Case Report

Negative Sestamibi-Dipyridamole Perfusion Imaging in Severe Coronary Artery Disease in the Preoperative Period of Correction of Abdominal Aortic Aneurysm

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We report the case of a 73-year-old male patient who was a candidate for correction of an abdominal aortic aneurysm without abnormalities in his first cardiological evaluation. The surgery was postponed because of the need for treatment of epididymitis. Two weeks later, the patient returned to the hospital with thoracic pain, when the angiography showed obstructions in 2 coronary arteries, which were successfully treated with percutaneous transluminal angioplasty and stent implantation. After 45 days, the patient underwent surgery for correction of the abdominal aortic aneurysm under peridural and general anesthesia. The patient evolved without complications.

In high-risk noncardiac surgeries, such as vascular surgeries, that cause greater cardiac demand, patients with significant coronary artery disease (CAD) should be adequately identified and undergo pharmacological optimization or surgical revascularization. Some studies have tried to define strategies to identify patients at risk for perioperative cardiac events; however, it is currently known that no test is able to imitate all perioperative stress.

Case Report

The patient is a 73-year-old male, who quit smoking 7 years earlier, and who was a candidate for correction of a 5-cm infrarenal abdominal aortic aneurysm discovered during routine abdominal ultrasonography. The patient denied any morbid antecedents except for a transurethral resection of the prostate performed 2 years earlier. He had no cardiac symptoms. The cardiac assessment, including echocardiography and MIBI-dipyridamole perfusion imaging, showed no abnormality. The surgery was postponed due to left epididymitis diagnosed on the day of surgery, and the patient was treated with antibiotics. Two weeks later, he returned to the hospital complaining of chest pain on minor exertion. The electrocardiogram revealed a first-degree atrioventricular block and alteration of the ventricular repolarization in the lateral wall. The coronary angiography revealed an 80% obstruction of the right coronary artery and a 70% obstruction of the anterior descending coronary artery. Both lesions were successfully treated with angioplasty and stent implantation. The patient received antiplatelet therapy for 30 days. Forty-five days after angioplasty, with another normal sestamibi-dipyridamole perfusion imaging, and without any symptoms, the abdominal aortic aneurysm was corrected through retroperitoneal access while the patient was anesthetized with lumbar peridural anesthesia with a catheter combined with general anesthesia. Clamping of the infra-renal aorta lasted 49 minutes, and the surgery lasted 2 hours and 25 minutes. The patient received 3500 mL of crystalloids, 500 mL of hydroxyethyl amide, 150 mL of 20% albumin, and 445 mL of blood retrieved from intraoperative auto-transfusion. The diuresis during surgery was 1000 mL, 800 being in the period after reperfusion. At the beginning of surgery, hemoglobin was 14.3g/dL, and, after surgery, it was 11.4g/dL. The patient was extubated at the end of surgery and remained in the ICU for 20 hours. The postoperative period was uneventful, and the patient was discharged from the hospital 4 days after surgery. Two years after surgery, the patient is in excellent condition, with no cardiovascular symptoms.

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Discussion

The incidence of coronary artery disease is significantly greater in patients undergoing vascular surgery than in the general surgical population [1,2].

Myocardial perfusion imaging with sestamibi and dipyridamole has a sensitivity of 96%, when stenoses > 70% are considered, and specificity for detecting disease in the anterior descending coronary artery and in the right coronary artery of 97% and 89%, respectively [3]. The limitations of perfusion imaging are found in patients with hypertension, ventricular hypertrophy and left bundle-branch block. Stress echocardiography is preferred for that subgroup [4]. In addition, other factors, such as caffeine ingestion before the test (inadequate preparation), presence of 3-vessel lesions, and the use of beta-blockers may reduce the sensitivity of myocardial perfusion imaging. Patients who will undergo perfusion imaging with drugs, such as adenosine or dipyridamole, should refrain from having caffeine and medications derived from the xanthines at least in the 24 hours preceding the test. Caffeine and the xanthines block the adenosine receptors, reducing the effect of vasodilation and heart rate elevation. These alterations reduce the sensitivity of the test and increase the chance of false-negative results [5,6]. Patients with 3-vessel lesions or a lesion in the left main coronary artery have a worse prognosis. Nevertheless, in the presence of 3-vessel lesions, perfusion imaging may detect a "balanced" pattern of perfu-

sion, which reduces the sensitivity of the method. Because ischemia occurs in a similar manner in the different territories, it is difficult to compare the images of decreased and normal perfusion, which may result in a false-negative test. In those cases, the combined analysis of perfusion and ventricular function may increase the sensitivity of the perfusion imaging, identifying the regions with segmentary dysfunction in patients with balanced ischemia [7]. Finally, the beta-blockers, although useful in the preoperative period, may reduce the detection of ischemic areas on myocardial perfusion imaging. Two studies with beta-blockers introduced in the preoperative period of noncardiac surgery in patients with coronary artery disease or simply with multiple cardiovascular risk factors showed a benefit with reduction in mortality and in myocardial infarction in the postoperative period up to 2 years after surgery [8,9]. However, the use of beta-blockers may cause a reduction in the sensitivity of the perfusion imaging with dipyridamole performed in the preoperative period for risk stratification [10].

The ACC/AHA Guideline Update for Perioperative Cardiovascular Evaluation for Noncardiac Surgery suggests that noncardiac surgery is usually safe in patients without major or intermediate predictive signs or symptoms of surgical risk and who have moderate or excellent functional capacity [11]. The results of noninvasive tests may be used to determine the need for additional preoperative tests and the treatment. For low-risk patients with good functional capacity (above 4 mets), tests for cardiac risk stratification are not necessary.

According to the guidelines of the American College of Physicians for preoperative assessment, our patient would be initially classified as low risk. Of the high-risk variables, he had only age > 70 years, and, therefore, could even undergo the procedure without stratification with perfusion imaging [12].

Once the coronary artery disease is identified or in the presence of an acute myocardial infarction, percutaneous transluminal angioplasty is considered to be less invasive, less expensive, and to require a shorter period of time for recovery and hospital stay. The technological advances of stents and antiplatelet agents have reduced the 30-day stent occlusion rate to less than 0.5% [13].

In patients who had an infarction in the preceding 6 months and were treated with percutaneous transluminal angioplasty and stenting, the incidence of postoperative infarction was 0.5%, comparable to that of patients with no coronary artery disease [14]. Patients treated with percutaneous transluminal angioplasty and stenting more than 90 days before noncardiac surgeries had half of the adverse cardiac events as compared with the nonrevascularized patients, whose risk is twice that of healthy individuals [15].

However, another study [16] analyzing 40 patients revascularized through percutaneous transluminal angioplasty with stent implantation less than 6 weeks before noncardiac surgery reported a high incidence of catastrophic perioperative complications in patients undergoing elective or semi-elective noncardiac surgeries. A recent study reported the case of a patient who evolved to heart failure after nephrectomy 32 days after stent implantation and who required emergency percutaneous transluminal angioplasty to clear the thrombotic stent [17].

In conclusion, failure to identify coronary artery disease shows that negative or normal support tests do not exclude the close association between vascular disease and coronary artery disease, and all patients with peripheral artery disease should be considered at risk for developing adverse cardiac events. In addition, the safe time between performance of percutaneous transluminal angioplasty with stent implantation and highly serious noncardiac surgery is apparently longer than 90 days.

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