Middle-aged Woman With Recurrent Chest Pain

November 01, 2005 | Atrial Fibrillation [1], Cholesterol Disorders [2], Cardiovascular Diseases [3]
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Five days ago, a 46-year-old woman experienced dull, aching retrosternal pain that radiated toward the left shoulder. The pain was accompanied by diaphoresis and did not abate; she was hospitalized.

An initial ECG revealed striking ST-segment elevations and T-wave inversions in the anteroseptal leads; these findings appeared to be acute. The cardiac troponin levels and creatine kinase (CK) and MB CK fractions obtained during a "rule out myocardial infarction (MI)" protocol were all elevated. In the first 24 hours, no signs or symptoms of congestive heart failure appeared and oxygen saturation was normal. An echocardiogram showed normal ejection fraction.

After the patient received standard therapy, her pain and other symptoms resolved. However, on day 3 of her hospital stay, the chest pain recurs.

HISTORY
The patient was previously healthy. She has no history of diabetes or hypertension and does not smoke or drink. She takes no medications. Results of a drug screen (including for cocaine) are negative.

PHYSICAL EXAMINATION
Blood pressure is 110/70 mm Hg. No carotid bruits or neck vein distention is noted. Her chest is clear and her heart is normal, without murmurs, gallops, or friction rubs.

LABORATORY AND IMAGING RESULTS
Hemogram findings are normal. A chemistry panel reveals a blood glucose level of 98 mg/dL; total cholesterol, 189 mg/dL; low-density lipoprotein cholesterol, 82 mg/dL; and high-density lipoprotein cholesterol, 60 mg/dL. Levels of cardiac enzymes measured shortly after her chest pain recurred are normal. An ECG obtained at roughly the same time is characterized as a "borderline ECG." Eight hours later, the ECG findings are strikingly abnormal, with ST-segment and T-wave abnormalities inferiorly and anterolaterally; these findings are similar to those of her initial ECG.

Which of the following is the most likely diagnosis here?
A. Submassive pulmonary embolism (PE).
B. Prinzmetal angina with infarction.
C. Acute pericarditis.
D. Brugada syndrome. CORRECT ANSWER: B

Striking ECG abnormalities with ST-segment elevation and T-wave inversion are present; on first occurrence, they are accompanied by enzyme spillage, consistent with a diagnosis of MI. Shortly thereafter, the syndrome repeats, with ECG changes again consistent with transmural ischemia. Within a short time, however, these changes abate and the ECG returns to near-normal. These findings are consistent with complete but temporary occlusion of an epicardial coronary artery as a result of spasm. This condition is known as Prinzmetal angina (choice B).\textsuperscript{1,2} The ST and T changes seen in this syndrome can be identical to those typically seen in acute MI. However, in the former, the epicardial coronary artery is occluded by transient spasm, while in the latter, it is occluded by persistent thrombus. If the spasm lasts long enough, as it did initially in this woman, infarction can result.

Cardiac catheterization revealed normal, large, healthy coronary arteries consistent with this patient's age, sex, and lack of risk factors. Because there had been evidence of infarction, no provocative maneuvers were performed to demonstrate spasm.\textsuperscript{3}

Years ago, this syndrome was diagnosed frequently.\textsuperscript{1,4} Before 1980, catheterization following infarction was typically delayed and often no evidence of thrombus was found, leading physicians to diagnose Prinzmetal angina. However, once this procedure could be performed close to the time of infarction, researchers demonstrated that thrombus present during infarction often autolyses quickly. Thereafter, it was recognized that Prinzmetal angina is an uncommon cause of acute MI. ECG features of submassive PE (choice A) include T-wave inversion and ST-segment elevation, inferiorly or anteriorly, and the S\textsubscript{2}Q\textsubscript{3}T\textsubscript{3} pattern.\textsuperscript{1,5} A PE large enough to produce such ECG changes

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would almost certainly cause the much more common, although less specific, findings of tachycardia, tachypnea, dyspnea, and hypoxemia, none of which are present here. In addition, the echocardiogram probably would show right ventricular strain caused by elevated pulmonary pressures.

ST-segment elevation is also a common finding in acute pericarditis (choice C). In pericarditis, the ST-segment elevations are frequently diffuse, crossing ECG coronary artery segments and accompanied by PR-segment depressions, the atrial counterpart of this diffusely involving condition. Clinically, the diagnosis of acute pericarditis requires the presence of at least 2 of the following (a requirement not met here):

- Typical chest pain, which at times can mimic the pain of myocardial ischemia. More often, however, it has a pleuritic nature or component and is worsened by recumbency and eased by leaning forward.
- ECG changes as described above.
- Either an audible friction rub on cardiac auscultation or pericardial effusion on echocardiography.

The Brugada syndrome (choice D) is a common cause (40% to 60% of cases) of a rare clinical scenario--idiopathic ventricular fibrillation and sudden death.\(^2\,^3\) The syndrome is caused by mutations in the cardiac sodium channels; it manifests on ECG as right bundle-branch block and ST-segment elevation in the right precordial leads, with a normal QT interval and no evidence of structural heart disease. This patient's ECG and evidence of infarction exclude this diagnosis.

**Outcome of this case.** The patient did well and had no further episodes of chest discomfort or ECG changes during her hospitalization. A second echocardiogram showed her heart to be structurally normal, with an ejection fraction of 55% to 60%. She was discharged on a regimen of nitrates and calcium channel blockers. These medications are the treatment of choice for Prinzmetal angina. Their vasodilatory effects combat the vasospasm that is the main pathophysiology of the disorder.

**References:** REFERENCES:

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