

Perioperative Management of the Cardiac Patient Undergoing Non-Cardiac Surgery
Part 1 - May 4, 2009
J. Lewis, MD

1. A 74 year old man is scheduled for cataract extraction and intraocular lens implant. He has type 2 diabetes mellitus, coronary artery disease with congestive heart failure after CABS four years ago, and hypertension. He has no cardiac symptoms other than dyspnea on exertion after walking two blocks. His HgA1C was 7.2% one month ago. Medications are glyburide, amlodipine, lisinopril, furosemide, and low dose aspirin. A CBC is normal, and a BMP shows only a creatinine of 1.4. EKG done one month ago revealed no changes and showed only LVH and an old inferior myocardial infarct. Which of the following should be ordered preoperatively to better assess this patient's perioperative risk?
 - a. No further evaluation
 - b. EKG
 - c. Submaximal treadmill test
 - d. Dipyridamole/sestamibi scan
 - e. Cardiac catheterization

2. A 52 year old man needs to have a low anterior resection for a rectal cancer. He has type 2 diabetes mellitus and takes metformin and glipizide. He is a non-smoker and exercises four times a week on a treadmill for 30 minutes without chest pain or dyspnea. His BP is 138/86 and pulse 71. His BMP and CBC are normal. EKG shows a RBBB which is an old finding. What additional cardiac evaluation is needed?
 - a. No further evaluation
 - b. Exercise treadmill test with thallium
 - c. Dipyridamole/sestamibi scan
 - d. Echocardiogram
 - e. Cardiac catheterization

3. What is the actual cardiac major complication/death risk in the patient in question #2?
 - a. 0.4%
 - b. 0.9%
 - c. 7%
 - d. 11%
 - e. 25%

4. A 75 year old man with claudication is scheduled for an elective femoral popliteal bypass in two weeks. He has a history of previous myocardial infarction, hypertension, and chronic angina. He gets angina now after walking less than one half block. His angina one year ago occurred only on walking two or more blocks. He takes atenolol – 100 mg/day, amlodipine – 10 mg/day, simvastatin – 40 mg hs, and aspirin – 81 mg/day along with prn sublingual nitroglycerin. His pulse is 82, respiratory rate 18, and blood pressure 160/95. Heart and lung examinations are normal. Pulses are 1+ in his left leg. EKG shows Q waves in V1-V4 which are old. CBC and CMP are normal. What should be done preoperatively?
 - a. Echocardiogram
 - b. Dobutamine echocardiography
 - c. Exercise thallium scintigraphy
 - d. Coronary arteriography
 - e. Cancel surgery

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5. A 75 year old woman is seen for preoperative evaluation in the trauma center where she presented two hours ago for treatment of an open tibial fracture sustained in a fall. She has hypertension, coronary artery disease with a history of an inferior myocardial infarction six years ago, a stroke two years ago with a residual right hemiparesis, osteoarthritis, and type 2 diabetes mellitus controlled on 30 units glargine and 28 units lispro daily. Her last coronary evaluation was done six years ago following her MI. A coronary angiogram at that time revealed an occluded RCA and 30-40% stenosis in the circumflex and LAD arteries. Her exercise tolerance is limited to walking within her home because of her arthritis. Her medications are insulin as noted, hydrochlorothiazide, atorvastatin, low dose aspirin, acetaminophen, and atenolol. EKG reveals only large Q waves in II, III, and AVF. What should be done to prepare her for surgery?
 - a. Dipyridamole/sestamibi scanning
 - b. Echocardiogram
 - c. Coronary arteriography
 - d. Obtain cardiology consultation
 - e. Proceed with surgery

6. A 60 year old woman with type 2 diabetes mellitus, hypertension, and a stroke three years ago is referred for preoperative evaluation prior to an elective laparoscopic cholecystectomy. She is unable to walk a block because of a mild left hemiparesis from her stroke. Her medications include 70/30 insulin, aspirin, hydrochlorothiazide, and simvastatin. BMP and EKG are normal. What should be done perioperatively to reduce her cardiac risk?
 - a. Dipyridamole/sestamibi scan
 - b. Initiate atenolol therapy
 - c. Continue her statin perioperatively
 - d. Cardiac catheterization
 - e. Initiate clopidogrel therapy

Answers Sheet

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1. A 74 year old man is scheduled for cataract extraction and intraocular lens implant. He has type 2 diabetes mellitus, coronary artery disease with congestive heart failure after CABS four years ago, and hypertension. He has no cardiac symptoms other than dyspnea on exertion after walking two blocks. His HgA1C was 7.2% one month ago. Medications are glyburide, amlodipine, lisinopril, furosemide, and low dose aspirin. A CBC is normal, and a BMP shows only a creatinine of 1.4. EKG done one month ago revealed no changes and showed only LVH and an old inferior myocardial infarct. Which of the following should be ordered preoperatively to better assess this patient's perioperative risk?
 - a. **No further evaluation**
 - b. EKG
 - c. Submaximal treadmill test
 - d. Dipyridamole/sestamibi scan
 - e. Cardiac catheterization

Teaching Point: 2007 ACC/AHA guidelines specify no cardiac evaluation is needed for low risk procedures such as most eye surgeries, dermatological procedures, endoscopy, and minor breast surgery. These guidelines do recommend that an EKG be done within one month of the planned surgery in the setting of CDV risk factors.

2. A 52 year old man needs to have a low anterior resection for a rectal cancer. He has type 2 diabetes mellitus and takes metformin and glipizide. He is a non-smoker and exercises four times a week on a treadmill for 30 minutes without chest pain or dyspnea. His BP is 138/86 and pulse 71. His BMP and CBC are normal. EKG shows a RBBB which is an old finding. What additional cardiac evaluation is needed?
 - a. **No further evaluation**
 - b. Exercise treadmill test with thallium
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 - d. Echocardiogram
 - e. Cardiac catheterization

Teaching Point: This patient has no intermediate risk factors for a cardiac event (4C-IT: CHF, CAD, CVA/TIA, CRI with creatinine ≥ 2 , insulin-requiring diabetes, and type of surgery - intraperitoneal/thoracic/suprainguinal vascular). His exercise capacity is excellent - specifically > four blocks walking and/or 2 flights climbing. No further evaluation is needed.

3. What is the actual cardiac major complication/death risk in the patient in question #2?
 - a. **0.4%**
 - b. 0.9%
 - c. 7%
 - d. 11%
 - e. 25%

Teaching Point: Each of the revised cardiac risk indices increases surgical risk for a major CDV complication or death. No risk factors give a 0.4% risk, one factor - 0.9%, two factors - 7%, and three factors - 11%.

4. A 75 year old man with claudication is scheduled for an elective femoral popliteal bypass in two weeks. He has a history of previous myocardial infarction, hypertension, and chronic angina. He gets angina now after walking less than one half block. His angina one year ago occurred only on walking two or more blocks. He takes atenolol – 100 mg/day, amlodipine – 10 mg/day, simvastatin – 40 mg hs, and aspirin – 81 mg/day along with prn sublingual nitroglycerin. His pulse is 82, respiratory rate 18, and blood pressure 160/95. Heart and lung examinations are normal. Pulses are 1+ in his left leg. EKG shows Q waves in V1-V4 which are old. CBC and CMP are normal. What should be done preoperatively?
- Echocardiogram
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 - Cancel surgery

By 2007 ACC/AHA guidelines this patient has an active cardiac condition that needs stabilization prior to elective surgery. Active cardiac conditions are unstable coronary syndromes including Class III/IV angina and MI within one month, decompensated CHF, significant arrhythmias, and severe valvular heart disease. His proposed procedure is also high risk from a CDV standpoint (>5% morbidity/mortality). Also this patient meets Class 1 cardiac catheterization indications independent of his surgery. These include angina unresponsive to medical therapy, unstable angina, a markedly abnormal non-invasive test, and an equivocal non-invasive test in a high risk patient undergoing high risk surgery. Revascularization does not reduce perioperative risk in vascular patients with stable CAD. However, this patient is not “stable.” CABS will benefit patients with LM disease, three vessel disease, proximal LAD disease and one additional vessel disease and either EF<50% or ischemia on noninvasive testing.

5. A 75 year old woman is seen for preoperative evaluation in the trauma center where she presented two hours ago for treatment of an open tibial fracture sustained in a fall. She has hypertension, coronary artery disease with a history of an inferior myocardial infarction six years ago, a stroke two years ago with a residual right hemiparesis, osteoarthritis, and type 2 diabetes mellitus controlled on 30 units glargine and 28 units lispro daily. Her last coronary evaluation was done six years ago following her MI. A coronary angiogram at that time revealed an occluded RCA and 30-40% stenosis in the circumflex and LAD arteries. Her exercise tolerance is limited to walking within her home because of her arthritis. Her medications are insulin as noted, hydrochlorothiazide, atorvastatin, low dose aspirin, acetaminophen, and atenolol. EKG reveals only large Q waves in II, III, and AVF. What should be done to prepare her for surgery?
- Dipyridamole/sestamibi scanning
 - Echocardiogram
 - Coronary arteriography
 - Obtain cardiology consultation
 - Proceed with surgery**

Teaching Point: Emergency surgery such as an open fracture should proceed without further cardiac evaluation. Even if this was not emergency surgery, there is debate over whether further cardiac evaluation would be indicated. Her cardiac operative risk is 7% given her three RCRI factors. However, revascularization has not been shown to improve surgical prognosis. Any cardiac evaluation should be approached from the standpoint of its need independent of surgery.

6. A 60 year old woman with type 2 diabetes mellitus, hypertension, and a stroke three years ago is referred for preoperative evaluation prior to an elective laparoscopic cholecystectomy. She is unable to walk a block because of a mild left hemiparesis from her stroke. Her medications include 70/30 insulin, aspirin, hydrochlorothiazide, and simvastatin. BMP and EKG are normal. What should be done perioperatively to reduce her cardiac risk?
- Dipyridamole/sestamibi scan
 - Initiate atenolol therapy
 - Continue her statin perioperatively**
 - Cardiac catheterization
 - Initiate clopidogrel therapy

Teaching Point: This patient has two RCRI risk factors. The 2007 ACC/AHA guidelines suggest using a beta blocker or considering noninvasive testing if it will change management. However, the POISE study from 2008 suggests that the addition of a beta blocker is actually detrimental in patients with one or more of the RCRI factors. This large study almost surely invalidates the ACC/AHA beta blocker guidelines. Data continues to accumulate on improved CVD outcomes in patients who continue statin therapy perioperatively.

References:

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- UpToDate 2009. Edition 17.1. Sections on causes of atrial fibrillation, estimation of cardiac risk prior to noncardiac surgery, and management of cardiac risk for noncardiac surgery.
- Devereaux P et al. Effects of extended release metoprolol succinate in patients undergoing non-cardiac surgery (POISE trial): a randomized controlled trial. *Lancet* 2008; 371: 1839-1847.