A 23-Year-Old Man With Chest Pressure, Pallor, Tachypnea, and Tonsillitis

History of current illness

A 23-year-old obese man presents to the emergency department (ED) with a chief complaint of substernal chest pressure and dizziness for 2½ hours. The pain is a 6 on a scale of 10 and radiates to his back. The patient is diaphoretic, markedly pale, tachypneic, and complaining of shortness of breath. After triage, the nurse takes the patient immediately to the treatment area and places him on a cardiac monitor. The ED team initiates intravenous access with normal saline solution at 100 mL/h and oxygen therapy at 3 L/min by nasal cannula.

PERTINENT MEDICAL HISTORY

The patient had seen his primary care physician and an ear, nose, and throat (ENT) specialist the previous day and had been diagnosed with streptococcal tonsillitis, although no laboratory tests were done to confirm this diagnosis.

Medications. The ENT specialist prescribed amoxicillin and clavulanate potassium (Augmentin), but the patient did not fill the prescription because he could not afford it.

Family history. The patient has no family history of early cardiovascular disease.

Social history. The patient is a nonsmoker and denies recreational drug use.

Physical examination

Skin, head, eyes, ears, nose, and throat. Examination found bilateral cervical adenopathy and an erythematous pharynx with bilaterally enlarged exudative tonsils; the neck was supple.
Chest. Initial vital signs were as follows: pulse, 86 beats/min; blood pressure, 98/66 mm Hg; respiratory rate, 40 breaths/min; temperature, 37.9°C (100.2°F); SpO₂, 98% on room air. Lungs were clear; heart tones were normal without murmur; no jugular venous distention or peripheral edema was noted.

What are your differential diagnoses?

This patient presents both a diagnostic and a management dilemma. His symptoms are consistent with an acute cardiac event; however, his only risk factor is his obesity. His recent medical history suggests an infectious process, possibly causing cardiac complications. Also, despite his denial about recreational drug use, a drug-induced cardiac event is a possibility. Our initial differential diagnoses include a primary cardiac event, drug effect, sepsis, dehydration, bacterial endocarditis, viral myocarditis, and rheumatic fever.

What initial interventions and diagnostics does he need?

We obtain blood for laboratory analysis (Table 1). An electrocardiogram (ECG) reveals peaked T waves in the anterior leads. The results of a rapid Streptococcus test are negative. Because the patient has chest pressure, we administer 325 mg of aspirin and nitroglycerin 1:150 grains sublingually, but the chest discomfort is not relieved. After the nitroglycerin is administered, the patient’s blood pressure drops to 78/44 mm Hg but improves when we administer 1000 mL of intravenous normal saline solution. The ED physician interprets the patient’s chest radiograph as normal.

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What do you think?

The results of the diagnostic studies do not readily clarify the problem. Clearly, on the basis of his abnormal cardiac enzyme levels, the patient has had some type of cardiac event. In addition, in spite of the normal findings on the chest radiograph, the patient’s abnormal B-type natriuretic peptide (BNP) level indicates that he is in mild heart failure. Furthermore, the erythrocyte sedimentation rate (ESR) indicates that there is an inflammatory component to his condition. Although the white blood cells (WBCs) typically are elevated with a cardiac event, the degree of elevation along with the abnormal banding indicate an infectious process.

What additional interventions and diagnostics does he need?

We administer morphine 1 mg intravenously, which relieves the chest pressure, and 2 g of intravenous ceftriaxone for the infection. An emergency echocardiogram reveals a normal ejection fraction and heart valves and no evidence of tamponade. The ED physician consults cardiology, internal medicine, and ENT physicians to admit the patient to telemetry with an initial diagnosis of rheumatic fever versus viral myocarditis.

Outcome

Results of blood cultures and an antistreptolysin O titer were negative for any bacterial pathogen, effectively ruling out rheumatic fever and bacterial endocarditis. The ENT specialist ruled out epiglotitis. During hospitalization, the patient underwent a cardiac catheterization that again revealed a normal ejection fraction, no valvular pathologic condition, and normal coronary arteries. His heart failure was treated with furosemide, lisinopril, and carvedilol with good resolution of symptoms. He continued to receive intravenous antibiotics, and indomethacin for the inflammation. The patient was discharged after 5 days of hospitalization with a diagnosis of viral myocarditis. He continued to take the cardiac medications and antibiotics for a few weeks after discharge and was expected to make a full recovery.

Discussion

Viral myocarditis is an inflammatory disorder of the myocardium. The two most common pathogens are
adenovirus and enterovirus (eg, Coxsackie virus). Other causative viral agents include influenza, hepatitis A and C, human immunodeficiency virus, and cytomegalovirus. The specific virus causing this patient’s myocarditis was not identified.

Suspect [viral myocarditis] in patients who present with cardiac symptoms in the absence of a history of heart disease or cardiac risk factors but with a recent infectious illness.

The result of the infection is impaired myocardial functioning resulting from myocyte cell death. This causes myocardial enlargement and increased preload from volume overload related to dysfunctional contraction of the heart. As this cycle progresses, heart failure develops and, without intervention, end-stage cardiac failure and death result.

The presenting symptoms and history are variable and often are nonspecific. A history of a recent infectious illness should provide a clue. This patient’s shortness of breath, chest discomfort, fever, hypotension, pallor, and heart failure are common findings. In addition, his laboratory results showed the typical elevations in WBCs, ESR, and cardiac enzymes. Although his chest radiograph revealed normal findings, radiographs in 50% of cases of viral myocarditis will show cardiomegaly. Common findings on the ECG are nonspecific ST-T wave changes, low voltage, and sinus tachycardia.

**Treatment is aimed at stabilizing the patient’s hemodynamic condition, controlling the heart failure, and increasing cardiac output with standard interventions including acetylcholinesterase inhibitors, diuretics, anticoagulation based on patient condition, oxygen therapy, and inotropic agents such as digoxin.**

The most cost-effective test is the echocardiogram, which usually demonstrates global hypokinesia. A biopsy of the myocardium provides a definitive diagnosis, but this is not a first-line test and it would not be performed in the ED.

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<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Pertinent abnormal laboratory results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory test</td>
<td>Result</td>
</tr>
<tr>
<td>CBC</td>
<td>WBC 20.2 ×10^9/µL</td>
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<tr>
<td></td>
<td>Segments 72%</td>
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<tr>
<td></td>
<td>Bands 11%</td>
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<tr>
<td>Chemistry panel</td>
<td>Carbon dioxide 18 mmol/L</td>
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<tr>
<td>Cardiac enzymes</td>
<td>CPK 633 IU/L</td>
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<tr>
<td></td>
<td>CPK MB 36 ng/mL</td>
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<tr>
<td></td>
<td>Troponin I 20.50 ng/mL</td>
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<tr>
<td>Rapid Streptococcus test</td>
<td>Negative</td>
</tr>
<tr>
<td>Urine drug screen</td>
<td>Negative</td>
</tr>
<tr>
<td>ESR</td>
<td>56 mm/h</td>
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<tr>
<td>BNP</td>
<td>191 ng/L</td>
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CBC, Complete blood count; CPK, creatinine phosphokinase.

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fluid resuscitation, frequent assessment of lung sounds is vital for early detection of heart failure. A small number of patients will require cardiac transplantation as a result of irreversible cardiac damage. If the diagnosis of viral myocarditis is certain, antibiotic therapy would not be indicated.

Viral myocarditis is an uncommon but potentially fatal disease. Suspect it in patients with cardiac symptoms in the absence of a history of heart disease or cardiac risk factors but with a recent infectious illness.

REFERENCE