alternative to the risks of thoracotomy or leaving the material in place. Therapy must be instituted immediately to maximize chances of success, and the treatments must be performed by professionals experienced in their administration. Fogarty catheters are important adjuncts in bronchial foreign body removal, but their use is not without risks. Clinicians who employ the catheter for this purpose should be aware of the risks and consider the described regimen if balloon disruption occurs.

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Streptokinase in a Loculated Pleural Effusion*

Effectiveness Determined by Site of Instillation

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A patient with a large loculated pleural effusion had streptokinase instilled into the loculation, and this was ineffective; however, when the same amount of streptokinase was instilled into the space around the loculation, there was rapid lysis of the loculation, resulting in the drainage of purulent fluid through the chest tube. (Chest 1988; 94:854-56)

Instillation of streptokinase into the pleural cavity is an accepted form of treatment for loculated pleural effusions. This seems to obviate the need for decortication; however, in some patients, streptokinase is not effective in lysing loculations. Based on the following experience, we believe that the treatment might be more effective if the streptokinase were instilled into the area adjacent to the loculation.

CASE REPORT

A 35-year-old black man was admitted to Van Etten Hospital on April 12, 1987, with a two-week history of left-sided pleuritic chest pain, increasing shortness of breath, and cough with production of yellowish sputum. He was not an intravenous drug user or alcohol abuser but had snorted cocaine. The patient had a 15 pack-year smoking history.

The medical history was significant for right-sided pneumonia in 1985, and a shrapnel injury to the left leg and head in Vietnam. On examination the patient had tachypnea, with a respiratory rate of 36/min, temperature of 38.9°C (102°F), pulse rate of 92 beats per minute, and blood pressure of 150/90 mm Hg. He had no nuchal rigidity or photophobia. There was shotty intraginal lymphadenopathy and a mobile 2-cm to 3-cm left axillary lymph node. The heart sounds, S1 and S2 were normal, with a 2/6 systolic ejection murmur at the apex.

Chest examination revealed tenderness over the fifth rib on the left side in the midaxillary line, dullness to percussion at the left base with decreased breath sounds, and E to A changes over the same area.

Findings from the remainder of the physical examination were normal. The chest roentgenogram showed a patchy left lower lobar infiltrate with a left pleural effusion.

Laboratory data were significant for a leukocyte count of 14,000/ cu mm (68 percent segmented neutrophils, 11 percent band cells, 20 percent lymphocytes, and 1 percent monocytes). Gram stain of the sputum showed numerous polymorphonuclear leukocytes but no organism. Therapy was begun with intravenous penicillin (2 million units every four hours) and oral indomethacin for the pleuritic chest pain.

The first thoracentesis (April 13, 1987) in the left eighth intercostal space in the infrascapular region revealed turbid yellow fluid with a pH of 7.22, erythrocytes count of 11,450/cu mm, and 25,000 leukocytes/cu mm.

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leukocytes count of 36,600/cu mm (84 percent polymorphonuclear leukocytes and 16 percent lymphocytes), glucose level of 86 mg/dl, lactic dehydrogenase (LDH) level of 1,130 units/ml, and protein level of 5.5 g/dl. Gram stain of the fluid showed sheets of polymorphonuclear leukocytes, with no organism.

On April 14, 1987, a chest roentgenogram showed a loculated left apical effusion. Thoracocentesis was repeated in the fourth intercostal space on the left side medial to the scapula with a long aspiration needle.

The second thoracocentesis revealed fluid that was turbid yellow with a pH of 7.11, LDH level of 1,015 units/ml, protein level of 5.4 g/dl, and glucose level of 74 mg/dl. Gram stain of the fluid showed sheets of polymorphonuclear cells, with no organisms.

A chest tube was inserted into the sixth intercostal space in the midaxillary line on the left side. Only 150 ml of pleural fluid drained through the chest tube, and the apical loculated effusion persisted (Fig 1) and increased in size over the next 24 hours. On April 16, 1987, some 100 ml of fluid was aspirated from the apical loculated effusion, and 250,000 units of streptokinase diluted in 100 ml of physiologic saline solution was instilled into the same area. The loculated effusion persisted (Fig 2). On April 17, 1987, the same dose of streptokinase was instilled into the pleural space below the loculated effusion via the chest tube, following which the tube was clamped. Forty-five minutes later, fluid was noted to seep out around the chest tube into the dressing, so the tube was unclamped; and over the ensuing hour, 3,500 ml of turbid, blood-stained purulent fluid drained out, with no discomfort to the patient. A chest x-ray film obtained the next day showed total disappearance of the empyema (Fig 3). The chest tube was removed on April 20, 1987, and patient was discharged three days later.

DISCUSSION

Intrapleural injection of streptokinase and streptodornase was first used in patients with empyema to drain and eliminate pleural loculation, and it has been used as an adjunct to the removal of hematomas, pus, and fibrous materials from the thoracic cavity. Due to its local fibrinolytic effect on fibrinous pleural exudates within the pleural space, streptokinase has improved results of thoracostomy tube drainage and has obviated the need for decortication.

Streptokinase is a nonenzyme protein produced by Lancefield group C strain of β-hemolytic streptococci, which activates the fibrinolytic system indirectly. Streptokinase forms a 1:1 stoichiometric complex with plasminogen, which then undergoes a transition and exposes an active site in the modified plasminogen moiety, whereby the complex becomes a potent plasminogen activator. The complex of streptokinase and plasminogen has protease activity and catalyzes the conversion of plasminogen to plasmin. Plasmin, a trypsin-like enzyme, is active at neutral pH and is capable of hydrolyzing fibrin into a number of soluble fragments. This case raises an important point. Streptokinase was not effective when instilled into the large loculated empyema; however, when instilled into the space around the loculation, the drug was effective. In fact, the change was so dramatic...
that the chest tube had to be unclamped to allow free flow of the purulent fluid.

The reason that streptokinase did not affect the empyema when instilled directly into the loculation could be due to one of the following four reasons: (1) since plasmin is active at neutral pH, the acidic pH of the pleural fluid may have rendered the fibrinolytic system inactive despite the presence of streptokinase in the pleural fluid; (2) there may be an increase in the inhibitors of the fibrinolytic system in the pleural fluid of some patients with empyema or parapneumonic effusion; (3) dilutational factors may have played a role (perhaps larger amounts would have been effective); and (4) finally, the large number of leukocytes in the pleural fluid may have degraded the streptokinase, rendering it ineffective.

Our experience could explain why intrapleural instillation is not effective in some patients. Under such circumstances, the streptokinase should be instilled around the loculation after the chest tube has drained the surrounding fluid.

REFERENCES

Right Mammary-Coronary Anastomosis in a Patient with Situs Inversus

Henry Abensur, M.D.; Jose Antonio Ramires, M.D.; Luis Alberto Dallan, M.D.; and Adib Jatene, M.D.

We report a patient with situs inversus and ischemic heart disease who had myocardial revascularization with anastomosis of the right mammary artery to the anterior descending coronary artery. (Chest 1985; 94:86-87)

Dextrocardia associated with situs inversus is a rare condition; its incidence is 1:10000.1,2 The occurrence of coronary artery obstructive disease in this condition is similar to the general population.3,4 As far as we know, this case is the first in the literature of myocardial revascularization with anastomosis of the right mammary artery to the anterior descending coronary artery in a patient with situs inversus.

CASE REPORT

A 38-year-old mullato man, came to the hospital because of progressive effort angina of three months' duration. He was known to have situs inversus, and there was no past history of smoking or familial coronary disease. His physical examination was normal except for typical signs of situs inversus. The conventional ECG showed typical dextrocardia pattern (Fig 1.) The chest x-ray film was normal except for the dextrocardia. Abdominal x-ray film showed the stomach displaced to the right. A ECG stress test gave unequivocal ischemic response, and he was then submitted to coronary arteriography. A proximal lesion of the anterior descending coronary artery with 90 percent narrowing was found (Fig 2) and the ventriculography was normal. On July 28, 1987, the patient underwent myocardial revascularization with anastomosis of the right mammary artery to the anterior descending artery (Fig 3). He recovered uneventfully and was discharged on the ninth postoperative day.

Figure 1. Eletrocardiogram.

Figure 2. Lesion of the anterior descending coronary artery with 90 percent narrowing, left anterior oblique view.

Right Mammary-Coronary Anastomosis in Situs Inversus Patient (Abensur et al)