Tubercular osteomyelitis of the clavicle: a report of four cases

AN Aggarwal, IK Dhammi, AP Singh, S Kumar, MK Goyal
Department of Orthopaedics, University College of Medical Sciences and Guru Teg Bahadur Hospital, Shahdara, Delhi, India

ABSTRACT
We report the clinicoradiological features of tuberculosis in the clavicle in 4 patients. The patients’ ages ranged from 9 months to 29 years. All patients were managed with antitubercular drug therapy for one year and one underwent surgical debridement and curettage as well. Clinicians should be aware of the varied presentation (pain, non-healing ulcer, abscess, multifocal osteoarticular tuberculosis) of this condition. With the worldwide resurgence of tuberculosis, clinicians should maintain a high index of suspicion. The diagnosis of osteoarticular tuberculosis is usually made on clinico-radiological features.

Key words: clavicle; tuberculosis, osteoarticular

INTRODUCTION
Osteoarticular tuberculosis accounts for one to 3% of all tuberculosis. Tuberculosis of the clavicle without involvement of the neighbouring joint accounts for <1% of all osteoarticular tuberculosis. We report the clinico-radiological features of tuberculosis in the clavicle in 4 patients.

CASE REPORTS

Case 1
In March 2000, a 29-year-old female doctor presented with a 4-week history of insidious pain around her left shoulder. There was no history of previous trauma. She had experienced constitutional symptoms for the past 5 to 6 months and tenderness in the middle and lateral left clavicle. Her glenohumeral, sternoclavicular, and acromioclavicular joints were normal. Radiographs showed a lytic lesion surrounded by a zone of sclerosis; computed tomography (CT) showed an area of destruction with minimal soft tissue involvement (Fig. 1). The chest radiograph was normal. Her erythrocyte sedimentation rate

Address correspondence and reprint requests to: Dr Arun Pal Singh, Department of Orthopaedics, University College of Medical Sciences, Shahdara, Delhi, 110095, India. E-mail: singh_arunpal@hotmail.com
(ESR) was 28 mm in the first hour. An open biopsy was deferred because urine microscopy revealed microscopic haematuria during the pre-anaesthesia workup. A centrifuged urine sample showed acid-fast bacilli on Ziehl Neelson staining, suggestive of tuberculosis. The urine was not cultured for mycobacteria as her symptoms improved markedly after antitubercular therapy commenced and she refused the investigation. She was given a 4-drug antitubercular regimen (rifampicin 600 mg, isoniazid 300 mg, ethambutol 1000 mg, and pyrazinamide 1500 mg) for 2 months. The microscopic haematuria disappeared within 3 weeks. The pain around the clavicle gradually subsided after 6 weeks. The first 3 drugs were continued for 10 more months despite the patient becoming asymptomatic at 6 weeks. At the 6-month follow-up, the clavicular lesion had resolved.

Case 2

In May 2002, a 13-year-old girl presented with a non-healing, bone-deep ulcer measuring 4x2 cm, on the left lateral clavicle, with granulation tissue and a thin, watery discharge. The clavicular abscess had been drained 6 months earlier in another hospital. Her ESR was 70 mm in the first hour. Radiographs of the shoulder showed a soft tissue defect with an area of destruction (Fig. 2), but the chest radiograph was normal. A histopathological examination of material biopsied at the edge of the ulcer found tuberculous granulation tissue, caseating necrosis, epitheloid cell granuloma, and Langerhans giant cells. The patient was started on a 4-drug antitubercular regimen (rifampicin 450 mg, isoniazid 300 mg, ethambutol 800 mg, and pyrazinamide 1500 mg) for 2 months. The ulcer healed within 4 weeks. The first 3 drugs were continued for 10 more months. At the one-year follow-up, the lesion had become sclerotic, indicating healing.

Case 3

In April 2004, a 9-month-old girl presented with...
swelling of the left middle clavicle. The child was playful and afebrile and had received all the recommended vaccinations for her age. Radiographs of the shoulder showed an expansile lytic lesion (spina ventosa) [Fig. 3a]. A blood film revealed normocytic hypochromic anaemia. Her ESR was 24 mm in the first hour. Aspiration of the swelling yielded pus, which was sent for gram staining and culture and intravenous antibiotics (cloxacillin and gentamicin) were administered. The swelling gradually increased and indurated over 2 days. The gram stain and culture were sterile after 48 hours of incubation. Surgical evacuation of the pus and curettage were performed. The curetted tissue was sent for cytological and histopathological examination and polymerase chain reaction (PCR) analysis for mycobacterium tuberculosis. The cytological examination revealed a granulomatous process and the histopathological examination found caseating necrosis, epitheloid cell granulomas, and Langerhans giant cells. The PCR was positive for mycobacterium tuberculosis. The child was started on a 3-drug antitubercular regimen (rifampicin, isoniazid, and pyrazinamide) for one year. The child and her parents were negative for human immunodeficiency virus (HIV), syphilis, and pulmonary tuberculosis. At the one-year follow-up, the clavicle had remodelled (Fig. 3b).

**Case 4**

In July 2005, a 22-year-old woman presented with a 4-month history of a gradually increasing, painful swelling over the right clavicle (Fig. 4), together with swelling of the left wrist with a discharging sinus. She had no history of fever, coughing or constitutional symptoms. Her left wrist was palmar flexed and had a restricted range of movement. Radiographs showed a lytic lesion on the right medial clavicle, regional osteoporosis of the carpal bones and bases of the 2nd, 3rd, and 4th metacarpals, and a fibrocavitatory lesion in the upper lobe of the lung. CT revealed erosion and fragmentation of the medial clavicle with soft-tissue swelling. Her ESR was 45 mm in the first hour. Examination of cells obtained from fine needle aspiration of the swelling on the right clavicle and left wrist revealed a tubercular abscess. Staining of aspirate for acid-fast bacilli was positive. In view of the multifocal osteoarticular tuberculosis, the patient was screened for immunocompromising disorders. Her lymphocyte count, blood sugar (fasting and postprandial) levels, liver and kidney function tests were all normal. She did not have HIV-I and II antibodies. A bone scan revealed abnormal increased radionuclide uptake at the right clavicle, left wrist, and both sacroiliac joints. A diagnosis of multifocal osteoarticular tuberculosis was made and the patient was started on a 4-drug antitubercular regimen (rifampicin 450 mg, isoniazid 300 mg, ethambutol 800 mg, and pyrazinamide 1500 mg) for 2 months. The swellings at the wrist and clavicle began to decrease.
after 6 weeks. The first 3 drugs were continued for 10 more months. The wrist sinus healed after 5 months and the clavicle swelling gradually reduced after 8 months. At the one-year follow-up, CT revealed sclerosis of the bone with partial reconstruction and reduction of the soft-tissue swelling.

DISCUSSION

Tuberculosis of the clavicle with no involvement of the neighbouring joints is rare. Isolated clavicular tubercular osteomyelitis is less common than bacterial osteomyelitis.3 The differential diagnosis of non-traumatic lesions of the clavicle includes infection, (pyogenic, granulomatous or syphilitic), neoplasms, congenital pseudoarthrosis, condensing osteitis, and sternoclavicular hyperostosis.1,4 In a patient on dialysis who had tuberculous osteomyelitis of the clavicle, the clinico-radiological characteristics closely resembled a neoplasm or metastatic disease.5 In the early stage, the patient may present with painful swelling of the clavicle, with no major bone destruction. In the late stage, a cold abscess or sinuses/ulcers may form. Tuberculosis of the sternoclavicular region may be suspected in patients with unexplained chronic shoulder pain.6

The lesions may be destructive or proliferative (spina ventosa). Plain radiographs may show diffuse thickening and honeycombing or multiple cystic cavities or sequestration, similar to pyogenic osteomyelitis.7 Radiography is not an effective means of evaluating changes in the clavicle because of overlapping anatomic structures.3,4 CT or magnetic resonance imaging (MRI) provide superior anatomic images.4 On CT, destructive changes are better appreciated, particularly in the bone window setting. On MRI, they are seen as a breach in the normally hypointense rim formed by the cortices of the bones. MRI is useful for determining the extent of the lesion, particularly narrow and soft-tissue involvement. All imaging methods provide complementary information.6

Osteomyelitis of the clavicle can resemble a neoplastic process on radiographs, hence a biopsy may be necessary to confirm the diagnosis.1,3 Tissue needed for histopathological and microbiological investigation can be obtained from the sinus/ulcer edge during debridement. Antitubercular drug therapy may be started based on clinico-radiological features or the presence of an obvious tubercular focus.

Curettage and antitubercular drug therapy (for one year) were used to treat 4 children with tuberculosis of the clavicle.1 Advanced tubercular arthritis and osteomyelitis in the sternoclavicular joint should be treated with a combination of operative debridement and systemic administration of antitubercular agents. If the infection is diagnosed at an early stage, treatment with antitubercular agents alone may be sufficient.4 Surgical excision may be justified when the diagnosis is uncertain or the disease is unresponsive or for removal of a large sequestrum.7 A large part of the clavicle can be excised without loss of function.2 Regeneration of the clavicle after resection was seen in 3 children.1

Clinicians should be aware of the varied presentation (pain, non-healing ulcer, abscess, multifocal osteoarticular tuberculosis) seen in tubercular osteomyelitis of the clavicle. In an endemic region, it is necessary to maintain a high index of suspicion, especially with the worldwide resurgence of tuberculosis. Histopathological and microbiological investigation, or PCR can confirm the diagnosis. Nonetheless, the bacteriological diagnosis is made in only one to 30% of cases. The diagnosis of osteoarticular tuberculosis in endemic areas is usually made on clinico-radiological features.8

REFERENCES