Aspirin Responsiveness Lowered in ACS Patients?

BY MITCHEL L. ZOLER
Philadelphia Bureau

ORLANDO — About 10% of patients who presented to a hospital emergency department with chest pain and suspected acute coronary syndrome had platelets that were nonresponsive to aspirin, in a study with about 1,000 patients.

The prevalence of aspirin nonresponsiveness was even more prevalent in patients with a history of heart failure, renal insufficiency, or anemia, and was also more prevalent in Hispanics and African Americans, Dr. Lori B. Daniels said at the annual scientific sessions of the American Heart Association.

'We may find that [aspirin responsiveness testing] can help optimize antiplatelet treatment.'

DR. DANIELS

"Aspirin responsiveness testing may become an important adjunct when assessing patients with suspected acute coronary syndrome because we may find that it can help optimize antiplatelet treatment," said Dr. Daniels, a cardiologist at the University of California, San Diego.

The aspirin responsiveness of each patient's platelets was measured using the VerifyNow system, a point of care test marketed by Accumetrics, a San Diego company. This study was not sponsored by Accumetrics, and Dr. Daniels and her associates had no financial disclosures for this study.

The study enrolled 1,010 consecutive patients who presented to the emergency departments of six U.S. centers with a chief complaint of chest pain or an angina equivalent, and who were suspected of having acute coronary syndrome by their treating physicians. The study excluded patients if they were on clopidogrel treatment, had recently taken an NSAID, or had contraindications to antiplatelet treatment.

Following standard practice, about 90% of patients received an oral dose of aspirin in the emergency department; the other patients said that they had taken aspirin before coming to the hospital. The specific dose varied by center, ranging from 81 mg to 650 mg. Nearly 80% of patients received either 162 mg or 350 mg. The effect of the dose on their platelets was measured 2-4 hours after treatment.

The overall prevalence of aspirin nonresponsiveness was 10.3%. In patients with a history of heart failure (22% of all patients) the rate of nonresponsiveness was 15%.

In a multivariate analysis that controlled for age, gender, smoking history, and history of alcohol or drug abuse, Hispanic patients were 2.8-fold more likely to have nonresponsive platelets, and African Americans were about twice as likely, compared with white patients. Diabetes did not affect the nonresponsiveness rate. In the multivariate analysis, a history of heart failure was a significant risk factor, increasing the likelihood of nonresponsiveness by 76%.

It's unclear why a history of heart failure is linked to a higher prevalence of aspirin nonresponsiveness. Possible explanations include increased serum levels of catecholamines or angiotensin II, increased intracellular levels of calcium, and nitric oxide deficiency in the vascular endothelium, Dr. Daniels said.

"Physicians should be aware of the high rate of aspirin nonresponsiveness in patients with heart failure since they may be susceptible to thrombotic events," she said.

The rate of confirmed acute coronary syndrome in the entire study group was about 70%.

The aspirin responsiveness assay used in the study works by placing a specimen of whole blood in a test solution that is filled with fibrinogen-coated beads. If the platelets in the specimen have not been affected by aspirin, they retain a normal level of fibrinogen receptors on their surface that bind the beads and pull them out of solution, dropping the turbidity of the solution that is then measured by the test device. Platelets that have normal aspirin responsiveness have a reduced number of fibrinogen receptors following aspirin treatment and therefore fail to substantially change the test solution's turbidity. ■

AHA Scientific Sessions

THE CCU CORNER

Ventricular Septal Defect in the Post-MI Patient

BY GEORGE PHILIPPIDES, M.D., AND ERIC H. AWTRY, M.D.

The Patient

An 81-year-old woman presented complaining of severe shortness of breath. On admission, her blood pressure was 100/60 mm Hg, and her heart rate was 100 beats per minute. Her exam was notable for elevated jugular venous pulsations, a soft systolic murmur at the left sternal border, and bilateral pulmonary crepitations. Admission ECG revealed small Q waves and 1-mm ST-segment elevations in leads V3-V5, II, III, and F. Creatine kinase isoenzymes were normal, and serum troponin I was 20.2 ng/mL. She was admitted to the CCU with a diagnosis of recent MI and heart failure, and was treated with aspirin, nitrates, intravenous heparin, and intravenous furosemide. A transthoracic echocardiogram revealed normal left ventricular size and systolic function, a mildly enlarged and hypokinetic right ventricle, a small pericardial effusion at the apex, and mild mitral regurgitation. On hospital day 2 she suddenly became severely tachypneic, and her systolic BP dropped to 80 mm Hg. She was treated with pressors, and urgent cardiac catheterization revealed a right atrial pressure of 14 mm Hg, pulmonary artery pressure of 40/28 mm Hg, and pulmonary capillary wedge pressure of 24 mm Hg with minimal V wave. A significant "step up" in oxygen saturation was noted in the pulmonary artery. Coronary angiography revealed an 80% lesion in the midsegment of a large left anterior descending artery. Before ventriculography could be performed, the patient slipped into cardiogenic shock. An intra-aortic balloon pump was placed, and emergent transesophageal echo with color flow confirmed the presumptive diagnosis: a small ventricular septal rupture in the apical septum with left to right interventricular shunt flow.

The Problem

Acute interventricular septal (IVS) rupture is a rare but often lethal complication of MI. The rate of IVS rupture in the postthrombolytic era is about 0.2%. IVS rupture typically results from a large, transmural MI—frequently the patient's first infarction—and usually consists of a single direct perforation, but may also be irregular or serpiginous, and may be associated with left-ventricular or right-ventricular aneurysm, or free wall rupture.

Clinical Presentation and Diagnosis

Patients with IVS rupture usually present with acute right-sided heart failure, often accompanied by hypotension/shock and a new loud, pansystolic murmur. In some cases the murmur is less dramatic, is heard best at the apex, and can be mistaken for acute mitral regurgitation secondary to acute papillary muscle dysfunction or rupture. The ECG is not specific, though in one report, patients with rupture were found to be more likely to have persistent ST elevations and Q waves in the inferior leads.

A definitive diagnosis can be most rapidly made with 2-D echo with color flow mapping along the septum, looking for transeptal flow. Echocardiography also offers quick assessment of left and right ventricular function and identification of other related mechanical complications. On occasion, a transesophageal echocardiogram is needed to identify and further delineate the septal perforation. If echocardiography is not available or definitive, right heart catheterization can confirm the diagnosis by demonstrating the oxygen step up of left to right shunting.

Management

Hemodynamic stability should be achieved with the placement of an IABP and the judicious use of inotropes, diuretics, and intravenous nitroprusside. Emergency angiography should be considered after stabilization, since long-term survival is increased when surgical revascularization is performed at the time of surgical repair.

Emergent surgical repair is now recommended for all appropriate patients with acute IVS rupture. Operative mortality is high, but significantly lower than mortality with medical therapy. Mortality is particularly high in patients with cardiogenic shock, up to 87% in the SHOCK registry. Surgical repair consists of debridement of necrotic tissue and infarctectomy, aneurysmectomy when appropriate, then closure of the septal tear with sutures or a prosthetic patch. Transcatheter closure with a septal occluding device is also an option and has been used in selected patients, namely those who have been medically managed for several weeks and those who have small residual defects after surgical repair.

Outcome

Given the patient's age, comorbidities, and development of shock, transcatheter closure was considered. But, the finding of pericardial effusion raised the concern of apical free wall tear adjacent to the septal rupture. The patient underwent emergency surgery, in which a distal IVS rupture and apical free wall ruptures were repaired with a Dacron patch. After a difficult 3-week course in the surgical ICU, the patient was discharged in fair condition to a rehabilitation hospital.

Discussion

This critically ill patient posed several diagnostic and therapeutic challenges. Her initial examination—notable for hemodynamic stability, a right ventricular heave, and a muffled murmur—suggested the diagnosis of recent MI with mild mitral regurgitation or pulmonary embolism. The initial echocardiogram focused on these possibilities and may have missed a small, but detectable, IVS rupture at the time of presentation. This case highlights the need for a thorough Doppler interrogation in patients in whom mechanical complications of MI are suspected, especially in those with persistent ST-segment elevation. It is likely that sudden expansion of the rupture site on the second hospital day resulted in her hemodynamic collapse, underscoring how rapidly a seemingly stable patient can decompensate and the importance of swift and aggressive stabilization, angiography, and surgical repair.

DR. AWTRY is assistant professor of medicine and director of education at Boston Medical Center. DR. PHILIPPIDES is assistant professor of medicine and director of the Coronary Care Unit at BMC.
To respond to this column or suggest topics for consideration, write to our editorial offices or e-mail us at cardnews@elsevier.com.