Primary tuberculotic osteomyelitis (TBOM) of the rib is rare. We report our experience of seven patients presenting with primary TBOM of rib. Over a period of eight years, otherwise healthy patients presenting with discharging sinuses on the chest wall were managed. Patients included four males and three females, aged between 4 and 18 years. Following history and examination, radiological and histological investigations were performed. After confirming osteomyelitis of rib, excision of the sinus tract along with subperiosteal resection of the affected part of the rib was done. Tuberculosis was confirmed on histological examination of the resected specimens. Oral anti-tubercular therapy (ATT) was given for a period of one year. Patients were followed for 5–8 years. The lesion was demonstrable in all the patients on plain X-ray. Histological confirmation of tuberculosis (TB) before surgery could be done in one patient. The antero-lateral part of the rib was most commonly affected. Mean operative time was 35 min. Mean postoperative hospital stay was four days. There were no wound complications. No recurrence or relapse was seen. Resection of affected part of the rib with the sinus tract followed by oral ATT for one year is an effective modality of treatment for TBOM of rib.

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1. Introduction

Skeletal tuberculosis (TB) is not a new disease. The archeological analysis of the human skeletons from the medieval period confirmed the presence of this infection in the bones [1]. The diagnosis of skeletal TB in these medieval individuals is based upon the estimation of biomarkers of TB viz. Mycobacterium Tuberculosis complex mycolic acids and DNA target (IS6110) [2]. Parietal chest wall TB is rare and TB of the rib even rarer [3, 4]. It has an insidious onset and <50% of patients have active pulmonary disease [5]. We reviewed the recent literature and present the findings along with the observations of our seven cases. This extra pulmonary form of TB may tax the abilities of even an astute clinician. With the resurgence of TB all over the world, this article can assist in the management of rib TB.

2. Material and methods

Patients presenting with a discharging sinus over the chest wall in the outpatient clinic of UCMS and GTB Hospital, a tertiary care teaching hospital of Delhi, India, over a period of eight years were managed. There was a total of seven patients who included four males and three females. The patients were otherwise healthy, presenting only with the discharging sinus on the chest wall for a period of 3–10 months (Table 1). There was no family history or previous exposure to TB infection. All patients were immunized against TB (BCG vaccination at birth). There was no history of drug intake in past. All patients were subjected to plain X-ray of chest PA view and osteomyelitis of rib was confirmed. None of the patients had a history of lung parenchymal disease or pleural effusion. FNAC/curettage were performed from the sinus. All patients underwent sub-periosteal resection of the part of affected rib through a long thoracotomy incision and the sinus site was elliptically circumvented to be included in the excised specimen (Fig. 1). The resection was performed through the body of the rib that was grossly normal and which showed a healthy medulla at the resection site. Curettage of the adjoining abscess cavity and extraction of the infected granulation tissue was done, as and when necessary. The underlying pleura was found to be healthy and was not opened. The cavity was thoroughly cleaned and the wounds were closed primarily over a suction drain. The drains were removed once the amount of drainage was reduced to <50 ml (mean 48 h). The sutures were removed on the 10th postoperative day. Resected specimens were subjected to histopathological examination and primary tuberculotic osteomyelitis (TBOM) was confirmed by the presence of caseating granulomas, Langhans’ giant cells and acid fast bacilli. Oral ATT was given to all patients for a period of one year (Rifampicin – in the doses of 10–15 mg/kg, INH – 5 mg/kg, Ethambutol – 15 mg/kg and Pyrazinamide – 25 mg/kg of body weight for initial two months followed by a ten-month therapy of two drugs – Rifampicin and INH in the same doses). Patients were followed up in the out-
Table 1
Patient demography, presentation and findings

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>Presentation</th>
<th>Duration</th>
<th>Diagnostic findings</th>
<th>Operative findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>F</td>
<td>Discharging sinus on chest wall</td>
<td>8 months</td>
<td>Osteomyelitis on plain X-ray</td>
<td>Rib erosion</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>M</td>
<td>Discharging sinus on chest wall</td>
<td>10 months</td>
<td>Osteomyelitis on plain X-ray</td>
<td>Rib erosion</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>M</td>
<td>Discharging sinus following incision and drainage of cold abscess</td>
<td>5 months</td>
<td>Tubercular abscess proved on FNAC</td>
<td>Irregular surface of rib with granulation tissue adhered to periosteum</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>M</td>
<td>Discharging sinus on chest wall</td>
<td>3 months</td>
<td>Osteomyelitis on plain X-ray</td>
<td>Rib erosion</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>F</td>
<td>Discharging sinus on chest wall</td>
<td>7 months</td>
<td>Osteomyelitis on plain X-ray</td>
<td>Rib erosion</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>F</td>
<td>Discharging sinus on chest wall</td>
<td>9 months</td>
<td>Osteomyelitis on plain X-ray</td>
<td>Rib erosion</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>M</td>
<td>Discharging sinus on chest wall</td>
<td>6 months</td>
<td>Periosteal reaction over the rib</td>
<td>Irregular border of the rib</td>
</tr>
</tbody>
</table>

Fig. 1. Excised specimen of a tubercular rib showing granulation tissue on the inner surface (1) and sinus opening on the outer surface (2).

Fig. 2. Osteomyelitic (lytic) lesion of rib as seen in plain chest X-ray (arrow).

patient clinic initially every three months for up to one year and then six monthly for a period of 5–8 years.

3. Results

The total number of admissions to the Guru Teg Bahadur hospital, a tertiary care – 1150-bedded teaching hospital in Delhi, India, during the eight-year period (1994–2001) amounted to 367,468. Of these 49,646 were admitted to the department of surgery (13.5%). The total number of admissions in the hospital with a confirmed diagnosis of TB was 6579 (1.8%); out of which 7 (0.11% of patients admitted with tuberculosis) had rib TB and were admitted in the surgery department. The hospital records of the last eight years showed a rising incidence of TB after the year 1997.

The seven patients with rib TB included four males and three females with their age ranging from four to eighteen years. All of them presented with the sole complaint of discharging sinus on the chest wall. Rib OM was evident on plain radiography as rib destruction in five patients (Fig. 2), periosteal reaction in one and as irregular border of the rib in another. Preoperatively TB could be confirmed histologically in only one patient. The mean operative time was 35 min. The operative findings confirmed erosion of the rib in five patients with radiological evidence of rib destruction, while the other two patients had irregularity of the rib contour with out-sprouting granulation tissue. The antero-lateral part of the rib was the most commonly affected site with involvement of the adjoining chondral zone in one of the patients. All specimens were histologically confirmed to have TB. There were no wound complications in the form of wound infection, delayed healing, hypertrophic scar or scar tenderness. No recurrence or relapse of the disease was noted following five to eight years of follow-up.

4. Discussion

TB has been a major cause of morbidity and mortality, especially in the developing parts of the world. After an initial dramatic response to ATT, the disease has started to resurge. The problem is still more alarming due to the emergence of multi-drug resistant cases and association of TB with AIDS [4]. Tubercular parietal chest wall abscess is a rare form of extrapulmonary TB [4]. In a study, there were an estimated 1–5% of all cases of bone and joint TB, which themselves accounted for 15% of all extrapulmonary localizations [3]. The incidence of 1.8% of all the admissions in our hospital affected by TB over the eight-year period emphasizes that a good proportion of the hospital admissions in our set-up constituted patients with proven TB. The incidence of 0.11% of rib TB appears too minuscule; however, this may not reflect the true incidence of rib TB as many of the patients with parietal chest wall TB are treated as outpatients.

As there was no evidence of TB elsewhere in our patients, we assumed that all of them had primary TBOM of the rib.
Rib OM is a rare infection of various etiologies – chronic non-specific OM, rib affection following empyema necessitatis, eosi
nophilic granuloma, syphilis and tumors (benign and malignant) are other causes besides TB. The benign tumors involving rib are chondroma (commonest), osteochondroma, fibrous dysplasia, and lipid granuloma while the malignant lesions are chondrosarcoma, myeloma multiplex and secondary deposits from the lung and breast. All these present as expansion of the rib at the affected site, lytic lesion or pathological fractures.

The majority of cases occur in children and young adults and its diagnosis is usually delayed for several weeks [6] as in our cases. Out of 106 cases of rib OM reviewed in one study, mycobacterial and bacterial infections accounted for 47 cases each [6]. The rib affection on the basis of histopathological studies is mostly due to a lymph-borne dissemination of tubercle bacilli. The history of tubercular infection in the past is helpful to suggest the possibility of TBOM, though it is not always present [7], as was evident in our patients also. Prolonged period of the presence of a swelling, cold abscess formation and non-healing sinus are the common presentations. Routine X-ray of the chest sometimes fails to detect early skeletal disease in children and the diagnosis is often delayed until bony destruction occurs along with overlying soft tissue changes. Radiologically, presence of an osteolytic lesion, widening of the rib with periosteal reaction, and presence of sequestrum indicate TB [8]. Faure et al. [7] noted that there was mostly a solitary rib involvement and the most frequent location is the rib shaft (60%), as was evident in our cases also. In another study, posterior arc and the costovertebral joint are reported as common sites of involvement followed by the anterior arc of the rib [8]. TB should have a high degree of suspicion in multiple destructive bone lesions, especially in patients from regions where TB is endemic [9]. In the endemic areas, many a times ATT is initiated on presumption [7] and the nature of response then becomes the only clue to the etiology of the disease. In addition to history and a good clinical examination, use of CT-scan, percutaneous needle biopsy, bone scintigram and polymerase chain reaction (PCR) increases the diagnostic yield [10, 11]. A biopsy, whether open or CT guided, remains the gold standard for the diagnosis [12]. In our cases also, though the diagnosis looked easy as the lesion lay in front of us, yet the tuberculous etiology eluded us despite FNAC/curettage except in one case where the patient had presented with a cold abscess. Chang et al. [10] could confirm TB in all of their twelve cases only following rib resection, and opined that surgery is a final diagnostic and therapeutic option in parietal chest wall TB. Faure et al. [7] also could not diagnose TB prior to surgery in many of their cases and opined FNAC as an inaccurate diagnostic tool. TB of the rib is one such disease where preoperative tissue diagnosis may be difficult and it would be wise to surgically resect the diseased area, confirm the diagnosis, and then initiate ATT which would invariably lead to complete cure – as seen in our cases. Since ATT alone often does not give the desired results, parietal chest wall TB requires surgical management. On the other hand, a study of four cases states that surgery is rarely indicated and ATT is all that is necessary once the diagnosis is established by histology [3]. In another large series of 712 cases, spanning 11 years, surgical treatment was advocated for parietal chest wall TB [13]. It is also suggested that surgical debridement is necessary in treating TB of ribs followed by ATT for six months [14]. However, we feel that treatment for bone TB requires a minimum period of one year of ATT, as is also stated in other Indian studies [15]. We also support surgical excision of the affected rib, as it ensures the removal of the diseased area, enables histopathological confirmation, enhances post-surgical neovascularization in the healing tissues which aids in better distribution of the anti-tubercular drugs, thereby increasing the efficacy and ultimate response to therapy. We are satisfied with the methodology of treatment by surgical resection followed by ATT for one year and advocate this as the method of treatment of TBOM of the rib.

References


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