DEGENERATIVE RHEUMATOID CHANGES

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Rheumatoid disease may take many forms, and at times degeneration may be quite out of proportion to the other features. Sometimes a quiet atrophy of bone may lead to "main-en-lorgnette" and at other times tendon atrophy may cause rupture (Kersley 1948, Harris 1951). In a third type degeneration may be associated with proliferation and the formation of multiple nodules which break down and ulcerate. In one such case recently observed, hydrocortisone applied locally on a dressing, with continuation of antibiotics that had previously been in use, caused temporary healing.

Three cases have been investigated in which massive cysts filled with pus-like material were found. When first seen, the destruction was such that the differential diagnosis of a tuberculous abscess or a breaking-down sarcoma was suggested. Four examples of necrosis of the cervical vertebrae are also recorded.

CASE REPORTS

Case 1—A man aged forty-five, whose brother had severe rheumatoid arthritis, developed typical arthritis after a quinsy. Two years later he was treated with gold, which produced a rash. In the next year his left knee first became swollen. When he was first seen by one of us (G. D. K.) seven years after the onset he presented the picture of a typical victim of rheumatoid disease, with a much swollen left knee joint and a huge swelling on the left calf which had been variously ascribed to a sarcoma or a tuberculous abscess (Fig. 1). The sedimentation rate was 50 millimetres in one hour (Wintrobe) and the haemoglobin 66 per cent. The Wassermann reaction was negative. The leucocyte count was 7,100 per cubic millimetre. The swelling of the calf was found to consist of a sac extending 8 inches down into the leg and containing a large quantity of purulent-looking material, found later to consist of debris and cholesterol. The sac was completely excised.

Histological findings—The cyst wall consisted of dense collagenous fibrous tissue, varying in thickness from 2 to 4 millimetres. The surface lining the cavity showed clearly the remains of a "palisade" layer of mesenchyme cells, such as are frequently seen in the subcutaneous nodules of rheumatoid arthritis and in the synovial membrane in some cases of rheumatoid arthritis of long duration. In the wall were many foci of round cells of the type found in the capsular layer of a rheumatoid nodule; others were larger and resembled the cell reaction of a rheumatoid synovial membrane. The muscle adherent to the sac showed many foci of large round cells and other evidence of rheumatoid myositis (Figs. 2 and 3).

Progress—When seen again two years later, the patient had severe active rheumatoid arthritis, with typical radiographs of the condition. He was debilitated; the sedimentation rate was 121 millimetres in one hour (Westergren) and 64 millimetres (Wintrobe); haemoglobin was 61 per cent. The left calf appeared normal and the knee presented the usual picture of advanced rheumatoid disease.
Case 1—Muscle from left calf showing degenerative changes. A small lymphocytic focus is seen at the top of the field.

Case 1—An area of cell infiltration in the fibrous wall of the cyst. The cells are mainly lymphocytes with a few plasma cells.
Case 2—A crane driver aged fifty-seven was admitted to the Devonshire Hospital suffering from polyarthritis of rheumatoid type. Nothing of relevance was ascertained from his family or past histories. His symptoms began eighteen months before admission with "bad circulation" and pain in both hands. The pain spread rapidly to involve all joints; he lost twenty-one pounds in weight and he had to give up his work. A course of gold injections produced some remission but subsequently the condition relapsed and four months before admission he developed a swelling of the right calf (Fig. 4). The swelling was painful and fluctuated in size from day to day. He received treatment at his local hospital where the swelling was explored and some yellowish fluid with a specific gravity of 1.018 was aspirated.
Examination—On admission the findings were those of rheumatoid polyarthritis. The hands were severely affected, there were flexion deformities of both elbows, and the knees showed some synovial effusion. In the right calf there was a large cystic swelling, somewhat tender on palpation. The erythrocyte sedimentation rate was 120 millimetres in one hour (Westergren); the blood count was normal. The plasma proteins were: albumin 3·3 grammes per cent and globulin 2·9 grammes per cent.

Treatment and progress—The swelling over the right calf was explored with a needle and 10 cubic centimetres of a synovial-like fluid were aspirated. An equal quantity of diodone solution was introduced and the subsequent radiograph showed a communication with the knee joint (Fig. 5). It was decided that the cyst was an abnormal prolongation of a bursa from the knee joint, and this was confirmed at operation by one of us (J. C. F. C.) when it was excised and the communication with the knee joint tied off (Fig. 6). The subsequent progress was uneventful and the arthritis appears to be going into a remission.

Pathological examination—Macroscopically, the cyst was smooth-walled and contained yellow amorphous material. The cyst wall was about two or three millimetres thick. Microscopically, the lining of the cyst was composed of a thin (1-2 cell) layer of large eosinophilic cells containing mucopolysaccharide granules in their cytoplasm from which the contents of the cyst were probably derived. The lining cells rested upon connective tissue infiltrated with lymphocytes (Fig. 7). The histological appearance was like that of part of the cyst walls in Cases 1 and 3.

Case 3—A male civil servant aged forty-eight gave a history of rheumatoid arthritis of nine years duration. Three phases could be distinguished in the evolution of the articular lesion: firstly, an oligarticular phase of relatively short duration, during which the wrists were mainly involved; secondly, a longer phase in which all the joints were affected with typical rheumatoid changes; and thirdly, a phase of articular disorganisation and subluxation affecting nearly all the joints of the hands, the right shoulder, and the joint between the third and fourth cervical vertebrae. The hands were markedly deformed, with stunted fingers of the "main-en-lorgnette" type. The extensive disorganisation of the metacarpophalangeal and interphalangeal joints allowed abnormal movements of the fingers in all directions. The disintegration of the third and fourth cervical vertebrae, first noted about nine months before his death, continued and paresis of the arms ensued. Severe compression of the cord itself was prevented only by the permanent use of a collar.

During the phase of articular disorganisation a swelling appeared in the region of the right shoulder joint. At this time the sedimentation rate was 62 millimetres in one hour, haemoglobin 65 per cent, and leucocyte count 17,000 per cubic millimetre. The Wassermann reaction was negative. Neoplasm or tuberculosis was suspected but punch biopsy showed only necrotic tissue and cholesterol deposit. The patient died nine months later.

Necropsy. The right humerus—A broken-down mass of debris one and a half inches in diameter replaced a large part of the head of the humerus and contained a thick yellowish-grey material.
containing a large quantity of cholesterol, and on microscopy there were many "foam cells." Behind the shoulder there was a sausage-shaped cyst two and a half inches long consisting of a fibrous capsule enclosing a greasy necrotic material. Sections showed, in addition to granular amorphous debris and cholesterol, clefts in hyaline fibrous tissue and areas of large rounded or polygonal cells with small darkly stained nuclei, well defined cell membrane and vacuolated cytoplasm (foam cells) (Fig. 8). Cervical spine—On examination of the neck the disc between C.3 and 4 had almost completely disintegrated, allowing subluxation and compression of the cord. The discs above and below showed increasing degeneration at their periphery (Fig. 9). A radiograph of this specimen is shown in Figure 10. Histologically the disc showed fibrillation and complete disintegration in some areas with necrosis and fragmentation of the adjacent layer of bone. A narrow zone of dense vascular fibrous tissue containing lymphocytic accumulations was present above and below the affected disc, and in the bodies of the vertebrae loose fibrous tissue replaced the marrow (Fig. 11). Bone trabeculae in the main body of the vertebrae remote from the disc were normal.

Case 4—Man aged twenty-six. He first contracted gonorrhoea at the age of twenty and again six years later, when he was treated with penicillin. One month after this attack he developed pains in his buttocks which spread rapidly to nearly all the peripheral joints and to the back and neck. For three months he was severely ill, with swinging pyrexia. There was keratoderma blenorrhagica of both feet. The leucocyte count varied from 9,000 to 14,000 per cubic millimetre. He was anaemic, and the erythrocyte sedimentation rate was very high.

Treatment and progress—He was treated with massive doses of penicillin without response and was given repeated blood transfusions and, later, radiotherapy. Five months after the onset of the
arthritis the neck condition became more acute, with pain radiating into the arms. Radiographs showed necrosis with partial subluxation of the third and fourth cervical vertebrae. Traction was applied and a rigid cervical collar was ordered. Within a few weeks his general condition began to improve and after two months he was discharged from hospital wearing a leather collar. When he was seen four months later, the arthritic condition had almost entirely subsided. One finger was swollen but painless and the neck was stiff. He was able to discard the collar and begin work. 

**Case 5**—A married woman aged sixty-nine developed rheumatoid arthritis fifteen months before her death from broncho-pneumonia. On examination one month before her death the hands, feet and knees were swollen and the neck was very stiff and painful. The sedimentation rate was 73 millimetres in one hour and the haemoglobin 66 per cent. The patient was allergic to gold, and blood transfusion helped but slightly. 

**Necropsy**—Destruction of the intervertebral discs and early subluxation in the mid-cervical region were discovered.

**Case 6**—A woman of fifty-eight, bedridden with longstanding rheumatoid arthritis. On examination she was found to have marked angulation of the neck that had been present for several years. She refused hospital treatment.

**DISCUSSION**

Large cystic areas filled with breaking-down pus-like material rich in cholesterol may be formed in two ways: by the breaking down of a rheumatoid nodule or by the filling up of a bursa or pouch of synovial sac with necrotic debris shed from the synovial surface.

The earliest rheumatoid nodules consist of patches of fibrosis in subcutaneous fat, surrounded by a ring of small lymphocytic foci. From a study of many subcutaneous nodules the following sequence is suggested as describing its further development. First, the area of fibrosis increases, the lymphocytes occupying a capsular zone of looser texture at the periphery. Later, fibrinoid degeneration passing on to necrosis occurs at the centre. At first the necrotic areas are seen to be elongated and tortuous when cut longitudinally. Eventually they coalesce and liquefaction occurs; the result is a cyst with fibrous wall containing necrotic debris.

When the process occurs in a bursa, the synovial membrane becomes engorged and proliferated to form villi. Superficial necrosis of the surface layer and of the villi occurs and the necrotic tissue is exfoliated into the joint cavity. The result is again a fibrous cyst with round-cell foci in the wall and products of tissue degeneration in the lumen.

In the cases described here the latter course seems to have been the more likely but the end-results of each process may be indistinguishable.

It appears that rheumatoid arthritis of the cervical spine is commoner than used to be thought and that it may proceed to subluxation. We believe that it has no relationship to ankylosing spondylitis, in which this breaking-down process seldom if ever occurs.

**SUMMARY**

1. Three cases of a degenerative type of rheumatoid arthritis, with large cystic cavities filled with pus-like material, are described. They may arise from bursae or breaking-down nodules.
2. Four cases in which necrosis and subluxation complicated rheumatoid disease of the cervical column are recorded.
3. The pathogenesis of necrotic and cystic areas in rheumatoid arthritis is discussed.

**REFERENCES**


