Tuberculous Arthritis of the Sternoclavicular Joint

A REPORT OF THREE CASES*

BY TADASHI YASUDA, M.D.t, KIYOSHI TAMURA, M.D.t, AND MASATOSHI FUJIIWA, M.D.t, KOBE, JAPAN

Investigation performed at the Department of Orthopaedic Surgery, Kobe City General Hospital, Kobe

Tuberculous arthritis and osteomyelitis are uncommon diseases, but their sequelae may be disabling. Compared with other sites of skeletal tuberculosis, the clavicle and sternoclavicular joint have received little attention in the literature. We describe the cases of three adults who had a tuberculous infection in the sternoclavicular joint and the surrounding tissues. For each patient, modern imaging techniques greatly enhanced the understanding of the extent of the disease process.

Case Reports

Case 1. A seventy-four-year-old man who had had a painless swelling of the right sternoclavicular joint and of the proximal part of the right clavicle for nine months was seen in our hospital in 1989. With the exception of the localized swelling, no other focal findings were noted, and the motion of the shoulder was normal. The erythrocyte sedimentation rate was elevated to fifty-eight millimeters per hour, and the test for c-reactive protein was positive (forty-nine milligrams per liter). The leukocyte count was normal. A tuberculin skin test, however, was positive.

A roentgenogram showed opacification of the right upper lung field and suggested a lytic lesion in the medial part of the right clavicle (Fig. 1-A). Tomography demonstrated erosive destruction of the right clavicle and first rib (Fig. 1-B). Computerized tomographic and magnetic resonance images demonstrated a soft-tissue mass, which expanded over the sternoclavicular joint to the mediastinum and displaced the subclavian vessels (Figs. 1-C, 1-D, and 1-E). Furthermore, the computerized tomographic image revealed old inflammatory changes in the apex of the right lung, which were consistent with primary tuberculosis.

An open biopsy was performed. The diagnosis of tuberculous arthritis and osteomyelitis was made on the basis of the presence of tubercles and mycobacteria in the histological material. A gallium scintiscan failed to reveal any abnormal accumulation of isotope in joints other than the right sternoclavicular joint.

Isoniazid (0.3 gram per day), rifampin (0.45 gram per day), ethambutol (0.75 gram per day), and streptomycin (three grams, three times per week) were administered for three months. There was no clinical improvement, and the patient was hospitalized and operative débridement was performed. The sternoclavicular joint was found to be filled with granulomatous tissue as well as with bone and capsular debris. The articular disc was completely destroyed. The inflammatory mass expanded into the mediastinum. Two centimeters of the medial part of the clavicle, the medial end of the first rib, and the inflammatory mass were excised.

The chemotherapy protocol was continued. However, after one month, the rifampin was discontinued because of hepatic dysfunction.

The isoniazid, ethambutol, and streptomycin were given for an additional six months.

At a follow-up examination two years after treatment, there was no evidence of clinical recurrence of the tuberculous arthritis and osteomyelitis. The patient had a full range of motion of the right shoulder joint and no pain.

Case 2. A fifty-four-year-old man was examined in 1977 because he had had a painless swelling for ten years in the right sternoclavicular joint and pain in the right shoulder with movement.

There was no tenderness or local heat over the swollen sternoclavicular joint. Motion of the shoulder was only slightly affected. Hematological examination revealed elevation of both the leukocyte count and the erythrocyte sedimentation rate (12.0 × 10⁹ per liter).

*No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article. No funds were received in support of this study.

†Department of Orthopaedic Surgery, Kobe City General Hospital, 4-6 Minatojimanakamachi, Chuo-ku, Kobe 650, Japan.

Fig. 1-A

Figs. 1-A through 1-E: Case 1.

Fig. 1-A: Routine roentgenogram showing opacification of the right upper lung field, suggesting a lytic lesion in the medial aspect of the right clavicle.

[12,000 per cubic millimeter] and sixty-one millimeters per hour, respectively) and a positive test for c-reactive protein. A tuberculin skin test was positive. An anteroposterior tomogram showed erosion of the right clavicular head and of the medial end of the right first rib. An arthrogram of the right sternoclavicular joint demonstrated communication between the joint and the apex of the right lung (Figs. 2-A and 2-B). Chest roentgenograms revealed findings that were consistent with tuberculous lesions in the apex of the right lung, and Mycobacterium tuberculosis was grown on a culture of sputum. Therefore, the diagnosis of pulmonary tuberculosis accompanied by sternoclavicular tuberculous arthritis was made. No other joints were involved.
Tuberculous Arthritis of the Sternoclavicular Joint

FIG. 1-B

Tomogram showing extensive osseous erosion of the medial aspect of the right clavicle and the first rib (arrow).

Antituberculous chemotherapy was administered and an operation was performed. During the operation, the joint cavity was found to be filled with granulomatous tissue, and the articular disc could not be identified. The clavicular head, the medial end of the first rib, and a portion of the sternum were eroded, and their remnants were excised. In addition to extensive débridement of the inflammatory tissue, a partial lobectomy of the right lung was performed.

The patient was given isoniazid (0.3 gram per day), rifampin (0.45 gram per day), and ethambutal (0.75 gram per day) for six months. Thereafter, isoniazid and rifampin were administered for an additional six months. The patient was discharged from the hospital. He had been there for one year.

At a three-year follow-up examination, no recurrence of the condition was found. The patient had neither pain nor restriction of motion of the shoulder, and there was no noticeable deformity.

CASE 3. When he was seen at our hospital in 1983, an eighty-eight-year-old man had a painless swelling over the left sternoclavicular joint, a fistula discharging pus, and a history of documented pulmonary tuberculosis. The swollen sternoclavicular joint was tender and warm when palpated. Both flexion and abduction of the shoulder were restricted to 150 degrees. The erythrocyte sedimentation rate and c-reactive protein were thirty-nine millimeters per hour and thirty-six milligrams per liter, respectively, although the leukocyte count was normal. The tuberculin skin test was positive. An anteroposterior tomogram revealed partial destruction of both the sternum and the left clavicle. Computerized tomography showed erosion of the clavicle and swelling of the soft tissue anterior to the sternoclavicular joint. A technetium bone scintiscan demonstrated no abnormal accumulation in any joints other than the sternoclavicular joint. A fistulogram showed the sternoclavicular joint to be the origin of the discharge of pus. Mycobacterium tuberculosis grew on culture of both pus and sputum.

The fistula was excised, and three centimeters of the medial aspect of the clavicle were resected. The articular disc was found to be completely destroyed. The entire tuberculous abscess was débrided, including the insertion of the sternocleidomastoid muscle.

Isoniazid (0.3 gram per day), rifampin (0.45 gram per day), and ethambutal (0.75 gram per day) were given postoperatively for six months. Thereafter, isoniazid and rifampin were administered for an additional six months. The patient was hospitalized throughout the duration of this one-year treatment.

At a follow-up examination two years after discharge from the hospital, the sternoclavicular joint was asymptomatic. There was no restriction of motion, and the patient did not object to the hollow that was created at the site of the operation.

Discussion

In studies of septic arthritis reported in the literature, the sternoclavicular joint has been involved in as many as 9 per cent of patients. The most common causative organisms have been Staphylococcus aureus and Pseudomonas aeruginosa. The prevalence of tuberculous arthritis of the sternoclavicular joint is extremely low: only 1 or 2 per cent of tuberculous arthritis lesions have involved that joint.

Tuberculous arthritis and osteomyelitis are secondary to either newly activated or reactivated pulmonary disease or joint disease at the same site. In our first patient (Case 1), the bone infection may have been the result of reactivation of the primary pulmonary tuberculosis. In our second patient (Case 2), the infection was considered to have been spread directly from the site of active pulmonary tuberculosis to the sternoclavicular

FIG. 1-C

Computerized tomography scan demonstrating swelling of the anterior chest wall and retrosternal extension of the mass in the right sternoclavicular joint (arrow).
Tuberculous arthritis of the sternoclavicular joint is frequently insidious in its onset. Patients who have tuberculosis of other joints usually have more obvious symptoms and signs, including pain, swelling, and a draining sinus. As in our patients, painless swelling may be the presenting finding in tuberculous infection of the sternoclavicular joint. A high index of suspicion is necessary for the diagnosis of this infection. A swollen sternoclavicular joint in a patient who has a history of previous tuberculous disease or chest roentgenograms suggestive of tuberculosis should raise the suspicion of tuberculous arthritis.

A confluence of structures in the region of the sternoclavicular joint makes it difficult to evaluate the joint on routine roentgenograms. Because tuberculous arthritis of the sternoclavicular joint may cause a retrosternal abscess with or without mediastinitis, we believe that computerized tomography scanning and magnetic resonance imaging provide superior anatomical images of this area. Computerized tomography provides a sharper image of the soft tissues and fascial planes and clear images of the bones and joints (Fig. 1-C). Arthrography and fistulography may also help to demonstrate the expansion of the mass to surrounding tissues over the joint or the communication with the primary lesion.
Technetium-99m scanning and gallium-67 scanning may be useful diagnostic tools to rule out concomitant osteomyelitis, a retrosternal abscess, or involvement of a remote joint.

A number of rheumatic disorders, including rheumatoid arthritis, ankylosing spondylitis, osteoarthritis, or Tietze syndrome may affect the sternoclavicular joint. Other conditions in which swelling near the sternoclavicular joint mimics tuberculous infection at this site are sternoclavicular hyperostosis, condensing osteitis, and necrosis with infection. A tuberculous abscess of the sternoclavicular joint is frequently misdiagnosed clinically as a tumor. Therefore, it is important to consider tuberculous infection as a possible cause of swelling near the sternoclavicular joint.

On the basis of our experience, we believe that advanced tuberculous arthritis and osteomyelitis in the sternoclavicular joint should be treated with a combination of thorough operative débridement and systemic administration of antituberculous agents. If the infection is diagnosed at an earlier stage than it was in our patients, treatment with antituberculous agents alone may be sufficient. Antibiotics should be chosen on the basis of the in vitro sensitivities of the isolated organisms, and they should be administered for at least twelve months when there is concomitant osteomyelitis. The disease did not recur in our patients, and the results of treatment were good for a relatively short period. However, the risk of reactivation of tuberculosis necessitates careful long-term follow-up.

References
1. Argen, R. J.; Wilson, C. H., Jr; and Wood, P.: Suppurative arthritis. Clinical features of 42 cases. Arch. Intern. Med., 117: 661-666, 1966.
2. Beutler, S. M., and Bayer, A. S.: Managing sternoclavicular septic arthritis. Drug Ther. (Hosp. Ed.), 7: 101-109, 1982.
3. Chartier, Y.; Martin, W. J.; and Kelly, P. J.: Bacterial arthritis: experiences in the treatment of 77 patients. Ann. Intern. Med., 50: 1462-1474, 1959.
4. Enarson, D. A.; Fujii, M.; Nakielna, E. M.; and Grzybowski, S.: Bone and joint tuberculosis: a continuing problem. Canadian Med. Assn. J., 120: 139-145, 1979.
5. Goldenberg, D. L., and Cohen, A. S.: Acute infectious arthritis. A review of patients with nongonococcal joint infections (with emphasis on therapy and prognosis). Am. J. Med., 60: 369-377, 1976.
6. Kelly, P. J.; Martin, W. J.; and Coventry, M. B.: Bacterial (suppurative) arthritis in the adult. J. Bone and Joint Surg., 52-A: 1595-1602, Dec. 1970.
7. Ward, J.; Cohen, A. S.; and Bauer, W.: The diagnosis and therapy of acute suppurative arthritis. Arthrit. and Rheumiat., 3: 522-535, 1960.
8. Yood, R. A., and Goldenberg, D. L.: Sternoclavicular joint arthritis. Arthrit. and Rheumiat., 23: 232-239, 1980.