CASE REPORTS

Cardiovascular Complications of Thrombolytic Therapy in Patients With a Mistaken Diagnosis of Acute Myocardial Infarction

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Thrombolytic drugs given to patients with a mistaken diagnosis of acute myocardial infarction could produce adverse effects, although no such cases have been reported. Two patients treated with intravenous streptokinase for presumed but nonexistent acute myocardial infarction are described. Pericardial tamponade developed in both patients, in one after aortic dissection and in the other after pericarditis. Both required surgery; one died.

Symptoms and electrocardiographic abnormalities mimicking acute myocardial infarction may be caused by noncoronary syndromes. In such cases, treatment with thrombolytic agents may exacerbate the underlying disease process and produce cardiovascular complications.

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Thrombolytic therapy has become standard treatment for selected patients presenting early in the course of acute myocardial infarction. Rigorous selection criteria for use of thrombolytic therapy may minimize but not totally prevent inappropriate use of these drugs. Patients presenting with cardiovascular conditions mimicking acute myocardial infarction are at risk for unnecessary bleeding complications or catastrophic exacerbation of the underlying condition if they are inappropriately treated with thrombolytic agents (1,2). This report describes two patients treated with intravenous streptokinase for a mistaken diagnosis of acute myocardial infarction who experienced significant cardiovascular complications.

Case Reports

Patient 1. A 60 year old man with no previous cardiac history presented with the acute onset of severe sharp substernal chest pain and dyspnea at rest. A pericardial friction rub was present. The electrocardiogram (ECG) (Fig. 1A) was interpreted by the primary physician as consistent with acute anterior myocardial infarction. Echocardiography showed a small but abnormal pericardial effusion without features of tamponade; formal interpretation was not immediately available to the primary physician. Intravenous streptokinase (1.5 million U) was given over 1 h. Approximately 1 h later, hypotension and pulmonary congestion developed and the patient was transferred to our medical center with a diagnosis of cardiogenic shock. On admission, systolic blood pressure was 80 mm Hg, heart rate was 120 beats/min, pulmonary rales were present and the neck veins were markedly distended. Heart sounds were normal; a rub was not appreciated. Echocardiography showed a large pericardial effusion with features of tamponade, as well as an aortic intimal flap that suggested dissection. Emergency pericardiocentesis removed 400 ml of gross blood and immediately increased systolic blood pressure to 120 mm Hg. Computed tomographic scanning showed aortic dissection (type I) extending from the aortic root to the infrarenal aorta. Emergent aortic repair was attempted. Surgery was complicated by extensive bleeding requiring 26 units of packed red blood cells, 36 units of fresh frozen plasma and 120 units of cryoglobulin. The patient could not be weaned from cardiopulmonary bypass and died without regaining consciousness after 13 h in the operating room. A serum creatine kinase level measured 11 h after the onset of chest pain was normal. Autopsy demonstrated no evidence of myocardial infarction or coronary artery thrombosis.

Patient 2. A 71 year old man with no previous cardiac history developed dyspnea and orthopnea over 3 days and substernal chest pain on the day of admission. Vital signs...
were normal. The physical examination was normal. The chest X-ray film showed cardiomegaly (cardiothoracic ratio 0.59). The ECG was interpreted as showing acute anterior myocardial infarction (Fig. 1B). The patient was treated with intravenous streptokinase (1.5 million units). Because of continued chest pain, he was transferred to our medical center on the next day.

On admission, blood pressure was 110/60 mm Hg, with 30 mm of paradoxic pulse. Heart rate was 90 beats/min and the neck veins were markedly distended. Heart sounds were diminished and no pericardial friction rub was present. An ECG showed diffuse ST elevation consistent with pericarditis. The chest X-ray film showed increased cardiomegaly (cardiothoracic ratio 0.66). Echocardiography demonstrated a very large pericardial effusion with evidence of tamponade.

The prothrombin time was elevated at 14.9 s because of streptokinase given <24 h earlier; therefore, pericardial drainage was delayed until the next day. A subxiphoid pericardial window was created surgically, and 1 liter of hemorrhagic fluid was drained. The patient's postoperative course was benign. Serial creatine kinase and MB isoenzyme values were normal.

Discussion

These two patients experienced a complication related to intravenous streptokinase that had been predicted (1–5) but not previously reported. In both cases, a primary physician diagnosed acute myocardial infarction from the ECG. In neither case was the diagnosis confirmed by cardiologists blindly interpreting the same ECG. In both cases, subse-
quent tests conclusively ruled out acute myocardial infarction. In retrospect, symptoms and ECG changes were caused by pericardial disease or aortic dissection, or both. In both patients, streptokinase may have caused or exacerbated the inappropriate bleeding that produced tamponade and hemodynamic compromise. In both patients, hemodynamic status worsened and the pericardial effusion enlarged after streptokinase was given. Streptokinase complicated the surgical management by contributing to excessive bleeding in Patient 1 and by delaying surgery in Patient 2. In both cases, the use of tissue plasminogen activator instead of streptokinase might have simplified surgical treatment because of the former’s briefer disruption of hemostatic mechanisms.

Previous reports. Other patients with syndromes mimicking acute myocardial infarction have been treated with intravenous streptokinase without adverse effects. Tilley and Harston (1) reported on two patients with acute pericarditis given streptokinase for presumed acute myocardial infarction. Both gradually developed nonhemorrhagic tamponade 2 to 4 days later. The authors (1) did not attribute tamponade to thrombolytic therapy, but did point out the risk of thrombolytic therapy producing rapid hemorrhagic tamponade with catastrophic consequences in patients with pericarditis. Ferguson et al. (3) described an additional patient receiving streptokinase for pericarditis without adverse consequences. Satler et al. (2) described three patients diagnosed as having acute myocardial infarction and referred for intracoronary streptokinase. Emergent coronary arteriography demonstrated patent coronary arteries, and subsequent investigation revealed aortic dissection. Emergent coronary arteriography demonstrated patent coronary arteries, and subsequent investigation revealed aortic dissection. Emergent coronary arteriography demonstrated patent coronary arteries, and subsequent investigation revealed aortic dissection. Satler et al. (2) pointed out the potential for adverse consequences if these patients had been given thrombolytic therapy before their true diagnosis was determined. Although none of the six patients reported by the authors (1–3) suffered adverse consequences from thrombolytic therapy, they demonstrated the potential for disaster when thrombolytic therapy is given to patients with cardiovascular conditions mimicking acute myocardial infarction.

The potential for misdiagnosis of chest pain syndromes. The potential is clear. The Gruppo Italiano per lo Studio della Streptochinasi nell’Infarto Miocardico (GISSI) trial (6) documented a 3.8% incidence of incorrect diagnoses of acute myocardial infarction. The Anglo-Scandinavian Study of Early Thrombolysis (ASSET) (7) found that 4.1% of patients with suspected acute myocardial infarction had a nonischemic syndrome and another 6.4% had coronary disease without acute myocardial infarction. Although thrombolytic therapy given to the small fraction of patients without myocardial infarction in these studies was not reported to have adverse effects, it could prove catastrophic in individual patients. In ASSET, among patients in whom a nonischemic chest pain syndrome was finally diagnosed, those treated with tissue plasminogen activator had a 9.5% mortality rate; those treated with placebo had only a 1.2% mortality rate. The higher mortality rate in the group treated with tissue plasminogen activator may reflect adverse effects of thrombolytic therapy in patients similar to ours.

Implications. Two large recent trials (7,8) demonstrated improved survival in patients with suspected acute myocardial infarction treated with a thrombolytic drug. In both studies, even patients admitted with a normal ECG and treated with thrombolytic drugs showed a trend toward a decreased mortality rate. However, no study to date has shown that thrombolytic drugs decrease the incidence of death in patients with chest pain in whom acute myocardial infarction is ultimately excluded. Therefore, it is appropriate that, at present, most centers require rigid ECG criteria of acute myocardial infarction (≥1 mm of ST segment elevation in two contiguous leads) before considering a patient for thrombolytic therapy. If the diagnosis is unclear after the initial ECG, it is important for the physician to clarify it before giving thrombolytic therapy. Serial ECGs spaced as closely as 20 min apart may reveal evolving diagnostic changes. Emergent angiography or echocardiography may demonstrate evidence of ischemic disease or diagnose other syndromes responsible for chest pain. It is notable that, in both of our patients, timely performance and interpretation of the two-dimensional echocardiogram might have detected the pericardial effusion and prevented the inappropriate use of streptokinase.

Conclusion. The physician must strike a delicate balance between offering treatment to those it will help and withholding it from those whom it may harm. This report illustrates the dangers of initiating thrombolytic therapy before the diagnosis is certain. Aggressive, accurate diagnosis of patients with acute chest pain and nondiagnostic ECGs will help the physician adhere to the caveat “first, do no harm.”

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References
