from the cardiophrenic angle were explained by caudal movement of the septum transversum after cyst forma-
tion. On the other hand, Maier6 regarded pericardial
cysts as a congenital structure, but felt that diverticulae
from the cardiophrenic angle were explained by caudal
movement of the septum transversum after cyst forma-
tion. He reported a case of surgically proved
pericardial diverticulum enlarging over a six-year period after idiopathic pericarditis. Development of a pericardial
cyst after acute pericarditis has not been documented.

In the case we describe, a pericardial cyst was first
discovered ten years after pericarditis. Either it was
absent or too small for detection on a standard chest x-
ray examination when the patient had acute pericarditis.
Repeated roentgenograms after contrast material injec-
tion into the cyst showed no communication with the
pericardial space. This sequence suggests that pericar-
dial cysts may appear as a consequence of pericarditis,
perhaps by inflammatory closure of a diverticulum,
which in turn may depend on a congenitally weakened
gastropericardial pericardium for its development. The diagnosis
of pericardial cyst can be made without surgical inter-
vention in selected cases.

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Acute Effusive-Constrictive
Staphylococcal Pericarditis

Dennis A. Ehrich, M.D.,** Jean J. Widmann, M.D.,† and
Walter H. Abelmann, M.D.;

A case of acute effusive-constrictive pericarditis caused by
Staphylococcus aureus infection is reported. The clinical
course and hemodynamic response to pericardiocentesis
are described. Emphasis is placed on the importance of
early pericardiocentesis in the therapy of staphylococcal
pericarditis.

The syndrome of concurrent effusive-constrictive peri-
carditis has been associated with acute purulent pericarditis,1,2 tuberculosis,3 mediastinal radiation,4 peri-
cardial malignancy,5 and idiopathic pericarditis.6

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The hemodynamics of the effusive-constrictive syndrome
and their response to pericardiocentesis have been deline-
ated.† The present patient represents the first reported
case of acute purulent effusive-constrictive pericarditis
documented by cardiac catheterization and postmortem
examination.

Case Report

A 49-year-old Caucasian man was hospitalized with severe
pleuritic substernal pain of seven days' duration. Ten days
prior to admission the patient had noted substernal discom-
fort, progressing in severity, described as a continuous pain,
as if the esophagus were a "lead pipe being twisted." The
pain was worsened by lying flat, coughing and deep breath-
ing; it was relieved by lying on the right side and by taking
3.6 grams of aspirin daily. The patient also noted breathless-
ness after climbing stairs, progressing to dyspnea at rest. The patient had been a heavy consumer of alcohol.
The patient was obese, diaphoretic, and in moderate dis-
tress. Blood pressure was 136/92 mm Hg, pulse regular at
110 beats/min, respirations labored at 30 per minute, and
temperature 36.1°C oral. His weight was 98.99 kg. The
lungs were dull at the bases, with fine rales bilaterally. The
point of maximum impulse and left border of cardiac dullness
were indeterminate. The first and second heart sounds were
normal, with physiologic splitting of S2. There were no
murmurs or rubs, but a fourth heart sound was heard at the
lower left sternal border, and 26 mm Hg of pulsus paradoxus
were noted. The abdomen was soft. The liver was palpable
and tender 1 cm below the right costal margin. The re-
mainder of the examination was unremarkable.

A chest roentgenogram demonstrated marked enlargement
of the transverse cardiac diameter, left pleural effusion, but
no evidence of infiltrate or redistribution of pulmonary blood

*From the Harvard Medical Unit and Mallory Institute of
Pathology, Boston City Hospital, and the Departments of
Medicine and Pathology, Harvard Medical School, Boston.
**Professor of Medicine.
†Research Fellow.
‡Instructor in Pathology.
§Professor of Medicine.

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Reprint requests: Dr. Abelmann, Beth Israel Hospital, 330
Brookline Avenue, Boston 02215

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flow. The electrocardiogram showed a sinoatrial tachycardia but was otherwise unremarkable. The central venous pressure was 22 cm of water. The hematocrit was 40 percent, white blood cell count 11,400/cu mm, with 82 percent polymorphonuclear, 14 percent bands, 2 percent lymphocytes, and 2 percent monocytes. There was toxic granulation of the polymorphonuclear leukocytes. The erythrocyte sedimentation rate was 53 mm/hour. The urine was acid, positive for glucose. The blood urea nitrogen was 31 mg percent, the creatinine 2.1 mg percent, the blood sugar 320 mg percent, potassium 2.8 mEq/liter; the remainder of the serum electrolytes were normal. The uric acid was 11.9 mg percent, acid phosphate 0.35 Bessey-Lowrey units, bilirubin 7.6 mg percent, total protein 7.6 gm percent, albumin 2.4 gm percent, lactic dehydrogenase 355 Wacker units, alkaline phosphatase 184 international units, amylase 150 units, and creatinine phosphokinase 6 units. The arterial blood on room air showed pH 7.55, oxygen tension (P02) 115 mm Hg, arterial carbon dioxide tension (PCO2) 26 mm Hg, oxygen saturation 98.6 percent and bicarbonate (HCO3) 22.0 mEq/liter. Thoracentesis of the left pleural space produced 200 ml of a straw-colored fluid of specific gravity 1.025, containing 3,400 cells/cu mm with 79 percent polymorphonuclears, 4 percent lymphocytes, 4 percent macrophages, 3 percent mesothelial cells and 11 percent red blood cells. The blood sugar was 1,000 mg percent and the amylase 23 units. Gram stain and acid-fast smears of the pleural fluid showed no organisms. Potassium chloride and crystalline zinc insulin therapy was begun.

Over the next 24 hours, the temperature rose to 39.4°C. A pericardial friction rub became audible, and six blood cultures revealed Staphylococcus aureus. An intermediate strength PPD was negative. Therapy was begun with 12 gm of nafcillin daily. Forty-eight hours later the patient had reaccumulated a left pleural effusion again shown to be a nondiagnostic exudate. The electrocardiogram showed injury currents in all limb leads except aVR and across the precordium. On the fifth hospital day the right atrial mean pressure was 24 mm Hg, the right ventricular pressure 48/28 mm Hg, the pulmonary arterial pressure 48/28 mm Hg (40 mm Hg mean), and the intrapericardial pressure 22 mm Hg. The right atrial pressure fell with inspiration. Pulsus paradoxus was noted in the systemic arterial pressure tracing. On removal of 533 ml of purulent-hemorrhagic pericardial fluid, the intrapericardial pressure fluctuated with respiration around 0 mm Hg, while the right atrial and pulmonary arterial pressures failed to change significantly. The systemic arterial pressure continued to show pulsus paradoxicus. The right ventricular pressure prior to and following pericardiocentesis demonstrated a square root configuration2 (Fig 1). A soft plastic catheter was left in the pericardium. The pericardial fluid obtained demonstrated Staphylococcus aureus on a gram-stained smear, confirmed by culture. Following pericardiocentesis, the patient's arterial blood pressure ranged between 100 and 105 mm Hg systolic, and 60 and 70 mm Hg diastolic. The temperature rose to 40°C. On the sixth hospital day, atrial fibrillation appeared, with ventricular response of 100 beats per minute. Brief runs of ventricular tachycardia culminated in a fibrillatory cardiac arrest which failed to respond to the usual resuscitative measures, including thoracotomy and direct cardiac massage.

At postmortem examination, the heart was entirely covered by a thick, shaggy, fibrinohemorrhagic exudate. There was no fluid in the pericardial cavity. The exudate was more hemorrhagic on the right side of the heart, and blood clots were overlying the right atrium. The exudate measured up to .4 cm in thickness, with a dark hemorrhagic rim underlying the epicardial surface (Fig 2). There was marked subepicardial fatty infiltration. The total weight of the heart was 710 gm. The thickness of both ventricular walls being within normal limits, it may be assumed that the exudate and hemorrhage amounted to 250-300 gm. Histologically, the exudate was mainly purulent. Early granulation tissue was seen along the original epicardial surface, with dilated capillaries and hemorrhages surrounded by hemosiderin-laden macrophages. There was no fibrosis, and the age of the inflammatory process was estimated at ten days. Postmortem cultures of the exudate grew Staphylococcus aureus. The cardiac valves were not remarkable. The myocardium generally appeared normal to gross and microscopic examination. There was only mild-to-moderate coronary atherosclerosis, without evidence of obstruction. Other significant autopsy findings included focal pneumonitis in the lower left lobe from which Staphylococcus aureus was cultured, and marked hepatic fatty metamorphosis (liver weight: 3,540 gm), which may be related to the patient's known alcoholism.

**Figure 1.** Simultaneous arterial and right ventricular pressure tracings obtained after pericardiocentesis, demonstrating pulsus paradoxus and square root configuration of ventricular pressure tracing, respectively. AP, arterial pressure; RV, right ventricular pressure.

**Figure 2.** Transverse-cut sections of ventricles (left ventricle above, right ventricle below) show thickness of exudate (up to .4 cm). Hemorrhagic areas are seen mainly as continuous rim around abundant subepicardial fat.
D I S C U S S I O N

This patient entered the hospital seven days after the onset of a staphylococcal pericardial infection and was treated with antibiotics alone for an additional five days. The clinical and hemodynamic picture was indicative of the onset of a staphylococcal pericardial infection and was borne out by the postmortem examination. This was supported by the evidence of tamponade, indicating pericardial constriction, which was noted in our patient was accelerated, occurring, at most, in conjunction with adequate systemic antibiotic dosage, and the inherent tendency of staphylococcal infection to mimic neoplastic disease but follow a benign course. Diagnostic pathologic synonyms have included the terms: histiocytoma, xanthoma, xanthofibroma, post inflammatory tumors, plasma cell granulomas, and pseudolymphomas. A more general classification of three histologic categories would include (1) xanthogranuloma, (2) plasma cell granuloma, and (3) pseudolymphoma.

The importance of early, adequate pericardial drainage in conjunction with specific antimicrobial therapy has been stressed by others. It is recognized that penicillin concentrations attained in pericardial fluid are lower than simultaneous serum levels, and that an undrained pericardial effusion may dilute an intrapericardial antibiotic and therefore impede its effectiveness.

To our knowledge, this is the first hemodynamically documented report of effusive-constrictive pericarditis occurring with pyogenic infection. The rapidity with which the process occurred in our patient should serve to reemphasize the importance of early pericardial drainage and possible intrapericardial antibiotics in the therapy of purulent pericarditis, especially when caused by Staphylococcus aureus.

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Pseudotumor of the Lung

A Case Report and Review Stressing Radiographic Criteria*

Ira L. Cox, III, M.D.,** C. H. Joseph Chang, M.D.,† and Frank Mantz, M.D.†

A case of plasma cell granuloma of the lung and a review of the literature on pseudotumors of the lung are presented. The radiographic findings are stressed and the inadequacy of our present criteria to make a pre-biopsy diagnosis is noted. A unified concept of pseudotumor of the lung to include xanthogranuloma, plasma cell granuloma, and pseudolymphoma is suggested.

Pseudotumors of the lung comprise a group of entities presenting findings on the chest x-ray film which mimic neoplastic disease but follow a benign course after excision. Diagnostic pathologic synonyms have included the terms: histiocytoma, xanthoma, xanthofibroma, post inflammatory tumors, plasma cell granulomas, and pseudolymphomas. A more general classification of three histologic categories would include (1) xanthogranuloma, (2) plasma cell granuloma, and (3) pseudolymphoma.

Roentgenographically, there are two common forms of presentation by a pseudotumor of the lung. The first is that of a well circumscribed homogenous mass lesion of the lung which, upon removal, follows a benign course. These lesions are almost invariably xanthogranulomas and plasma cell granulomas. Over 100 lesions of these types have been reported to date. The other roentgenographic pattern is that of a lung mass which mimics a lymphoma in its presentation with pulmonary consolidation and an air bronchogram. Histologically these lesions have often appeared very similar to the plasma cell granulomas, but because of their unique radiographic appearance and predominance of small lymphocytes and germinal centers on histologic examination, they are generally called "pseudolymphomas." Only 13 cases have been reported to date, and all have followed a benign course upon removal. A case is presented which exhibits radiographic

*From the Departments of Diagnostic Radiology and Pathology, University of Kansas Medical Center, Kansas City.
**Resident in Diagnostic Radiology.
†Professor and Head, Division of Roentgenology.
‡Professor of Pathology; Director of Surgical Pathology. Reprint requests: Dr. Cox, Department of Radiology, University of Kansas Medical Center, Kansas City, Kansas 66103

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