occasions without resolution, and wider exploration revealed a tuberculous coracoid process.

Case 15.—An Indian man aged 28 complained of pain and tenderness in the first metacarpophalangeal joint of his right hand for two months. He had received injections of hydrocortisone and physiotherapy for seven months before there were radiographic changes of sufficient severity to justify biopsy. Unfortunately only the joint capsule was examined, and it was not until three months later that bone removed from the base of the metacarpal was found to contain tuberculous granulation tissue. The earliest x-ray changes were of minimal periosteal reaction, which suggested a fracture. Further films showed slow destruction of the cortex with an increase of periosteal new bone.

Case 16.—A 54-year-old Englishman developed increasing pain and swelling of his ankle for one year. As the joint had suffered a minor injury 12 years previously he was treated with physiotherapy, including short-wave diathermy, heat, and exercises for six months, without relief. He presented at a second hospital with a grossly disorganized joint and a fluctuant swelling over the lateral malleolus. The destruction was so severe that neuropathy was considered, but pus aspirated from the swelling contained tubercle bacilli. He had been treated for a pleural effusion 20 years previously.

Case 17.—A 70-year-old Englishwoman whose tuberculous left kidney had been removed 20 years previously slipped and fractured the neck of her femur. This was immobilized with a pin and plate, but union did not occur, and finally the implant was removed with release of copious pus from which tubercle bacilli were cultured. In retrospect it was obvious from the radiographs that the greater trochanter had already disappeared at the time of the fracture.

Case 18.—A 10-year-old Indian boy presented at a London hospital with a sinus which had been discharging on the back of his hand for eight months. There had been little swelling, but pain was severe until the discharge began. A cystic destructive lesion in the second metacarpal involving both epiphysis and metaphysis was shown by radiography. Culture and histology were positive for tuberculosis.

Discussion

It is a truism to say that to make a diagnosis of tuberculosis one must consider it as a possibility. Tuberculosis has now joined syphilis as a great deceiver largely because its rarity so often excludes it from consideration in differential diagnosis. The arrival of immigrants prone to or suffering from tuberculosis in whom skeletal lesions often present in unusual ways,

and the fairly rare but eminently treatable fresh cases arising among the indigenous population, make it vital that the possibility of tuberculosis as a cause of skeletal pain (which may be referred) should always be remembered (Hunt, 1964), particularly as these lesions usually respond satisfactorily to antibiotics reinforced by surgery when indicated.

Good-quality radiographs should be insisted on (repeated later if necessary), together with films of the corresponding normal side for comparison. A positive Mantoux reaction is of value. A raised sedimentation rate, though not specific, must not be ignored. Suspicion of a tuberculous lesion should be confirmed by histology or bacteriology before antibiotic therapy is begun (M. Heywood-Waddington, personal communication, 1964; Kirkaldy-Willis and Thomas, 1965), and this usually demands biopsy, which should not be delayed if reasonable suspicion exists.

Summary

Tuberculous lesions of bones and joints are being overlooked because the possibility of their occurring, often in unusual ways, is not remembered.

Nine of the 18 cases reported were at first misdiagnosed, with an average delay of one year seven months before tuberculosis was confirmed.

Pain was the commonest presenting symptom.

Good-quality radiographs and a positive Mantoux reaction are of value in suggesting the diagnosis.

Histological or bacteriological confirmation is very important and often necessitates biopsy.

I am indebted to the many surgeons who have allowed the inclusion of records of patients under their care in this report; to Mr. J. A. Cholmeley, who has kindly read the manuscript; and to the consultant medical staff of the Royal National Orthopaedic Hospital for permission to publish.

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Medical Memoranda

Rupture of Sinus of Valsalva

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Congenital aneurysm of the sinus of Valsalva is a rare malformation of the heart. Abbott (1936) collected 12 cases in her series of 1,000 congenital heart diseases; and Sawyers, Adams, and Scott (1957) found 37 cases of rupture of the sinus of Valsalva in the literature.

The object of this paper is to describe the clinical course of such a case, particularly in relation to its diagnosis and management.

CASE REPORT

The patient, a Chinese woman aged 27, was referred for a medical opinion because of a cardiac murmur. She was gravida-4 and five months pregnant. There was no history of undue dyspnoea on exertion. Her previous pregnancies had been uncomplicated,

but a cardiac murmur had been noted during her first pregnancy, seven years ago.

Physical examination showed a moderately nourished woman in good general condition. Pulse rate was 70 per minute and blood pressure 110/60. Jugular venous pressure was not raised and there was no suprasternal pulsation or Corrigan's sign. The apex beat was at the fifth intercostal space on the midclavicular line, and was normal in character. There was no parasternal lift and pulmonary closure was not palpable. No thrills were present. The first heart sound was soft and was followed by a loud harsh pansystolic murmur, which was maximal over the pulmonary area but also heard all over the precordium. Splitting of the second heart sound was not heard. There was no diastolic murmur. Other systems were normal. All the peripheral pulses were palpable and equal.

X-ray examination of the chest showed fullness of the right and left cardiac borders, but the heart size and pulmonary artery appeared normal. The lung fields were within normal limits. An electrocardiogram showed no evidence of right or left ventricular hypertrophy and there was no bundle-branch block.

The patient received chlorothiazide 500 mg. in the morning for five days a week, and was in good condition until two months later, when she was admitted to hospital with a history of small haemo-

ptyses for three days. Her general condition was rather poor. There was marked orthopnoea and Corrigan pulsation. Pulse rate was 104 per minute, blood pressure 135/50. Jugular venous pressure was not raised. The apex beat was at the fifth intercostal space outside the midclavicular line. A loud continuous murmur associated with a thrill was present at the pulmonary area, indistinguishable from the Gibson murmur of patent ductus arteriosus. There were no crepitations at the lung bases, the liver was not palpable, and there was no dependent oedema.

X-ray examination of the chest showed generalized enlargement of the cardiac shadow and congestion of the lung fields. A repeat electrocardiogram showed no evidence of right ventricular strain, but the previously upright T waves in leads II, aVF, and left chest leads became much smaller and ST depression developed in these leads.

Digitalis was begun and the oral diuretic was replaced by mersalyl intramuscularly thrice weekly and later twice a week. The patient responded to treatment of her cardiac condition and gave birth to a live baby.

Two months after delivery an aortogram showed a communication between the aorta and the right ventricle (see Fig.) which strongly suggested the diagnosis of ruptured sinus of Valsalva into the right

Aortogram showing radio-opaque dye from the aorta filling the right ventricle.

ventricle. Associated ventricular septal defect was thought to be likely in view of the pansystolic murmur present before rupture of the sinus.

Repair of the sinus of Valsalva and the septal defect was performed under bypass at 30° C. by Mr. H. D. Sutherland at the Royal Adelaide Hospital, South Australia. At operation a sleeve of redundant white tissue was present around the fistula of the sinus, which was about 1 cm. in diameter. The ventricular septal defect was 1 cm. or less in diameter. Both defects were closed with a series of double-armed mattress sutures reinforced with Teflon. The right ventricle was found to be dilated and hypertrophy of the right and left ventricles was noted.

The patient withstood the operation well and returned to Hong Kong in good condition 32 days later. Physical examination was negative apart from a short soft ejection murmur at the pulmonary area and the apex.

DISCUSSION

Aneurysms of sinuses of Valsalva are classified under the main headings of acquired and congenital. This paper is concerned with the congenital type. Two well-documented conditions—Marfan's syndrome and Ehlers-Danlos syndrome—have been reported to have aneurysm of the sinus of Valsalva (Steinberg and Geller, 1955; Steinberg, Mangiardi, and Noble, 1957; Steinberg, 1960; Tuna and Thal, 1961; Tucker, Miller, and Jacoby, 1963), but this patient showed no clinical features of either condition.

Symptoms and Signs.—Congenital sinus aneurysms are often symptomless (Davidsen, Fabricius, and Husfeldt, 1958), but may have complete heart block due to pressure of the aneurysm on the atrioventricular node and the bundle of His. Similarly, right ventricular outflow obstruction may occur, giving rise to an ejection systolic murmur. Sometimes aortic incompetence is present together with a ventricular septal defect, and a high-pitched diastolic murmur may then be heard (Tuna and Thal, 1961). When a pansystolic murmur is present a ventricular septal defect, a known associated anomaly (Burchell and Edwards, 1951), is likely to be the cause, as was the case in this patient.

Rupture of Sinus of Valsalva.—It is understandable that rupture of the sinus gives rise to acute symptoms (Evans, Harris, and Brody, 1961), since there is often an abrupt change in haemodynamics. Death may occur soon after, but in most cases heart failure progresses relentlessly over a period, causing death (Sakakibara and Konno, 1962) unless the lesion is corrected surgically. In the present case left heart failure was evidenced by haemoptyses and orthopnoea, which were controlled by medical means, but there is little doubt that the final outcome would be bad without surgical intervention.

The sinus of Valsalva and the ventricular septal defect were repaired five months after rupture of the sinus. In view of the delay in obtaining surgical aid, it was not surprising that dilatation and hypertrophy of the right ventricle was observed during operation. However, full recovery is anticipated, as there was no significant murmur after surgery to indicate the presence of residual anomaly.

My thanks are due to the Honorary Director of Medical and Health Services of Hong Kong for permission to report this case. I am indebted to Mr. H. D. Sutherland for information of the findings at surgery and the operative procedure.

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