until a week later, when on provocation she muttered two expletives. Thereafter she was mobilized and made satisfactory progress. The tracheostomy was closed and it subsequently healed. Four weeks after stopping the diazepam it was clear that her mental faculties were unimpaired and that she retained a remarkably good sense of humour.

She was discharged home three months after her admission walking well, thinking clearly, and with her original wounds almost healed. When seen as an outpatient two months after discharge she was completely cured and had no appreciable physical, haematological, or biochemical defect. She was living alone and managing her home without difficulty.

Comment

Tetanus is a serious disease, the mortality of which was as high as 70% before Lassen *et al.* (1954) described the use of total paralysis and intermittent positive-pressure ventilation.

This case is of particular interest because of the huge doses of diazepam used and the prolonged recovery time. Even when a patient is satisfactorily paralyzed with curare-like drugs direct stimulation of a nerve at operation will provoke a muscular contraction. Diazepam is a centrally-acting muscle relaxant and seems a reasonable drug to use to combat the effects of tetanus. Despite doses of pancuronium which allowed us to ventilate the patient artificially and controlled most of her spasms, she continued to have intermittent serious spasms. Faced with the choice of increasing either the pancuronium or the diazepam we chose the latter. Our reasons

were that pancuronium may have cardiovascular side effects (Kelman and Kennedy, 1971), while diazepam is largely free from side effects in high doses. At the time we did not anticipate any long-term effects of diazepam.

We suggest that the prolonged delay in regaining consciousness may be accounted for by the cumulative body stores in this obese patient. Fortunately there were no mental or neurological sequelae to this severe attack of tetanus and the 40 days of therapeutic "unconsciousness," despite her age and the possibility of cerebrovascular disease.

In further cases of tetanus treated with large doses of diazepam the possibility of a similar prolonged recovery phase of cerebral activity should be borne in mind and meanwhile other supportive treatment continued.

We thank Professor Sir W. Melville Arnott for permission to report this case, Dr. C. G. Burgess, of Roche products, for his help and co-operation, and members of the department of anaesthesia and the intensive care unit for their help with the patient.

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Pulmonary Embolectomy by Flying Squad

J. A. BOOKER

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Massive pulmonary embolism is a grave surgical emergency. In most peripheral hospitals, however, facilities for pulmonary embolectomy with cardiopulmonary bypass are not available. Reported below are two cases treated successfully by a flying squad which brought both the surgeon and the bypass apparatus to the patient.

Case 1

A 34-year-old housewife taking a contraceptive pill with a high oestrogen content had been confined to bed for several weeks with a respiratory tract infection. During that time her left calf became swollen and tender and one week before admission she had a sudden onset of severe dyspnoea, substernal pain, and palpitations lasting 20 minutes. Seven days later she had woken up severely dyspnoeic and was admitted to hospital.

On examination she was found to be anxious, pale, and sweaty and had severe dyspnoea and peripheral cyanosis. The blood pressure was not recordable by auscultation but by palpation the systolic pressure was 70 mm Hg. The pulse rate was 150/min and regular. The jugular venous pressure was not raised but there was a pronounced parasternal heave and a right ventricular triple rhythm. Heparin and warfarin were immediately given but five hours after admission her condition remained critical. The

systolic blood pressure was 100 mm Hg by palpation, the jugular venous pressure was raised to the angle of the jaw, and a loud friction rub was heard over a large area of the precordium.

Eight hours after admission pulmonary embolectomy was carried out under cardiopulmonary bypass by a surgeon who had come with the bypass apparatus from the nearest thoracic surgical centre 40 miles (64 km) away. At operation both the main pulmonary trunk and the right ventricle were tense and scarcely pulsating, and masses of clot were removed from both main pulmonary arteries and their branches. There was no evidence of femoral vein thrombosis on either side on exploration. The patient recovered well and remained in good health. There were no residual symptoms or signs referable to her chest or cardiovascular system.

Case 2

A 61-year-old woman had a vagotomy and gastroenterostomy for a duodenal ulcer. Seven days later she was transferred from a nursing home to hospital because of the onset of severe breathlessness. On admission she was dyspnoeic, sweaty, and pale. The blood pressure was 100/60 mm Hg and the pulse regular at 110/min. The jugular venous pressure was raised to the ear lobes and there was a pronounced parasternal heave and a right ventricular triple rhythm. An electrocardiogram showed complete right bundle-branch block. X-ray examination of the chest showed no definite abnormality. Four hours later pulmonary embolectomy was carried out under cardiopulmonary bypass, the surgeon and the apparatus again coming from the regional thoracic surgical centre. A large, pencil-like clot 9 to 12 in (22.5 to 30 cm) long was removed from the main pulmonary artery and small pieces of clot were removed from each main branch. Neither femoral vein seemed to contain clot. She recovered well and remained in good health.

Comment

Reviewing 271 cases of death from massive pulmonary embolism, Donaldson *et al.* (1963) concluded that about one in five patients suffering from massive fatal embolism may

Northampton General Hospital, Northampton NN1 5BD

J. A. BOOKER, M.R.C.P., Medical Registrar (Present Address: Lidcoombe Hospital, Lidcoombe, N.S.W., 2141, Australia)

live long enough for a planned surgical procedure to be instituted. Up to 1961 only 21 successful pulmonary embolectomies had been reported in the world literature, but since the introduction of cardiopulmonary bypass by Sharp (1962) a large number of successful embolectomies have been reported from many centres (Beale and Cooley, 1965; Cross and Mowlem, 1967; Barraclough and Baimbridge, 1967).

A new view of the natural history of the disease (Sautter *et al.*, 1967) and the introduction of enzyme therapy (Sasahara *et al.*, 1967) have diverted attention away from surgical treatment. Nevertheless, follow-up studies of patients treated for pulmonary embolism with streptokinase and heparin have shown that large areas of lung may remain underperfused one year later (Gunning, 1971). If these studies are substantiated the pendulum may once again swing in favour of surgical treatment, and when cardiopulmonary bypass is not available the possibility of bringing a flying squad from

the nearest cardiothoracic surgical centre to the patient should be explored.

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Synovial Rupture of Shoulder Joint

P. W. F. LANE, N. H. DYER, C. F. HAWKINS

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Synovial rupture is an uncommon complication of rheumatoid disease. The rupture usually involves the knee joint but may also occur in the elbow and wrist (Dixon and Grant, 1964; Goode, 1968; Jayson *et al.*, 1969.) We report a case in which a patient with destructive arthropathy showing some of the features of rheumatoid arthritis developed sinuses from several joints and then presented with synovial rupture of the shoulder joint. This complication has not been previously described. Release of irritant synovial fluid resulted in swelling, induration, and inflammation of the tissues of the anterior chest wall and axillary fold, mimicking cellulitis or cold abscess formation. The purpose of this report is to draw attention to the clinical features of this rare complication, since antibiotics are unnecessary and incision may encourage infection.

Case Report

A 72-year-old woman was admitted to hospital with a two-year history of polyarthritides which had been treated with indomethacin. Pain and stiffness started in the feet but within 12 months had spread to the knees, hands, and elbows, in that order. Fourteen months after the onset synovectomy of the left elbow was carried out but six months later an inflamed nodule, resembling a furuncle,

appeared in the scar in the left antecubital fossa. This ruptured and then persisted as a sinus discharging blood-stained serous fluid. Progressive arthritis of the knees was complicated by fixed flexion deformity so that she became chairbound. A spontaneous sinus then appeared in the left popliteal fossa and discharged serosanguineous fluid which was normal on microscopy and sterile on culture.

On admission she was bedridden, wasted, and pale, with hepatosplenomegaly and gross flexion deformities of the knees and elbows. Examination showed the classical diagnostic triad of ulnar deviation, rheumatoid nodules, and erosions. The arthritis involved all joints of the limbs but there was relative sparing of both hips and left shoulder. The right shoulder was swollen, fixed, and very painful on movement but not inflamed.

Investigations included haemoglobin 9.0 g/100 ml; E.S.R. (Westergren) 94 mm/hr; serum albumin 2.6 g, globulin 3.6 g/100 ml; and uric acid 2.3 mg/100 ml. Rose-Waaler test was positive at a titre of 1 in 32; serum complement was raised at 40 units/ml but antinuclear factor was not detected. Rectal biopsy showed no evidence of amyloid. A skeletal survey showed severe rheumatoid arthritis affecting the hands, feet, elbows, left knee, and right humerus, and the right glenoid process had been resorbed with adjacent soft tissue calcification.

Soon after admission an area of erythema suddenly appeared anterior to the right shoulder joint. It became increasingly swollen and red, eventually pointing in the right anterior axillary fold. The swelling was tense and slightly fluctuant but was not hot, though dilated veins were present in the overlying skin. There was no tenderness except in the right axilla, she was afebrile, and there was no leucocytosis. Two days later 150 ml of brown opaque fluid was aspirated and an arthrogram showed that contrast material escaped laterally and anteriorly through at least three perforations in the capsule. The inflammation subsided gradually leaving an indurated subcutaneous plaque in the right axillary fold. No organisms were cultured on three aspirations and an arthrogram repeated eight weeks later showed persistent leakage of Hypaque.

Reprint requests should be sent to Dr. N. H. Dyer.

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Queen Elizabeth Hospital, Birmingham B15 2TH

P. W. F. LANE, M.B., CH.B., House Physician
 N. H. DYER, M.D., M.R.C.P., Senior Medical Registrar
 C. F. HAWKINS, M.D., F.R.C.P., Physician