TUBERCULOSIS OF THE SUBDELTOID BURSA

A Review, with a Report of Two Cases

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Tuberculosis of the shoulder joint represents less than 1 per cent of all bone and joint tuberculosis, and affection of the subdeltoid bursa is still less common. It receives scant, if indeed any, mention in current British and American orthopaedic text-books, and since it is possible that the occasional case which does occur may be incorrectly diagnosed in the earlier stages, when treatment should be most effective, a brief review of the condition is presented, together with a report of two cases.

The previous literature was reviewed by Cone when he reported a proven case in 1911. He considered that Acrel's description in 1779 of the "Ganglion Crepitans Acrelii" containing rice bodies was one of the earliest accounts of tuberculous bursitis, but in fact neither this account nor the descriptions of Cruveilhier in 1816 and of Dupuytren in 1839 of "cysts" containing rice bodies can be considered as proven cases. At that time the true pathology of the condition was not understood, and tuberculous, syphilitic and simple non-specific chronic bursitis were probably not clearly differentiated. For instance, Dupuytren thought that the cysts he described were hydatidiform cysts and that the rice bodies were parasites.

The fibrinous nature of the rice bodies was first demonstrated in 1856 by Virchow, who began the controversy on the mode of their formation. The discovery of the tubercle bacillus and the subsequent clarification of the pathology made it possible to differentiate tuberculous bursitis with certainty. It is now generally accepted that rice-body formation is not peculiar to tuberculous bursitis.

REVIEW OF PREVIOUS CASE REPORTS

Reports of tuberculosis of the subdeltoid bursa in English are few, and Cone's case reported in 1911, as already mentioned, appears to be the earliest report of a proven case. The patient was a man of twenty-two who complained of morning stiffness in the right shoulder for three years and of lancinating pain for three months. The pain had become continuous and forced him to give up work. On examination there was fullness of the shoulder, with crepitus in front of the joint and tenderness localised to the acromial region. Full abduction and medial rotation of the arm were prevented by pain. Radiographs showed rarefaction of the greater tuberosity of the humerus and roughening there and at the upper part of the glenoid fossa. There was tuberculous involvement of the apices of both lungs. At operation the bursa was found to be a thick grey sac containing 400 multi-faceted bodies; it was excised completely and the soft tip of the acromion was removed; the bone elsewhere was found to be normal. The shoulder joint was opened for inspection and found to be normal. Subsequently a sinus developed, but it healed and the patient returned to work.

In 1935 Deacon reported a presumptive case with bilateral involvement. The symptoms were of six years' duration on the right side and of four and a half years' on the left side. The patient, a man of thirty-five, complained of swelling and occasional aching, but there was no limitation of movement. Both bursae were excised and the diagnosis appears to have been based on the presence of rice bodies alone.

In 1942 Etchegorry and Blanco reported a case involving the right shoulder of a fifty-two years old man who had also a bilateral tuberculous pulmonary lesion. There was a two years' history of pain and swelling of the right shoulder which was improved by aspiration. The patient died of his pulmonary tuberculosis and the diagnosis was confirmed at necropsy.
In 1950 Kenin could find only seven cases in the records of the Hospital for Joint Diseases, New York, in the previous twenty-eight years. Only three were proven cases: in a girl of seventeen years, a woman of forty-eight and a man of thirty-eight. In all three cases the bursa was excised successfully and the diagnosis was confirmed histologically.

**CASE REPORTS**

Case 1—Woman aged twenty-four, married. Tapestry designer. Right handed. No personal or family history of tuberculosis.

At the age of twenty she complained of limitation of movement and swelling of the right shoulder which had become progressively worse during the previous two years. She remembered no injury to her shoulder, but attributed her condition to rowing. She was recorded as a healthy girl with a spherical swelling over the front of the right shoulder under the deltoid. Passive shoulder movements were full except for slight limitation of lateral rotation and abduction. Subdeltoid bursitis with fibrinous loose bodies was diagnosed.

A month later the bursa was completely excised. It contained several hundred fibrinous loose bodies which appeared to be budding from a proliferative area over the greater tuberosity of the humerus; the remainder of the bursal lining was merely corrugated. Seemingly no bacteriological or histological examination was made. After a week with the arm on an abduction frame and a short course of physiotherapy as an out-patient she was discharged two months after operation with a full range of shoulder movement.

Four years later the right shoulder again became swollen and she noticed increasing pain and a feeling of stiffness. Her general health was excellent and she allowed six months to pass before seeking advice. The erythrocyte sedimentation rate (Westergren) was 38 millimetres in the first hour. A provisional diagnosis of "tuberculous shoulder" was made and she was provided with an abduction frame while awaiting admission to hospital. Aspiration yielded 20 millilitres of opalescent yellowish fluid, but the tubercle bacillus was neither seen nor cultured.

On admission to the Wingfield-Morris Orthopaedic Hospital the patient's general nutrition and condition were good. No abnormality was detected in the respiratory, cardio-vascular or
Central nervous system. The movements of the right shoulder joint were painless and limited by only 10 or 15 degrees at the extreme range in each direction. There was a large subdeltoid swelling with an extension herniating through an apparent gap in the anterior fibres of the deltoid.

Investigations—The Mantoux reaction (1/10,000) was strongly positive. The Wassermann and Kahn tests were negative. The erythrocyte sedimentation rate was 13 millimetres in one hour (Westergren). Haemoglobin was 100 per cent (14.8 grammes per cent). The white cell count and blood film were within normal limits. Urine—No abnormality was detected. Culture for M. tuberculosis was negative.

Radiographic examination—The chest showed multiple foci, but there was no evidence of recent spread and no definite evidence of activity. The right shoulder showed gross irregularity of the acromion and of the underlying greater tuberosity (Fig. 1).

Tuberculosis of the subdeltoid bursa was considered to be a possible diagnosis and it was decided that the bursa should be excised.

Operation—Through the previous "sabre-cut" scar the deltoid was split, revealing a large adherent bursa which was completely excised and found to be full of loose bodies. The capsule of the shoulder joint and the greater tuberosity of the humerus appeared normal.

Histological examination—The specimen was cystic and filled with rice bodies. It consisted of fibroblastic tissue surrounding a cystic cavity. There were numerous epithelioid systems in the cyst wall, with many giant cells. The numerous rice bodies were composed of fibrinoid material; some were attached to the cyst wall, but others were free within the cyst. There was a chronic inflammatory reaction around the epithelioid systems. The histological structure was morphologically that of tuberculosis (Fig. 2). Though no acid-fast bacilli were seen in sections stained by the Ziehl-Neilsen method, fluid from the cyst grew M. tuberculosis on culture.

Progress—Sterile collections of blood-stained fluid were aspirated twice after the operation. The patient received a three months' course of chemotherapy in the form of streptomycin (1 gramme daily) and isonicotinic acid hydrazide (50 milligrams three times daily). She remained in hospital wearing an abduction splint for six weeks. Thereafter she wore a collar-and-cuff sling and continued chemotherapy at home. Four months after operation the sling was discarded.

Twelve months after operation there had been no recurrence of swelling of the right shoulder. The deltoid muscle had regained its normal power and shoulder movements lacked only about 5 degrees of the full range. Chest and shoulder radiographs showed no activity of the disease, and the erythrocyte sedimentation rate was 4 millimetres in 1 hour (Westergren).


This patient strained his right shoulder while strap-hanging on the London Underground. During the ensuing month he noticed stiffness, pain and some swelling in the shoulder. When seen at a hospital six months later he was found to have subdeltoid bursitis, probably with rice bodies. Radiographs showed some rarefaction in the region of the greater tuberosity. Operation was declined by the patient who received physiotherapy with little benefit.

Two years later the pain increased and at a second hospital tuberculosis subdeltoid bursitis was diagnosed and was confirmed by aspiration. Radiographs showed tuberculosis of the lungs but there was neither clinical nor radiological evidence that the shoulder joint itself was infected. Treatment was by rest in bed for three months, with a full course of streptomycin and para-aminosalicylic acid. This was followed by three months' convalescence.

When the patient was first seen at the Wingfield-Morris Orthopaedic Hospital in the following year there was fullness of the subdeltoid region and a distinct fluctuant swelling along the line of the long head of biceps (Fig. 3). The range of shoulder movements was limited by only a few degrees at the extremes of each movement. Aspiration of the bursa yielded a small quantity of yellowish pus, thick with fibrinous flakes. On direct staining no organisms were seen, but tubercle bacilli were grown on culture. An attempt was made to relieve the condition by aspiration and streptomycin replacement, but without success.

Investigations—The Wassermann and Kahn tests were negative. The erythrocyte sedimentation rate was 3 millimetres in one hour (Westergren). Haemoglobin was 103 per cent (15 grammes per cent). The white cell count and blood film were within normal limits. Urine—No abnormality was detected. Culture for M. tuberculosis was negative. Agglutination tests with S. typhoid and parathyroid suggested previous immunisation. Agglutination tests with the brucella group were negative; tubercle bacilli were not found in three specimens of gastric washings.

Radiographic examination—A lesion of the outer end of the acromion shown in the early films now appeared to be partly healed. A cavity in the acromion had for the most part become filled in (Fig. 4). An arthrogram of the shoulder showed no alteration from the normal, and there was no communication with the subdeltoid bursa. Chest radiographs showed apical and sub-apical infiltration on both sides, with evidence of fibrosis and shrinkage over a year.
Operation—Through a "sabre-cut" incision the deltoid muscle was split. Under the deltoid there lay fibro-fatty tissue with no evidence of a residual cavity except at its distal limit, where there was a small dumb-bell shaped cavity containing a little pus, a few flakes of fibrin and some watery fluid. The diseased tissue was excised completely. The acromion process and the greater tuberosity appeared normal. The shoulder joint itself was not explored. One gramme of streptomycin powder was inserted locally.

Histological examination—Sections showed connective tissue with considerable chronic inflammatory reaction and numerous clefts lined by poorly vascularised chronic inflammatory granulation tissue of tuberculous type. Epithelioid systems were fairly frequent and giant cells numerous. Large amounts of fibrinoid caseous material were present within the clefts. The appearances were morphologically those of tuberculous bursitis.

Progress—A three months' course of chemotherapy (streptomycin 1 gramme daily and isonicotinic acid hydrazide 50 milligrams three times daily) was given. The wound healed by first intention. An abduction splint was worn for one month after operation and then gradually discarded in favour of a collar-and-cuff sling. Two months after operation the patient was discharged to a convalescent home.

Nine months after operation the patient suffered no discomfort from the shoulder and was in excellent health. Shoulder movements were restored to the pre-operative range and there was good deltoid power. The chest lesion had remained stable.

DISCUSSION

Tuberculosis of the subdeltoid bursa, although rare, is a distinct entity, and if the diagnosis is borne in mind it should be possible to differentiate it from non specific bursitis on the basis of the symptoms, clinical examination and radiographic pictures. The condition is of insidious onset and a year or more may pass before advice is sought. Pain does not appear to be a prominent feature in the early stages, and is often more in the nature of a feeling of stiffness. Constitutional signs are absent unless there is an active tuberculous focus elsewhere in the body. There is local swelling of the shoulder, associated in some instances with crepitation, tenderness and increased warmth. Limitation of movement, although reported, was not pronounced in the two cases described here, and it seemed
mechanical in origin. Diagnostic aspiration is useful because isolation of the tubercle bacillus allows chemotherapy to be begun before operation.

In these cases radiographic examination showed changes in both the acromion and the greater tuberosity of the humerus, like those reported by Cone (1911) and by Kenin (1946, 1950). At operation the bone appeared healthy and, as pointed out by Kenin (1946), such changes probably represent rarefaction from local hyperaemia rather than tuberculous involvement of the bone.

The treatment of choice is radical excision of the bursa if the patient’s general condition allows. Ideally, streptomycin combined with one or more of the other available anti-tuberculous drugs should be begun before exploration. Jefferson et al. (1950) reported excellent results from a two weeks’ course of streptomycin after excision of tuberculous greater trochanteric bursæ. However, in our cases a full course of streptomycin (total dose 90 grammes) was favoured.

**SUMMARY**

1. The previous literature in English on tuberculosis of the subdeltoid bursa is reviewed.
2. Two further cases are reported.
3. Emphasis is placed on the neglect of the condition in standard text-books and the need for bearing the diagnosis in mind.
4. Treatment by radical excision, a period of immobilisation and full supportive antibiotic therapy are recommended.

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