

# Decortication of the heart for staphylococcal pericarditis

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A case of acute staphylococcal pericarditis with constriction of the heart is reported. The response to antibiotics and simple pericardial drainage was poor. Pericardiectomy and decortication of the heart was performed on a moribund patient. Marked improvement followed surgery combined with intensive antibiotic therapy. At follow-up eight months later, the patient was a normal active 6-year-old boy.

## CASE REPORT

A 5½-year-old boy was admitted to Alder Hey Children's Hospital, Liverpool, in January 1969, complaining of dyspnoea and dull abdominal pain referred to the left shoulder. At the onset of the illness, two weeks earlier, he had had influenza-like symptoms, and had been treated by his doctor with salicylates and tetracycline. The day before admission his general condition had deteriorated, he had vomited several times, and he had loose stools. The abdominal pain, shoulder pain and dyspnoea came on at the same time. There was no evidence of sepsis detectable as an antecedent to this illness.

On examination in hospital the boy was irritable and looked ill but was not cyanosed. The pulse rate was 114 beats/minute, regular but of small volume. The jugular veins were dilated as high as the angle of the jaw. The blood pressure was 100/50 mmHg and respiratory rate 24/minute. The heart sounds were distant with no murmurs and no pericardial rub. The percussion note was impaired and air entry was diminished in the left lower chest posteriorly. The abdomen was distended due to a smooth, tender, enlarged liver palpable five fingerbreadths below the costal margin. There was no oedema of the feet or sacrum.

The ECG showed low voltage complexes with flattened T waves. A radiograph of the chest showed a large pericardial effusion, and a small pleural effusion on the left side. The WBC was 16,000 cells/mm<sup>3</sup> and the haemoglobin was 11.3 g/100 ml of blood.

A diagnosis of acute pericarditis with tamponade was made, and urgent pericardiocentesis was done under local anaesthesia. Pus, 300 ml, was aspirated, and 600,000 units of penicillin and 0.5 g of streptomycin were instilled into the pericardium. Digoxin, 0.25 mg eight-hourly for three doses and then twice daily, and frusemide (Lasix), 10 mg daily, were given.

Culture of the pus from the pericardium was reported next day as being positive for *Staphylococcus pyogenes*. The antibiotics were changed to

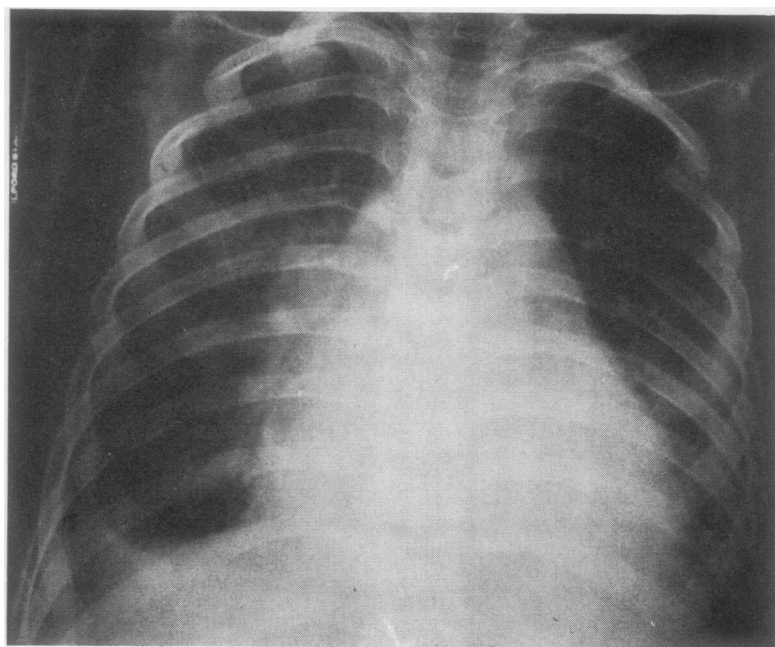
ampicillin, 250 mg, and cloxacillin, 250 mg, by injection every six hours. On the third day, as the cardiac shadow was still large and as evidence of tamponade persisted, the pericardium was drained through an epigastric incision. The tamponade was relieved.

On the fifth day a left pleural effusion was drained through an intercostal tube and 600 ml of sero-sanguinous fluid was obtained. By the fourteenth day, the condition of the patient was deteriorating in spite of treatment; the cardiac shadow had increased in size with further evidence of cardiac tamponade; the haemoglobin was 9.6 g/100 ml of blood, and the WBC 13,000 cells/mm<sup>3</sup>. Pus from the pericardium still grew *Staph. pyogenes* on culture. The radiograph and ECG are shown (Figs 1 and 2). No blood culture was done in view of the positive culture from the pericardium.

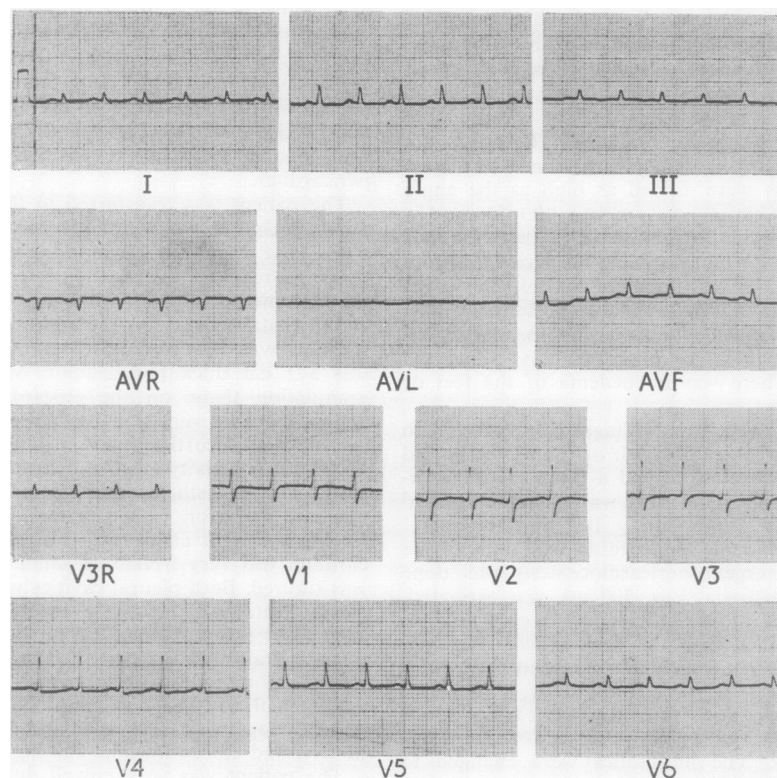
The patient was transferred to the Cardio-thoracic Surgical Unit at the Royal Liverpool Children's Hospital. That evening a left anterior thoracotomy at the upper border of the sixth rib was done. Further exposure was obtained by dividing the costal cartilages at the costal margin on the right and left sides. The sternum was retracted upwards. At operation there was a 1 cm thick pericardium, with thick pus and granulation tissue on the epicardium. The cardiac action appeared very sluggish. An extensive pericardiectomy and decortication was done to free the ventricles. The activity of the heart increased dramatically. The anaesthetist commented on the improvement of perfusion of the extremities. An attempt at freeing the right atrium was abandoned as the myocardium was very friable. A small tear of the atrium was sutured. Both pleural cavities were opened during pericardiectomy. They were macroscopically normal except for seropurulent fluid on both sides. Bilateral pleural drains were inserted. The patient was given parenteral antibiotics, erythromycin, 200 mg, chloramphenicol, 150 mg, and methicillin, 500 mg, all six-hourly, together with digoxin, 0.0625 mg eight-hourly, and chlorothiazide, 250 mg daily.

The patient was very unwell during the first post-operative week. The left pleural drain was removed

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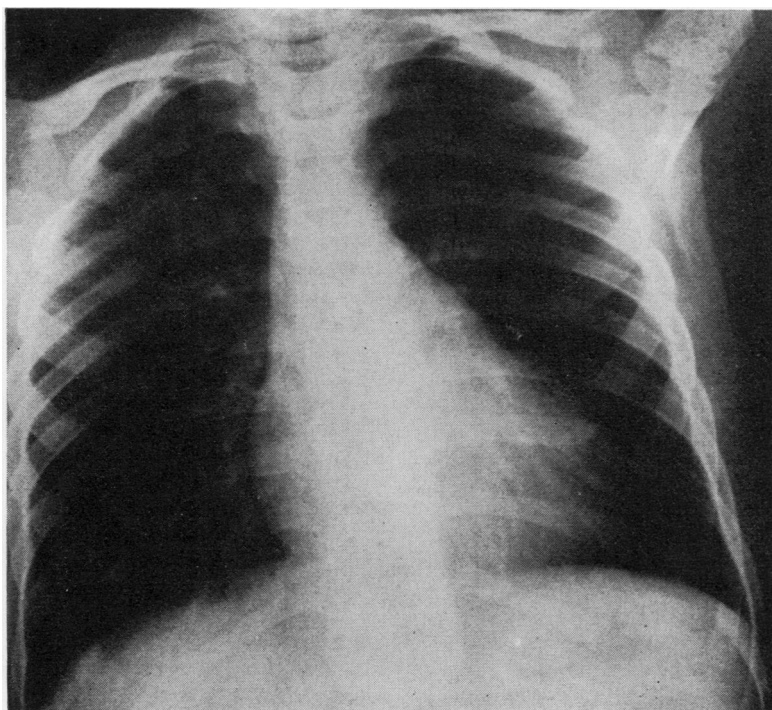


**FIG. 1.** *Preoperative radiograph showing bilateral pleural effusion and large cardiac shadow.*

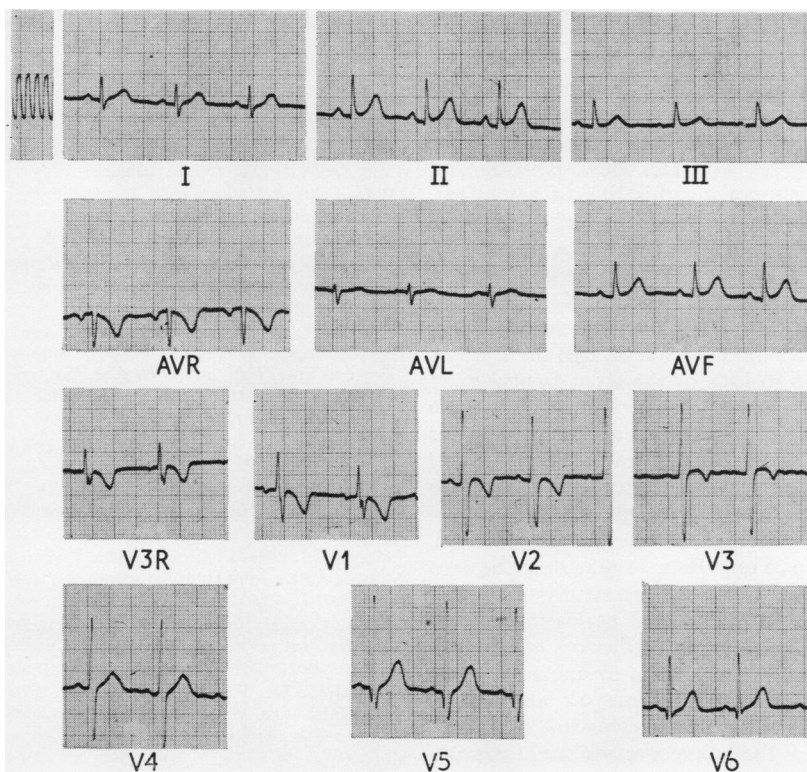


**FIG. 2.** *Preoperative ECG showing low-voltage complexes and flattened T waves.*





**FIG. 3.** *Radiograph eight months after pericardiectomy.*



**FIG. 4.** *ECG eight months after pericardiectomy.*

after 36 hours. The right pleural drain continued to discharge serous fluid amounting to approximately 200 ml per day which gradually tailed off. The tube was removed at the end of seven days. He was anaemic and hypoproteinaemic. The serum bilirubin was 6.3 mg/100 ml. The left hemidiaphragm was raised, probably due to injury to the phrenic nerve during pericardiectomy.

During the second postoperative week he gradually improved; there was a fall in jugular venous pressure; the pulse volume improved; the hepatomegaly decreased; the icterus receded and the anaemia was corrected. There was no evidence of recurrence of infection. He was sent home in April 1969 after a total of two and a half months in hospital.

When last seen eight months after his illness, he was attending school and had a normal jugular venous pressure and a liver palpable 2.5 cm below the costal margin. The chest was clear. The chest radiograph and ECG were normal, as shown in Figs 3 and 4.

#### COMMENT

Staphylococcal pericarditis is an uncommon disease. Cases reported in the literature appear to be only among children. Many of the cases were associated with sepsis elsewhere, e.g., osteomyelitis and pneumonia. Reports of a surgical approach to treatment of staphylococcal pericarditis are few.

Keith, Rowe, and Vlad (1958) consider that pyogenic pericarditis should be treated by suitable antibiotics combined with repeated pericardial aspiration or, if necessary, pericardiostomy. Horan (1957) agrees with this view. Benzing and Kaplan (1963), supporting this line of treatment, quote eight cases so treated with 100% survival. One of their cases subsequently had a pulmonary valvotomy and no abnormality of the pericardium was seen. More recently, Sanyal, Kaur, Hooja, Thapar, and Vaishnava (1970), reporting six cases from India, have similar views, though there was a fatal termination in four of the six patients.

The need for surgery is suggested by a case seen in 1944 and reported by Farber and Vawter (1965). This 12-year-old boy had staphylococcal pyaemia with pericardial constriction due to staphylococcal pericarditis. He died during induction of anaesthesia for pericardiectomy. Ranti, Irwan, and Gan Yong Bing (1965) describe two 10-year-old boys treated successfully by pericardiectomy for staphylococcal pericarditis. They mention the value of the instillation of streptokinase in helping to resolve the fibrinous exudate. Gomez, Nakpil-Miranda, Aguayo, and Bote-Martinez (1964) report a successful pericardiectomy and stress the value of using streptokinase-

streptodornase (Varidase) locally on the heart as well as systemically, to help fibrinolysis. In a report of three cases of staphylococcal pericarditis, Morgan (1964) describes one patient treated with antibiotics alone, one with antibiotics and pericardiostomy, and the other with pericardiectomy; in addition, Folger (1966) reports one case, seen at necropsy, that had a thick layer of constricting granulation tissue. Subsequently, he successfully excised a 3-4 mm thickened pericardium in a girl of 9 months on the fourth day of illness from staphylococcal pericarditis.

A patient with pyogenic pericarditis poses two therapeutic problems—one a generalized septic caemia and toxicity, the other the mechanical embarrassment of the heart. Our patient was in grave danger of death from the second cause. Though he had been treated for 14 days, probably due to inadequate drainage and inadequate antibiotics, the sepsis was also uncontrolled. The recognition of the mechanical element in this patient's disease led to surgical decortication. The slow recovery from the infection with *Staph. pyogenes* was then possible.

It was gratifying to see that a moribund child could be returned to good health.

I am grateful to Mr. B. J. Bickford for permission and encouragement to report this case, and to Mr. P. P. Rickham and Dr. R. S. Jones, who also treated this patient.

#### REFERENCES

- Benzing, G., and Kaplan, S. (1963). Purulent pericarditis. *Amer. J. Dis. Child.*, **106**, 289.
- Farber, S., and Vawter, G. F. (1965). Clinical Pathological Conference, Children's Hospital Medical Center, Boston, Mass., *J. Pediat.*, **66**, 805.
- Folger, G. M. Jr. (1966). Suppurative pericarditis—review of the problem plus observations on two patients. *Clin. Pediat. (Phila.)*, **5**, 225.
- Gomez, R. A., Nakpil-Miranda, R., Aguayo, L., and Bote-Martinez, R. (1964). Massive staphylococcal pyopericardium with acute cardiac tamponade: the role of early pericardiectomy and cardiac decortication with a 7-month follow-up. *J. Philipp. med. Ass.*, **40**, 874.
- Horan, J. M. (1957). Acute staphylococcal pericarditis. *Pediatrics*, **19**, 36.
- Keith, J. D., Rowe, R. D., and Vlad, P. (1958). *Heart Disease in Infancy and Childhood*. Pp. 679-700. Macmillan, New York.
- Morgan, J. (1964). Case reports. Pericardial tamponade as a complication of staphylococcal pericarditis. *Canad. med. Ass. J.*, **90**, 1082.
- Ranti, I. S. F., Irwan, S. S., and Gan Yong Bing. (1965). Radical pericardial resection in purulent pericarditis—a report of two cases. *Paediat. indones.*, **5**, (suppl.), 980.
- Sanyal, S. K., Kaur, I., Hooja, V., Thapar, M. K., and Vaishnava, S. (1970). Staphylococcal pericarditis with cardiac tamponade in children. *Arch. Dis. Childh.*, **45**, 198.