medscape Cardiology 2007. Available at: http://www.medscape.com/viewarticle/560650 Accessed January 18, 2008.

Q

A 62-year-old woman is referred for right heart catheterization for suspected pulmonary hypertension. Her history is significant for a 10-month history of dyspnea on exertion. Her medical history includes diabetes and hypertension. Her physical examination shows a BP of 160/89 mm Hg, pulse 84 beats per minute, respirations 16 breaths per minute, and an oxygen saturation of 96% on room air.

On right heart catheterization, the following pressures were obtained:

Right Ventricle = 50 / 8 mm Hg
Pulmonary Artery = 50 / 26 mm Hg
Mean Pulmonary Artery = 33 mm Hg
Pulmonary Capillary Wedge Pressure = 26 mm Hg

This patient has:

A. Intrinsic pulmonary hypertension
B. Passive pulmonary hypertension
C. Components of both intrinsic and passive pulmonary hypertension
D. Normal hemodynamics

A

B. Passive pulmonary hypertension.

The diagnosis of pulmonary hypertension requires a mean pulmonary artery pressure greater than 25 mm Hg with a pulmonary capillary wedge pressure less than 15 mm Hg (or a mean pulmonary artery pressure greater than 35 mm Hg with exercise). This patient's pulmonary capillary wedge pressure is elevated and equal to the pulmonary artery diastolic pressure. This is characteristic of passive pulmonary hypertension, probably due to diastolic dysfunction from long-standing uncontrolled systemic hypertension.

Mathier MA. The role of the cardiologist in PAH. Lessons From Heart Failure for Pulmonary Arterial Hypertension (PAH). Medscape Pulmonary Medicine 2006. Available at: http://www.medscape.com/viewarticle/530730_1 Accessed January 14, 2008.

Q

Acute chest pain prompts 6 million patient visits each year to emergency departments.

In low-risk patients (ie, those with normal ECGs and cardiac enzymes), which noninvasive cardiac imaging modality is able to accurately identify or exclude coronary disease in nearly 75% of cases, facilitating a timely diagnosis and limiting healthcare costs?

A. Myocardial perfusion imaging
B. Transthoracic echocardiography
C. Multislice computed tomographic (MSCT) angiography
D. Chest radiography

A

C. Multislice computed tomographic (MSCT) angiography.

Multislice computed tomographic angiography (MSCT) provides high-resolution coronary angiograms noninvasively. MSCT has been shown to be highly accurate in delineating the presence and severity of coronary atherosclerosis. This technique has a high negative predictive value for the exclusion of significant coronary artery stenosis. A recent study, which included a nuclear stress testing protocol, compared MSCT vs standard of care (SOC) in 197 patients who presented to the emergency department with acute chest pain. Both approaches were completely safe. MSCT alone excluded or identified coronary artery disease as the source of chest pain in 75% of patients. MSCT evaluation reduced diagnostic time compared with SOC and lowered costs. And over a 6-month follow-up period, fewer patients who underwent MCST required repeat evaluations for recurrent chest pain.

Wood S. Multislice CT angiography offers effective evaluation of chest pain in ED. Medscape Medical News. Feb 21, 2007. Available at: http://www.medscape.com/viewarticle/552469 Accessed January 18, 2008.

Q

Cardiac CT technology has undergone rapid advances in technology and techniques over the past several years.

What aspect of current CT technology has led to improved temporal resolution?

A. Faster gantry rotation speed
B. Decreased slice collimation
C. X-ray tube strengthening
D. Increased number of slices acquired per rotation (ie, 16-slices vs 64 slices)

A

A. Faster gantry rotation speed.

Faster gantry rotation speed has triggered improvements in cardiac CT temporal resolution. Data acquired in projections of approximately 180 degrees are necessary to reconstruct a cross-sectional image. These data can be obtained during a single 180-degree sweep of the CT gantry (and the temporal resolution then corresponds to one-half the rotation time).

Lawler LP. CT Scanning of the coronary arteries: How to do it and how to interpret it. Appl Radiol. 2005; 34:816. Available at: http://www.medscape.com/viewarticle/514631 Accessed January 18, 2008.

Q

A 61-year-old man with a history of diabetes, hypertension, and hyperlipidemia presents with approximately 30 minutes of crushing substernal chest pain with associated shortness of breath, nausea, and diaphoresis.

His vital signs are: blood pressure, 150/90 mm Hg; heart rate, 95 beats per minute; respiratory rate, 25 breaths per minute; oxygen saturation, 89% on room air, 100% on a non-rebreather. On clinical examination, he appears to be in moderate distress. He has JVD to the angle of the jaw. He is tachycardic with a regular rhythm. S1 and S2 are present. There is no S3 or S4. He has crackles throughout his lung fields bilaterally. His abdominal examination is benign. His lower extremities are without edema, and his distal pulses are 2+ bilaterally.

His ECG reveals 2 mm of ST elevation in leads V1-V3 with reciprocal depressions. His chest radiograph reveals pulmonary edema. All laboratory values are pending.

While making preparations to take the patient to the catheterization laboratory for emergency primary PCI, should an intravenous beta-blocker be among the medications given to the patient in the emergency department?

A. Yes
B. No

A

B. No.

Although early beta-blocker use in the setting of STEMI reduces the risk of fatal arrhythmias and reinfarction, it increases the risk for cardiogenic shock by 11 cases per 1000, especially within 1 day of admission. This was demonstrated in the COMMIT trial. High-risk patients with heart failure or hypotension were most at risk for cardiogenic shock. These patients accounted for a sizable portion of the excess risk associated with metoprolol use in the COMMIT trial.

Peck P. Early IV beta blockade may Be harmful in acute MI. Medscape Medical News conference coverage of the American College of Cardiology 2005 Annual Scientific Session. Available at: http://www.medscape.com/viewarticle/501494 Accessed January 14, 2008.

Q

A 55-year-old man presents to his local emergency department with chest pain. ECG shows 2 mm of ST elevation in leads II, III, and aVF. He is treated with aspirin and a fibrinolytic agent. Preparations are being made to transfer him to a center with a catheterization laboratory in the event that the lytics are unsuccessful.

Should he be given clopidogrel?

A. Yes
B. No

A

A. Yes.

In STEMI patients treated with fibrinolytics, treatment with clopidogrel resulted in a 36% reduction in the odds of an occluded infarct-related artery or death/MI by the time of angiography and a 46% reduction in the odds of cardiovascular death, MI, or CVA following PCI during the index hospitalization.

Gruberg L. CLARITY-TIMI 28: Clopidogrel as adjunctive reperfusion therapy - thrombolysis in myocardial infarction 28: PCI and ambulance substudies. Medscape Cardiology conference coverage of the European Society of Cardiology 2005 Congress. Available at: http://www.medscape.com/viewarticle/513981 Accessed January 14, 2008.

Q

A 57-year-old man with a medical history of NSTEMI 1 year ago, preserved systolic function, hypertension, diabetes, and dyslipidemia presents to your clinic for scheduled follow-up. He had been prescribed metoprolol, ramipril, atorvastatin, aspirin, and clopidogrel by his previous cardiologist. He discontinued all but his glycemic control medications 6 months ago because he believes that his cardiac medications have affected his sexual performance.

How would you counsel this patient?

A. Sympathize with the patient that beta-blockers have been shown to contribute to erectile dysfunction but reassure him that they are "good for his heart"
B. Prescribe a phosphodiesterase inhibitor
C. Refer the patient to urology and refill his medications
D. Reassure the patient that his previously prescribed medications can be beneficial in erectile dysfunction

A

D. Reassure the patient that his previously prescribed medications can be beneficial in erectile dysfunction.

The ONTARGET/TRANSCEND subgroup analysis included 1537 male patients from 13 countries and demonstrated that statins, beta-blockers, and ACE inhibitors did not contribute to erectile dysfunction; they were shown to have a beneficial effect.

Bohm, M, Baumhäkel M, Probstfield JL, et al. Sexual function, satisfaction, and associated erectile dysfunction with cardiovascular disease and risk factors in cardiovascular high risk patients: substudy of the ONTARGET/TRANSCEND trials. Am Heart J. 2007;154:94-107. Available at: http://www.medscape.com/viewarticle/559039 Accessed January 14, 2008.

Q

Sudden cardiac death is responsible for 300,000 to 400,000 deaths in the United States annually. In patients with coronary artery disease, 45% present with sudden cardiac death.

For which of the following patients is an ICD NOT indicated?

A. 44-year-old woman with a history of post partum cardiomyopathy, EF 30%, who becomes short of breath when performing heavy housework. She has been unable to tolerate an angiotensin receptor blocker or ACE inhibitor secondary to renal insufficiency

B. 60-year-old man with a STEMI 2 months ago, EF 40%, who was just revived after a witnessed cardiac arrest. He has been unable to tolerate beta-blockade secondary to symptomatic bradycardia

C. 32-year-old woman with a history of metastatic breast cancer in remission and a chemotherapy-induced cardiomyopathy, EF 35% on stable medical therapy for greater than 3 months who is frequently short of breath at rest

D. 54-year-old man with a history of repaired tetralogy of fallot and unexplained syncope, with inducible VT on electrophysiology study

A

C. 32-year-old woman with a history of metastatic breast cancer in remission and a chemotherapy-induced cardiomyopathy, EF 35% on stable medical therapy for greater than 3 months who is frequently short of breath at rest.

This 32-year-old woman has drug refractory class IV heart failure. Placement of an ICD in this patient is a class III indication because she is more likely to succumb to heart failure than to cardiac arrhythmia.

Klein GJ. Who should get an ICD? Cardiosource. American College of Cardiology. 2007. Available at: http://www.medscape.com/viewarticle/553394 Accessed January 14, 2008.

Q

A 65-year-old man presents to your clinic as a scheduled visit. Three months ago, he presented to the hospital with complaints of chest pain and was found to have a NSTEMI. He was sent to the cardiac catheterization laboratory and received 2 bare metal stents in his mid-LAD and discharged home after an uneventful 2-day hospital stay. Since his discharge, the patient has been doing fine and not required any further hospital admissions. Today the patient reports that he continues to feel okay, but does complain of shortness of breath when he walks for long distances. Physical examination shows no JVD and is only remarkable for trace lower extremity edema. His vital signs are blood pressure, 108/64 mm Hg; heart rate, 62 beats per minute; respirations, 12 breaths per minute. His current medications include aspirin (81 mg once daily), atorvastatin (80 mg once daily), clopidogrel (75 mg once daily), enalapril (10 mg twice daily), metoprolol succinate (100 mg once daily), and furosemide (40 mg once daily). An echocardiogram was unchanged from his previous echo studies, and continues to show an EF of 20%-25%. ECG showed a normal sinus rhythm, a QRS interval of 100 milliseconds, and Q-waves in V2-V4 consistent with a prior myocardial infarct that is unchanged.

What should be the next intervention for this patient?

A. Increase the patient's beta-blocker dose
B. Schedule the patient to receive a biventricular/ICD device
C. Schedule the patient to receive a prophylactic ICD without biventricular
D. No changes. Continue to monitor because patient reports minimal symptoms

A

C. Schedule the patient to receive a prophylactic ICD without Bi-V

The patient is on effective medical therapy and has a pulse of 62 beats per minute, so increasing his beta-blocker would not provide much benefit and may cause the patient to become symptomatic from its side effects. Although he has an EF < 35%, he does not have a QRS interval of > 120 milliseconds, or NYHA class III/VI symptoms so would not meet criteria for a biventricular/ICD device. MADIT-II showed that patients who had an ejection fraction of < 35% had decreased mortality after receiving a prophylactic ICD when compared to the standard treatment arm.

Singh B. AFFIRM, MADIT II, and ALIVE trial outcomes: Possible implications for arrhythmia control. Medscape Cardiology conference coverage of the North American Society of Pacing and Electrophysiology 23rd Annual Scientific Sessions. 2002. Available at: http://www.medscape.com/viewarticle/443346 Accessed January 14, 2008.

Q

Vascular surgery has asked you to evaluate a 65-year-old man for an upcoming elective femoral-popliteal bypass because of moderate claudication. He has a history of a previous MI for which he was managed medically, treated hypertension (currently 130/84 mm Hg), and hyperlipidemia. His medications include metoprolol succinate, atorvastatin, ipratropium, and aspirin. He continues to smoke one-half pack per day of tobacco (x 40 years). Although exercise is limited by claudication, he is able to ascend 2 flights of steps without excessive shortness of breath and denies chest pain, orthopnea, or lower extremity edema. The vascular department ordered a preoperative nuclear stress test that indicated a small area of moderate reversibility at the apex. Physical examination reveals a sinus rhythm at 70, clear but diminished lung sounds bilaterally, no JVD, and no murmurs or gallops. ECG shows no evidence of ST elevation or depression.

What is your next recommendation for this patient?

A. Delay surgery and proceed to cardiac catheterization
B. Increase the dose of beta-blocker and proceed to surgery
C. Maintain current medications and proceed to surgery
D. Recommend conservative treatment of the claudication with smoking cessation, exercise, and pentoxifylline, and avoid surgery

A

C. Maintain current medications and proceed to surgery.

The 2004 Coronary Artery Revascularization Prophylaxis (CARP) trial demonstrated that preoperative revascularization among patients with stable cardiac symptoms provided no improvement in short- or long-term outcome. Although the application of perioperative beta-blockade is currently recommended in AHA guidelines, its use has become controversial with results of the recently published POISEd study. While all the therapies in answer D do improve claudication, the patient may undergo surgery.

Gruberg L. CARP: Coronary artery revascularization prophylaxis trial. Medscape Cardiology conference coverage of the American Heart Association 2004 Annual Scientific Sessions. Available at: http://www.medscape.com/viewarticle/494695 Accessed January 14, 2008.

Q

A 76-year-old white man is admitted to the cardiac care unit (CCU) with NSTEMI. His medical history is significant for CABG 12 years ago, paroxysmal atrial fibrillation, hypertension, hyperlipidemia, and mild dementia. Home medications include atorvastatin, sotalol, lisinopril, hydrochlorothiazide, aspirin, and warfarin. Upon admission, he is afebrile with a pulse of 54 beats per minute, blood pressure of 126/78 mm Hg, respiratory rate of 16 breaths per minute. ECG shows sinus rhythm with nonspecific T-wave inversions and a corrected QT interval of 472 milliseconds. Abnormal admitting laboratory values indicate elevated CK, CK-MB, and troponin; with a creatinine of 1.4 and potassium of 3.3. That night, the patient becomes agitated and several doses of haldoperidol are administered. Two hours later, a code blue is called when the patient's telemetry indicates a wide complex ventricular tachycardia consistent with torsades de pointes.

In addition to potassium replacement, which is the most appropriate immediate therapy?

A. 2 g of intravenous magnesium sulfate
B. Insertion of a temporary pacemaker for overdrive pacing
C. Administration of isoproterenol
D. 5 mg of IV metoprolol

A

A. 2 g of intravenous magnesium sulfate.

The patient presents a complication of prolonged QT interval and torsades induced by sotalol, haldoperidol, bradycardia, and hypokalemia. The treatment of torsades involves stabilization of the membrane potential and shortening of the QT interval by increasing the heart rate. In this patient, isoproterenol is contraindicated due to acute MI and angina. Its use is also contraindicated in hypertension or known severe CAD. Overdrive pacing may be an effective means to shorten the QT interval but must be used cautiously in this patient with recent MI and can cause delay in treatment due to pacer insertion. Metoprolol would be contraindicated, as bradycardia lengthens QT. For this reason, the most appropriate immediate treatment for this patient is the administration of IV magnesium in addition to discontinuation of haldol and replacement of potassium. Overdrive pacing could be considered as a next resort.

Fenichel, RR, Malik, M, Antzelevitch C, et al. Drug-induced torsades de pointes and implications for drug development. J Cardiovasc Electrophysiol. 2004; 15:475-495. Available at: http://www.medscape.com/viewarticle/475084 Accessed January 14, 2008.

Q

A patient reports to the emergency department with acute onset of severe chest pain and is taken immediately to cardiac catheterization. Coronary angiography demonstrates severe left main disease and cardiothoracic surgery is consulted for bypass surgery and an intra-aortic balloon pump (IABP) is placed.

In which of the following situations is IABP indicated?

A. Cardiogenic shock and severe aortic insufficiency
B. Ventricular arrhythmia unresponsive to conventional therapy in a patient with acute intracranial hemorrhage
C. Ventricular septal defect in a post-infarct patient
D. Acute mitral insufficiency in a patient with an abdominal aortic aneurysm
E. Patient with uncontrolled septic shock

A

C. Ventricular septal defect in a post-infarct patient.

Intra-aortic balloon counterpulsation is used as a circulatory assist device in a number of cardiac conditions. The device decreases afterload, decreases mean pulmonary capillary wedge pressure, decreases myocardial oxygen consumption, and increases cardiac output by rapid balloon deflation during systole and inflation during diastole. Current indications for IABP placement based on AHA guidelines include severe left main disease, cardiogenic shock refractory to volume optimization and ionotropic support, ventricular arrhythmia unresponsive to conventional therapy, ventricular septal defect in a post-infarct patient, and acute mitral insufficiency. Contraindications to IABP include significant aortic insufficiency, abdominal aortic aneurysm, patients with a contraindication to anticoagulation, and uncontrolled septic shock. Therefore answers A, B, D, and E are incorrect. Other indications not described above include IABP as a bridge to transplant, adjunctive therapy in high risk angioplasty, and in weaning patients from cardiopulmonary bypass.

Moulopoulos SD. Intra-aortic balloon counterpulsation in the treatment of cardiogenic shock: Hemodynamic effects and clinical challenges. Medscape Clinical Review. 2001. Available at: http://www.medscape.com/viewprogram/607 Accessed January 14, 2008.

Q

A 67-year-old man with a medical history significant for diabetes mellitus, hypertension, and dyslipidemia reports to the emergency department (ED) complaining of chest pain and shortness of breath. He states that he has had 4 to 5 episodes of chest pain in the previous 24 hours. An electrocardiogram (ECG) obtained in the ED shows evidence of ST depression of 1 mm in leads II, III, aVF. Cardiac biomarkers are obtained, which demonstrate an elevation in troponin T, creatine kinase (CK), and CK-MB. The patient is taking aspirin, 81 mg orally once daily; metoprolol, 50 mg orally once daily; enalapril, 10 mg orally once daily; and atorvastatin, 20 mg orally once daily.

What is this patient's thrombolysis in myocardial infarction (TIMI) risk score?

A. Score of 0/1
B. Score of 2
C. Score of 3
D. Score of 4
E. Score of 5
F. Score of 6/7

A

F. Score of 6/7.

The patient's risk factors include: age older than 65 years, presence of at least 3 risk factors for coronary heart disease, 2 or more episodes of angina/24 hours, positive biomarkers, ST segment changes, and current aspirin use. The TIMI risk score has been used to effectively predict prognosis in patients with acute coronary syndrome (ACS). Analysis of data from the TIMI 11B and ESSENCE trials found 7 variables to be independent predictors of outcome in patients with unstable angina (UA) and non-ST-segment elevation myocardial infarction (NSTEMI). These criteria were defined as the TIMI risk score. To calculate the score, a value of 1 was assigned when each variable was present and 0 when it was absent.

Almeda FQ, Hendel RC, Nathan S, et al. Improved in-hospital outcomes in acute coronary syndromes (unstable angina/non-ST segment elevation myocardial infarction) despite similar TIMI risk scores. J Invas Cardiol. 2003; 15:502-506. Available at: http://www.medscape.com/viewarticle/462109 Accessed January 18, 2008.

Q

A 50-year-old man with a medical history significant for coronary artery disease (CAD) and coronary artery bypass graft surgery presents to your clinic complaining of shortness of breath, chest pain, and lower extremity edema. You send the patient to right and left heart catheterization. The left heart catheterization shows patency of his bypass grafts and native CAD. The right heart catheterization demonstrates atrial tracings with rapid x and y descents and a square root sign on the right ventricular tracing during ventricular filling. There is discordance between the left and right ventricular pressures (ie, during inspiration the left ventricular pressure decreases and the right ventricular pressure increases).

Which of the following conditions is suggested by these findings?

A. Restrictive cardiomyopathy
B. Hypertrophic cardiomyopathy
C. Constrictive pericarditis
D. Pericardial effusion with tamponade physiology
E. None of the above

A

C. Constrictive pericarditis.

The classic dip-and-plateau (also known as the square-root sign) that has been described in abnormal ventricular diastolic filling patterns can occur in both constrictive and restrictive disorders. The discordance of the left ventricle (LV) and right ventricle (RV) pressures points towards constrictive pericarditis and not restrictive cardiomyopathy. The atrial waveforms in constrictive/restrictive disease have rapid X and Y descents. This is in contrast to the Y descent in cardiac tamponade, which becomes attenuated or even upsloping. The hemodynamic findings in this case would not be appreciated in hypertrophic cardiomyopathy.

Meyerson SL, D'Amico, TA. Pericardial procedures: introduction. ACS Surgery Online. 2006. Available at: http://www.medscape.com/viewarticle/535596 Accessed January 18, 2008.

Q

A 35-year-old man presents to your clinic after a syncopal episode that occurred while he was playing basketball. The patient states that he has had similar episodes in the past with moderate exertion. As part of your evaluation, you order an echocardiogram, which shows asymmetric septal hypertrophy with outflow obstruction. The peak gradient across the outflow track is > 50 mm Hg, with left ventricular wall thickness of 30 mm. On further history, the patient relates a strong family history of sudden cardiac death. You order the placement of a Holter monitor, which shows nonsustained ventricular tachycardia (23 beats or more and of at least 120 beats/minute).

Which of the following conditions is NOT associated with an increased risk of sudden cardiac death?

A. Left ventricular outflow gradient of > 50 mm Hg
B. Family history of sudden death
C. LV wall thickness of 30 mm
D. Ventricular tachycardia
E. History of cardiac arrest

A

A. Left ventricular outflow gradient of > 50 mm Hg.

All other answer choices are associated with an increased risk of sudden death.

Vaglio JC, Sorajja P, Gersh BJ. Ambulatory monitoring of aborted sudden cardiac death in a patient with hypertrophic cardiomyopathy. Nat Clin Pract Cardiovasc Med. 2005;2:659-662. Available at: http://www.medscape.com/viewarticle/518720 Accessed January 18, 2008.

Q

A 34-year-old woman with chronic severe mitral regurgitation because of myxomatous disease presents for follow-up evaluation. You have monitored her condition for several years and she has not yet needed surgery. Her exercise tolerance is unchanged, as she is still able to run 2 miles a day without symptoms. An ECG study shows a LV ejection fraction (LVEF) of 65% and a LV systolic diameter of 46 mm, which was 38 mm 6 months ago. Her RV systolic pressure is estimated at 35-40 mm Hg.

Which of the following is indicated in this case?

A. Left heart catheterization with left ventriculography to assess the regurgitation
B. Treadmill echocardiography
C. Referral for mitral valve repair
D. Repeat clinic appointment and echocardiography in 6 months

A

C. Referral for mitral valve repair.

The indications for mitral valve surgery in chronic mitral regurgitation include an LV systolic diameter of > 45 mm, NYHA class 2 symptoms, new onset of atrial fibrillation, and pulmonary hypertension. Ventriculography and treadmill echocardiography have no role in this patient. A repeat evaluation in 6 months is not appropriate because she has signs of LV dilation.

Chikwe J, Walther A, Pepper J. The surgical management of mitral valve disease. Br J Cardiol. 2004;11:42-48. Available at: http://www.medscape.com/viewarticle/469807 Accessed January 18, 2008.

Q

A 67-year-old man with a history of smoking, hypertension, and diabetes mellitus presents to his physician with complaints of "cramping" of his bilateral calves after 2 blocks of walking; this cramping is consistently relieved by rest. On physical examination, his feet are cool to the touch and trophic skin changes are present. His dorsalis pedis and posterior tibial pulses are not palpable, but are evident on Doppler ultrasound examination. There is some pallor of the lower extremities when the patient is supine. An ankle-brachial index is performed and is 0.5 bilaterally. The patient feels limited by his symptoms and wants to know what can be done.

Which of the following recommendations is NOT appropriate for this patient at this time?

A. Enroll him in an exercise program
B. Counsel him on smoking cessation
C. Prescribe cilostazol
D. Schedule arteriography with angioplasty and stenting
E. Pursue aggressive management of his diabetes and hypertension

A

D. Schedule arteriography with angioplasty and stenting.

The first step in the management of patients with claudication is aggressive treatment of the underlying comorbidities and lifestyle management. Lifestyle management choices include smoking cessation, exercise programs designed to "walk through the pain," and proper diet and weight loss regimens. Also appropriate is pharmacologic treatment with cilostazol. Angioplasty and stenting are only recommended after 3-6 months of failed conservative management.

Jude EB. Intermittent claudication in the patient with diabetes. Br J Diabetes Vasc Dis. 2004;4:238-242. Available at: http://www.medscape.com/viewarticle/489585 Accessed January 18, 2008.

Q

An obese 57-year-old man with dyslipidemia and poorly controlled hypertension returns to your office 1 month after you added aliskiren to his previous blood pressure regimen of hydrochlorothiazide, amlodipine, carvedilol, and losartan (he had developed a persistent cough after starting lisinopril). He reports that his systolic blood pressures have continued to run in the mid 150-160 mm Hg with diastolic blood pressures in the mid 100-110 mm Hg. He has had his home blood pressure machine calibrated. Within the past year, he has undergone renal ultrasound and angiography studies, which were normal. Serum assessment for hyperadrenalism, thyroid and parathyroid dysfunction, pheochromocytoma, hyperaldosteronism, and hyperreninism has been unremarkable. The patient has been fully compliant with sodium restriction to less than 2000 mg/day and denies taking any alternative or herbal medications.

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

A. Continue his current antihypertensive regimen and reassess the patient in 1 month
B. Continue his current antihypertensive regimen and add diltiazem
C. Repeat the imaging and laboratory studies for secondary hypertension in case there was a false-negative finding
D. Restrict the patient's sodium intake to less than 1000 mg/day
E. Refer the patient for polysomnography

A

E. Refer the patient for polysomnography.

In this instance, the patient's blood pressure is inadequately controlled despite therapy with a thiazide diuretic, calcium channel blocker, alpha/beta blocker, angiotensin receptor blocker, and a renin inhibitor, so A and B are incorrect. C and D are likely to be low-yield measures given the patient's previous extensive workup and dietary behaviors. Obstructive sleep apnea appears to be an independent risk factor for hypertension; a recent study has shown that therapy with continuous positive airway pressure can reduce blood pressure significantly.

Campos-Rodriguez F, Perez-Ronchel J, Grilo-Reina A, et al. Long-term effect of continuous positive airway pressure on BP in patients with hypertension and sleep apnea. Chest. 2007;132:1847-1852. Available at: http://www.medscape.com/viewarticle/568095 Accessed January 18, 2008.

Q

A 56-year-old man with a history of longstanding hypertension presents to the ED complaining of chest pain and dyspnea. He says the pain started abruptly, was severe at onset, and is tearing in character radiating to his back. His blood pressure is 86/42 mm Hg and his pulse is 115 beats per minute. Contrast-enhanced computed tomography of the chest shows a proximal aortic dissection involving the aortic root. ECG shows 2 mm of ST segment elevation in leads II, III, and aVF.

What is the next best step in the management of this patient?

A. Insert an intra-aortic balloon pump
B. Emergency PCI
C. Emergency surgical repair of the aortic root and thoracic aorta
D. Start an esmolol infusion

A

C. Emergency surgical repair of the aortic root and thoracic aorta.

Acute ascending aortic dissections (Stanford type A) are treated as a surgical emergency even in the setting of acute myocardial infarction. The mortality rate is as high as 1%-2% per hour after the onset of symptoms and surgery should not be delayed. Medical therapy is inferior to the surgical management of ascending aortic dissections in contrast to descending aortic dissections, which are treated medically or with endovascular stent grafting.

Shemin, R, Menon P, Ketchedjian A. Aortic dissection: Case study and therapy. Medscape Cardiology 2006. Available at: http://www.medscape.com/viewprogram/5467 Accessed January 18, 2008.

Q

A 45-year-old man visits your clinic to establish care with a cardiologist. He moved to the United States from India 6 months ago. He reports that he had rheumatic fever when he was in his 20s and has been followed by a cardiologist in India for the past 10 years. He was previously active, but has noticed that his exercise tolerance has gradually decreased over the previous 3-4 years and he now becomes dyspneic after walking 1 block. He currently takes no medications. He has no history of atrial fibrillation, stroke, or bleeding. His ECG shows a normal sinus rhythm. His clinical examination uncovers a grade III/VI systolic murmur and a holodiastolic murmur at the apex with no opening snap. A transthoracic echocardiogram shows normal left ventricular size and function. The mitral valve is minimally calcified with a calculated mitral valve area of 0.9 cm^2. The chordae do not appeared thickened or calcified. There is moderate mitral regurgitation. The left atrium measures 5.0 cm.

What is the most appropriate treatment option for this patient?

A. Percutaneous balloon valvuloplasty of the mitral valve
B. Mitral valve replacement with a tissue (bioprosthetic) valve
C. Mitral valve replacement with a mechanical valve
D. He should be started on medical therapy with an angiotensin-converting enzyme inhibitor and beta-blocker. If his symptoms do not improve on medical therapy, surgery should be considered

A

C. Mitral valve replacement with a mechanical valve.

Patients with a mitral valve area of < 1.5 cm^2 and NYHA class III or IV symptoms should be evaluated for surgery. If this patient had presented with class I or II symptoms, a right heart catheterization should be performed to assess his pulmonary artery systolic pressure. There is evidence that patients with NYHA class I-II symptoms and a mitral valve area less than 1.0 cm^2 should undergo valve replacement if their pulmonary artery systolic pressure is greater than 60-80 mm Hg. Given his young age and the high likelihood that he would outlive a bioprosthetic valve, a mechanical valve would be the best option in this patient. The half life of a bioprosthetic valve in the mitral position is much shorter than in the aortic position. In patients with porcine mitral valves, more than one third will present with structural valve failure within 11 years of valve replacement. The younger the patient, the earlier the structural valve failure tends to occur, with some patients presenting within months after surgery. Balloon valvuloplasty is contraindicated in this patient because of the presence of moderate mitral regurgitation. Medical therapy alone is inappropriate given the severity of the patient's stenosis and the degree of symptoms.

Chikwe J, Walther A, Pepper J. The surgical management of mitral valve disease. Br J Cardiol. 2004;11:42-48. Available at: http://www.medscape.com/viewarticle/469807 Accessed January 18, 2008.

Q

A 52-year-old man with CAD and paroxysmal atrial fibrillation presents to your clinic for assessment. His episodes of atrial fibrillation are usually of limited duration, relatively asymptomatic, and have been managed with metoprolol 100 mg once daily. Over the previous 2 months, however, the episodes have increased in frequency and duration, becoming highly symptomatic with cardiac awareness, dizziness, and shortness of breath (SOB). When in sinus rhythm, the patient's blood pressure averages 106/68 mm Hg with a heart rate in the 50s and he feels well. The remainder of his medications include only aspirin, 325 mg once daily; and atorvastatin, 40 mg once daily. Echocardiography reveals normal LV function without left ventricular hypertrophy (LVH), no valvular disease, and a left atrial size of 4.3 cm. His laboratory values, including electrolytes and renal and thyroid function, are normal.

Assuming that this patient's CAD is stable, what is your next management decision?

A. Increase metoprolol to 150 mg once daily
B. Initiate flecainide at a dose of 50 mg orally twice daily, to be titrated to a dose of 100 mg twice daily
C. Add diltiazem XR 120 mg once daily
D. Initiate a loading dose of amiodarone 400 mg twice daily for 6 weeks, followed by a continued maintenance dose of 200 mg once daily
E. Admit the patient to the hospital to begin sotalol at a dose of 80 mg twice daily

A

E. Admit the patient to the hospital to begin sotalol at a dose of 80 mg twice daily.

In patients with highly symptomatic paroxysmal atrial fibrillation, maintenance of sinus rhythm with an antiarrhythmic drug is the preferred treatment. The choice of medication is based on the presence of structural heart disease, hypertension with or without LVH, CAD, or heart failure. Answers A and C (increase metoprolol or add diltiazem) will not help this patient maintain sinus rhythm and may produce symptomatic bradycardia. Answer B (initiate flecainide) is contraindicated in patients with CAD. Results of the CAST trial indicated increased mortality and nonfatal cardiac arrest in post-myocardial infarction subjects who received flecainide. Although amiodarone (answer D) can be used as an antiarrhythmic drug in the setting of CAD, the side effect profile is large and cumulative. In this young patient, another drug with less extensive side effects is preferable. Remaining choices of antiarrhythmic drugs for paroxysmal atrial fibrillation in patients with CAD include sotalol and dofetilide; however, because of the risk of QT prolongation and subsequent Torsade de Pointes, inpatient hospitalization for observation during initiation of these agents is essential.

Epstein AE, Naccarelli GV. Antiarrhythmic drug use before and after atrial fibrillation ablation (slides with video). Selection from: Role of nonpharmacologic treatments in the management of atrial fibrillation. Medscape Cardiology 2007. Available at: http://www.medscape.com/viewarticle/560642 Accessed January 18, 2008.

Q

A 56-year-old man with a history of hypertension, hypertriglyceridemia, and coronary artery disease is referred to your clinic for evaluation of dyslipidemia. He has no specific complaints and is otherwise in a normal state of health. His medications include aspirin 81 mg daily, enalapril 20 mg daily, and gemfibrozil 600 mg twice daily. He is a nonsmoker and denies any alcohol intake. His physical examination is unremarkable. A fasting lipid blood draw shows his total cholesterol of 252 mg/dL, triglycerides of 285 mg/dL, a high-density lipoprotein cholesterol of 44 mg/dL, and a low-density lipoprotein cholesterol (LDL) of 151 mg/dL. His liver function tests are within normal limits.

In addition to diet and exercise recommendations, the most appropriate next step in the management of this patient is to:

A. Add a HMG-CoA reductase inhibitor (statin) medication
B. Increase gemfibrozil
C. Stop gemfibrozil and start a statin medication
D. Stop gemfibrozil and start fenofibrate and a statin medication

A

D. Stop gemfibrozil and start fenofibrate and a statin medication.

This patient has a mixed dyslipidemia that requires a reduction in both triglycerides and LDL. Fibrates are associated with a slightly increased risk of myopathy and rhabdomyolysis. This risk is increased when gemfibrozil is prescribed with HMG-CoA reductase inhibitors (statins) and should generally be avoided. The combination of fenofibrate and statin is not associated with this increased risk. Other safe options for prescribing in combination with statin medications for dyslipidemia are omega-3 fatty acids and niacin.

Davidson MH. Combination therapy for mixed dyslipidemia. Medscape Family Medicine 2007. Available at: http://www.medscape.com/viewarticle/567703 Accessed January 18, 2008.

Q

A 55-year-old man with a history of hypertension and tobacco use presents to the emergency department with an acute inferior myocardial infarction (MI) approximately 3 hours after the onset of chest pain. The travel time to the nearest hospital with a primary percutaneous coronary intervention (PCI) capability is over 1 hour. The patient has no contraindications to fibrinolysis. Aspirin (325 mg), clopidogrel (300 mg), unfractionated heparin bolus and drip, and a tenecteplase bolus are administered. At 90 minutes he is hemodynamically stable; however, his chest pain continues and his inferior ST segment elevation is less than 50% resolved.

What strategy is the best approach at this point?

A. Repeat bolus of tenecteplase
B. Repeat bolus of tenecteplase and transfer the patient for cardiac catheterization
C. Conservative management with nitrates and beta-blockers
D. Transfer the patient for cardiac catheterization with rescue PCI

A

D. Transfer the patient for cardiac catheterization with rescue PCI.

The Rapid Early Action for Coronary Treatment (REACT) trial included 427 patients with an acute ST segment elevation MI that had failed fibrinolysis, which was defined as less than 50% resolution of ST segment elevation at 90 minutes post-therapy. Patients were randomized to conservative medical therapy, repeat fibrinolysis, or rescue PCI. The rate of the primary endpoint (death, reinfarction, cerebrovascular events, or severe heart failure) was significantly lower with rescue PCI (15.3% vs 31% and 29.8% with repeat fibrinolysis or conservative therapy, respectively).

Gruberg L. REACT: Rescue angioplasty versus conservative therapy or repeat thrombolysis. Medscape Cardiology conference coverage of the American Heart Association 2004 Annual Scientific Sessions. Available at: http://www.medscape.com/viewarticle/493995 Accessed January 14, 2008.

Q

A 40-year-old woman with multiple prior subendocardial infarcts presents to the emergency department with chest discomfort. Her medical history is significant for hypertension, elevated lipids, and current tobacco use. Her electrocardiogram (ECG) is significant for 1 mm of horizontal ST depression in V4-V6. Her cardiac biomarkers are elevated (creatine kinase [CK] 300, creatine kinase-MB [CK-MB] 10, and troponin [Tn] 0.5). She is currently hemodynamically stable and free from chest pain. In reviewing her prior cardiac angiograms, it is noted that she has had mild coronary artery disease, and no invasive intervention was required. She undergoes a coronary angiogram, which is unchanged from prior studies. You suspect that she may have "endothelial dysfunction."

What substance can you administer to test this hypothesis?

A. Acetylcholine
B. Nitroglycerin
C. Papaverine
D. Adenosine

A

A. Acetylcholine.

In these cases, ischemia may be the result of microvascular endothelial dysfunction. Invasive assessment of coronary endothelial function can be performed with the use of acetylcholine. Acetylcholine has 2 effects on the coronary circulation: A direct effect, which results in vasoconstriction; and an indirect effect, which results in endothelial-mediated nitric oxide production and vasodilation. In patients with normal endothelial function, acetylcholine results in an increase in coronary blood flow and slight vasodilation of the epicardial coronary arteries. In patients with abnormal endothelial function, acetylcholine results in a decrease in coronary blood flow and vasoconstriction of the epicardial coronary artery.

Asbury EA, Collins P. Cardiac syndrome X. Int J Clin Pract. 2005;59:1063-1069. Available at: http://www.medscape.com/viewarticle/511761 Accessed January 14, 2008.