Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jcot

Case Report

Tuberculosis of wrist joint in an 8-year-old child presenting as hamate osteitis: A rare case report

Anshul Goel MS, DNB^{a,*}, Dhananjaya Sabat MS, DNB, MNAMS^b,
Abhishek K. Sambharia MS^a

^a Senior Resident, Department of Orthopaedics, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi, India

^b Assistant Professor, Department of Orthopaedics, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi, India

ARTICLE INFO

Article history:

Received 27 December 2014

Accepted 24 April 2015

Available online 6 June 2015

Keywords:

Wrist tuberculosis

Paediatric TB

Osteitis hamate

ABSTRACT

Tuberculosis rarely involves wrist joint and is usually diagnosed in arthritic stage. We, hereby, describe a case of TB afflicting wrist joint in a young child. To our knowledge, similar presentation has never been reported. Diagnostic dilemma became more pronounced as the radiograph presented with features of osteitis of hamate instead of a classical phemister's triad, as is usually expected.

© 2015 Delhi Orthopedic Association. Published by Elsevier B.V. All rights reserved.

1. Background

TB wrist is a rare disease,¹ usually affecting elderly individuals and has an insidious and indolent course.² Both tubercular tenosynovitis and skeletal tuberculosis involving carpal are quite rare. Skeletal involvement in TB wrist usually includes capitate and distal radius.³ We report a case of a male child, diagnosed with TB of wrist joint. This case is unique due to the presentation of TB wrist in immature age group and as hamate bone osteitis instead of phemister's triad.

2. Case report

An 8-year-old male child presented to us with pain and swelling over right wrist for the past 6 months. The patient

initially consulted a primary care physician but was not relieved of symptoms.

The patient was malnourished and had an associated loss of weight and appetite. The wrist was in a position of 20 degrees volar flexion with only a jog of movements possible. Any attempted movement was painful. Mild swelling was noted in the carpal region dorsally, and the area was tender on deep palpation. Epitrochlear and axillary lymph nodes were enlarged.

There was no history of trauma or contact with tuberculosis. He had no complaints of cough and sputum expectoration. Blood investigations were as follows: Hemoglobin – 9.2 gm%, TLC – 11200 mm⁻³, DLC P68 L29 E2 M1, ESR-31 mm in the first hour by Westergrens method.

X-ray of the affected wrist showed increased density of hamate with fuzziness of margins suggesting periosteal reaction due to osteitis (Fig. 1A and B). The rest of the carpal

* Corresponding author at: Department of Orthopaedics, New Orthopaedic Block, Lok Nayak Hospital, Jawaharlal Nehru Marg, New Delhi 110002, India. Tel.: +91 85 274 19626.

E-mail address: dranshulgoel@gmail.com (A. Goel).

<http://dx.doi.org/10.1016/j.jcot.2015.04.006>

0976-5662/© 2015 Delhi Orthopedic Association. Published by Elsevier B.V. All rights reserved.

Fig. 1 – Anteroposterior (A) and oblique (B) radiographs of the right wrist showing increased density of hamate with fuzzy margins.

bones were apparently normal. Chest radiograph was also normal. Tissue culture for pyogenic organisms was negative. Biopsy reported epithelioid cells with necrotizing granulomas. PCR for *Mycobacterium TB* was positive.

A diagnosis of TB of hamate bone affecting the wrist was made. The four-drug antitubercular treatment (ATT) was started (Isoniazid:H, Rifampicin:R, Pyrizinamide:Z, Ethambutol:E), with the doses adjusted to weight. A removable wrist splint was used to immobilize the wrist in 10 degrees dorsiflexion. His general conditions improved gradually. Sequential ESR showed gradual return to normal levels. Pain and swelling subsided by 3 weeks, and tenderness resolved completely in 6 weeks. Bracing was intermittent after 3 months. ATT as intensive phase (HRZE) was continued for 2 months followed by continuation phase of 4 months on Isoniazid and Rifampicin.

At 6 months follow-up, the patient had no pain or deformity at wrist. He had some restriction of motion, with 40 degrees of palmar and dorsal flexion and 20 degrees of ulnar and radial

deviations being possible. The lesions also healed radiologically without any sequelae (Fig. 2A and B).

3. Discussion

Osteoarticular tuberculosis accounts for 1–4.3% of all tuberculosis illnesses.^{4–6} Wrist osteoarticular TB accounts for only 1% of all cases of skeletal TB.⁷ Both tubercular tenosynovitis and skeletal tuberculosis involving carpals are quite rare. Usually, it has insidious and indolent presentation of long duration. Also, the lack of detailed description of TB wrist in literature

Fig. 2 – Anteroposterior (A) and oblique (B) radiographs of the right wrist at treatment completion showing decrease in density of hamate and margins becoming well defined.

limits clinicians' understanding and awareness of this disease entity.² 30–50% of the patients initially present with history of undocumented trauma. Early lesions are easily missed radiographically.⁷ So the diagnosis is rarely established in a patient before the stage of arthritis.

TB of the wrist may start in the synovium or rarely in the carpus. The disease in synovium very soon gets disseminated to involve the whole carpus. The common sites of primary osseous focus are the os-capitatum or the distal end of radius.³ Secondary concomitant involvement of the flexor and extensor sheaths may also occur. Abscess and sinus formation and regional lymph node enlargement are common. In our case, the disease appears to be primary osseous type, initially affecting the hamate bone, with a later involvement of the wrist as a whole.

Demineralization, marginal erosions, and slight diminution of joint space are well-described early signs in TB wrist.³ It is similar to classical "Phemister's triad," i.e. the combination of juxtaarticular osteoporosis, peripherally located osseous erosions, and gradual narrowing of the joint space, which is the characteristic of tuberculous arthritis.³ These features are the result of the formation of granulation tissue in an inflamed synovium. This pannus erodes cartilage and bone, leading to demineralization. Tuberculous infection does not produce proteolytic enzymes, and so the joint space tends to be preserved for a considerable time.⁷

Tuberculosis of the digital extremities is known to present as dactylitis; flat bones, especially skull may also present as expanding destructive osteolytic lesions with ill-defined irregular margins having at first a sclerotic border and later an osteoporotic edge. There is lack of literature regarding TB wrist in immature skeleton and presentation of carpal bones. Many observers have, however, reported that in any tubercular osteomyelitis involving immature skeleton, bone sclerosis and periosteitis may be seen in the early course of disease.^{8,9} This requires ruling out other conditions, i.e. pyogenic infection and osteomyelitis, sclerosing osteomyelitis, and hyperostosis.^{8,9} So conformation of diagnosis by culture, PCR, and biopsy is essential.

Establishing the diagnosis is difficult in the cases of TB wrist. Radiological findings should be corroborated with histopathological and microbiological diagnoses. Culture positivity rate is 80% for synovial fluid and 90% for synovial tissue.¹⁰ Biopsy is of particular importance in determining organism sensitivities in the areas in which drug resistance is common.¹¹ Polymerase chain reaction (PCR) for *M. tuberculosis* may increase the diagnostic rate.¹²

Treatment is mainly conservative. Anti-tubercular chemotherapy and splintage are usually the treatments of choice, but helpful when diagnosis is established early. Surgery may be indicated rarely. In the case of extensive destruction, surgical debridement including synovectomy and excision of primary focus are required. When patients present late with arthritis and deformity, wrist arthrodesis is required.⁷

Conflicts of interest

All authors have none to declare.

REFERENCES

1. Bush DC, Schneider LH. Tuberculosis of the hand and wrist. *J Hand Surg [Am]*. 1984;9A:391–398.
2. Tsai MS, Liu JW, Chen WS, DeVilla VH. Tuberculous wrist in the era of effective chemotherapy: an eleven-year experience. *Int J Tuberc Lung Dis*. 2003;7(7):690–694.
3. Tuli SM. *Tuberculosis of the Skeletal System*. 3rd ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2004:153–158.
4. Davidson PT, Horowitz I. Skeletal tuberculosis: a review with patient presentations and discussion. *Am J Med*. 1970;48:77–84.
5. Sankaran B. Tuberculosis of bones & joints-oration. *Ind J Tuberculosis*. 1993;40:109–118.
6. Jutte PC, van Loenhout-Rooyackers JH, Borgdorff MW, van Horn JR. Increase of bone and joint tuberculosis in The Netherlands. *J Bone Joint Surgery Br*. 2004;86:901–904.
7. Yao DC, Sartoris DJ. Musculoskeletal tuberculosis. *Radiol Clin North Am*. 1995;33:679–686.
8. Van Dyck P, Vanhoenacker FM, Van den Brande P, et al. Imaging of pulmonary tuberculosis. *Eur Radiol*. 2003;13(8):1771–1785.
9. De Backer AI, Vanhoenacker FM, Van den Brande P. Computed tomography, magnetic resonance imaging and PET in tuberculosis. In: Schaaf HS, Zumla A, eds. *Tuberculosis: A Comprehensive Clinical Reference*. Philadelphia: Saunders Elsevier; 2009:296–314.
10. Resnick D, Niwayama G. Osteomyelitis, septic arthritis and soft tissue infection: organisms. In: Resnick D, Niwayama G, eds. *Diagnosis of Bone and Joint Disorders*. Philadelphia: WB Saunders Company; 1995:2448–2558.
11. Watts H, Lifso RM. Current concepts review, tuberculosis of bones and joints. *J Bone Joint Surg Am*. 1996;78-A:288–298.
12. Li Q, Pan YX, Zhang CY. Specific detection for *Mycobacterium tuberculosis* in clinical material by PCR and southern blot. *Chung-Hua Chieh Ho Ho Hu Hsi Tsa Chih Chin J Tuberc Respir Dis*. 1994;17:238–240.