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The role of surgery in chest wall tuberculosis

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Abstract

Chest wall tuberculosis is a rare entity and its clinical presentation may resemble a pyogenic abscess or chest wall tumor. The role of surgery in the diagnosis and treatment of chest wall tuberculosis is still controversial. During a 6-year period (1997–2002), six cases with cold abscesses of chest wall were managed in our clinic. Clinical presentation, diagnostic workup, treatment strategies, and results of medical and surgical treatment were retrospectively reviewed. There were four male and two female patients. All but one had a fluctuating and abscess-like chest wall mass. Pleura and mediastinal or chest wall lymph nodes were also involved in three patients. Before the debridement and abscess drainage, the diagnosis was not confirmed in any of our patients except one. All received a four-drug antituberculous regimen for 6–12 months postoperatively and improved clinically and radiologically. Surgical intervention and histological examination are usually necessary for the treatment and to confirm the diagnosis in chest wall tuberculosis. Antituberculous medical treatment and adjunctive surgery are quite effective in this process.

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Keywords: Chest wall; Tuberculosis; Cold abscess

1. Introduction

Although the incidence of tuberculosis has shown a decline with effective antituberculous drugs, it is still high in developing countries. Whereas the lungs are the main target in primary infection, extrapulmonary tuberculosis has been reported to constitute 15–20% of all tuberculosis cases [1]. Bone and joint involvements are rare, accounting for only 2% of all cases [1]. In Turkey, the rate of extrapulmonary tuberculosis is 22.7% and around 10% of these cases are pure skeletal system tuberculosis [2]. These rates are similar to rates in the United States [1]. In a series of skeletal tuberculosis, the spine has been involved in 50% of patients; pelvis in 12%; hip and femur in 10%; the knee and tibia in 10%, and the ribs in 7% [3].

Definitions such as chest wall tuberculosis, rib tuberculosis, and cold abscess of the chest wall are all used for the same pathological entity. Rib destruction may be present or not. Tuberculosis is second only to metastatic malignancies as a cause of destructive lesions of the ribs [4].

The diagnosis of rib tuberculosis with cold abscess of the chest wall may be difficult. Although antituberculous drugs and some surgical procedures have been used for the treatment of chest wall tuberculosis, optimal therapeutic management is still controversial.

The purpose of this study was to report our experience in six patients with chest wall tuberculosis and to discuss the clinical features, diagnostic workup, and the role of surgery in the management of disease.

2. Materials and methods

We retrospectively reviewed the charts of six patients with chest wall tuberculosis treated between 1997 and 2002. The evaluation included: symptoms and signs of the patients, location, size and duration of the chest wall mass, results of the aspiration of the chest wall abscess, chest X-rays and computed tomography (CT) of the patients. Chest wall mass was initially aspirated. Microbiological and cytological examination and acid-fast bacilli (AFB) investigation were performed from the aspirated fluid. Tissue biopsy was not performed at the initial aspiration. If this aspiration was not diagnostic, we operated

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on the patient. The surgical procedure performed was as follows: drainage of the fluid, excision of the abscess wall, abnormal looking surrounding tissues, tract of the fistula if present and involved rib or ribs or sequestrum.

Diagnosis was established if one or any combination of the following conditions was present: caseous granulomatous necrosis on surgical debridement or biopsy specimens, identification of tuberculosis bacilli by Erlich–Ziehl–Neelsen staining, or growth of bacilli on Lowenstein–Jensen culture media.

3. Results

Past history of tuberculosis was not present in any of our patients. However, one patient had a history of cervical draining sinus, which was improved with a scarring tissue. All were symptomatic (Table 1). The presenting symptom was a chest wall mass in all cases. The chest wall mass was soft and fluctuating on physical examination in five patients but firm in one.

Results of the diagnostic workup are shown in Table 2. Pulmonary parenchyma was normal on chest X-ray in all patients. Computed tomography of the patients was normal in three patients from the standpoint of pulmonary parenchyma and mediastinum. But in the other three patients, mediastinal lymph node enlargement with a size of 3 cm, rib destruction and pleural nodule were present, one each. In five patients, a well-defined juxtacostal soft tissue mass with central attenuation and peripheral rim enhancement (cold abscess) was present on computed tomography (Fig. 1). All patients underwent surgery. Surgical procedures performed were: postsurgical drainage time, postsurgical fistula formation, and outcome data of the patients are outlined in Table 3.

We put a small-sized catheter in the abscess cavity of the patients after debridement for drainage. We meanly took the drains out on fifth day (ranging from 3 to 7 days). Postsurgical fistula and sinus formation was observed in one patient in whom antituberculous treatment was not administered immediately after surgery. In 4 weeks, it was healed following tuberculosis medication, which was started after we had learned the pathological diagnosis (Table 3).

All patients received antituberculous therapy with initial four-drug regimen for 2 months followed with two drugs. Antituberculous drugs were started immediately after surgical procedure if the operative findings were consistent with tuberculosis. Antituberculous treatment consisted of isoniazid, rifampicine, pyrazinamide, and streptomycine in two patients and ethambutol instead of streptomycine in four patients. Medical treatment was given for 9 months in three patients, 6 months in two patients and 12 months in one patient.

Recurrence of cold abscess and fistula formation were not detected in any of the patients after a follow-up of 1 year.

4. Discussion

Chest wall tuberculosis is rare and still a diagnostic and therapeutic challenge. Cold abscess, meaning swelling without inflammation, is the characteristic presentation of the chest wall tuberculosis. Cold abscesses of chest wall are generally solitary, but multiple lesions are not surprising. In a series of 18 patients with chest wall cold abscess, 89% of them were solitary [5]. Five of our six patients had one abscess and the remainder had three abscesses.

Chest wall tuberculosis is usually presented with a painful mass. The palpable mass is frequently cystic or doughy or soft, and may fluctuate on physical examination [4], but it may sometimes be firm. Five of our patients had a soft abscess but the abscess of the last one was firm. Local tenderness or erythema may be present but this sign in fact is suggestive of superinfection of cold abscess. Two of our patients presented with erythema and local tenderness and purulent material was drained from the abscesses of these patients.

More than half of the lesions of rib tuberculosis show no evidence of rib destruction. Lee reported it as 69% [6]. In our series, computed tomography identified rib involvement in only one patient. The association of a soft tissue mass, osteolytic lesion, and sequestrum suggests chest wall tuberculosis on CT of thorax [7].

None of our patients had past history of tuberculosis or active tuberculosis. In Faure's report, 83% of the patients

Table 1
Clinical presentation of the patients with chest wall tuberculosis

Case no	Age (years)	Sex (M/F)	Local tenderness	Local pain	Local erythema	Diameter (cm)	Duration (months)	Location
1	27	M	+	+	+	4	1	Parasternal
2	45	F	–	+	–	10	2	Parasternal
3	40	M	+	+	+	8	1	Posterior
4	45	F	–	+	–	10	4	Posterior
5	20	M	+	+	–	5	6	Posterior
6	25	M	–	+	–	10	3	Posterior

Table 2
Diagnostic workup in patients with chest wall tuberculosis

Case no	Initial aspirate		Radiology		Debridement specimen		
	AFBn	Culture	Chest X-ray	CT	AFB	Culture	Histology
1	Neg	Neg	Nor	Nor	Neg	Neg	CGN
2	Neg	Neg	mLAP	mLAP	Neg	No test	CGN, LGC
3	No test	No test	Nor	Nor	Neg	Pos	CGN, LGC
4	Neg	Neg	Nor	Nor	Neg	Neg	CGN, LGC
5	Neg	Neg	Nor	Rib destruction	Neg	Neg	CGN
6	Pos	Neg	Pleural nodule	Pleural nodule	Neg	Neg	CGN

AFB, acid-fast bacilli; Neg, negative; Pos, positive; mLAP, mediastinal lymphadenopathy; Nor, normal; CT, computed tomography; CGN, caseous granulomatous necrosis; LGC, Langhan's giant cell.

had a positive history of tuberculosis and there had been active pulmonary tuberculosis in 33% of their patients [5]. In one of our patients, a pleural nodule was present and that nodule was positive for acid-fast bacilli by means of needle aspiration biopsy. If we consider the patient with the cervical draining sinus history as an old tuberculous lymphadenitis, the ratio of tuberculosis history in our series would be 34% (two of six patients). This association is variable in other series ranging from 17.4% to 62.5% [4,6,8].

Chest wall tuberculosis may occur by means of two mechanisms: (1) hematogenous dissemination associated with activation of a dormant tuberculous focus [5]; and (2) direct extension from a lymphadenitis of chest wall [9]. Burke [8] described the steps of the evolution of cold abscess of chest wall with the aid of his well-designed experimental and anatomical studies as follows: tuberculous bacilli invade the pleural space and set up a local or widespread pleuritis; some bacilli transported from the pleural space to the parasternal (or posterior intercostal) lymph nodes; these nodes become caseous and rupture; necrotic and caseous material burrows anteriorly (or posteriorly) to form a cold abscess in the chest wall. Location of abscess in our six patients were parasternal in two patients and posterior thoracic wall in four patients.



Fig. 1. Computed tomographic scan showing a large loculated cold abscess.

This result is in concert with Burke's statements and major localizations of chest wall lymph nodes.

Average size of cold abscesses of chest wall was 7.8 cm (ranging from 4 to 10 cm) in largest diameter in our six patients. It was reported as 5.4 cm previously (ranging 3–10 cm) [10]. A draining sinus is said to occur with great frequency, but it was reported as 25% [4]. Only one of our patients had a draining sinus at presentation. Actually, that sinus developed after drainage of the chest wall abscess of our fifth patient in another hospital, 1 month before his admission to our clinic. The reason of developing a chronic sinus in chest wall tuberculosis might be the delay in starting antituberculous treatment.

The diagnosis of chest wall tuberculosis has to be based on bacteriologic or histologic confirmation as it is true in all tuberculosis cases. An initial needle aspiration of the mass is necessary to first establish a diagnosis and second to exclude the other diagnoses such as malignancy and other infectious diseases. This procedure can show tubercloid lesions or acid-fast bacilli in direct smear or culture [11,12]. But needle aspiration cytology and biopsy are not always reliable [5]. In our series, a diagnosis was made by an initial aspiration in only one patient (17%).

The necessity of a surgical approach to chest wall tuberculosis is difficult to document. As it was seen in our six patients, surgical debridement and histopathological

Table 3
Treatment, complications, and outcome in patients with chest wall tuberculosis

Case no	Surgical procedure	Postsurgical drainage (day)	Postsurgical fistula	Outcome
1	WD	4	–	Good
2	WD	3	–	Good
3	WD	7	+	Good
4	WD	3	–	Good
5	WD + RR	6	–	Good
6	WD	7	–	Good

WD, wide debridement; RR, rib resection; –, negative; +, positive.

examination of the debrided specimen are at least needed to obtain a diagnosis. By means of histological examination of the debridement specimens, a diagnosis was obtained in all of our patients (Table 2).

The treatment of chest wall tuberculosis is controversial. There are some series [12,13] reporting good results with only antituberculous drugs. But in other series, abscesses were not cured and even recurred or progressed despite adequate medical treatment [10]. It also occurred in one of our patients. The abscess of that patient did not improve and progressed although he had been given antituberculous therapy for 3 months. He underwent an additional rib resection surgery at the third month of antituberculous therapy. Therefore, medical treatment alone is not sufficient and combination of wide debridement and an antituberculous drug regimen has been recommended [11]. In a large series of 89 patients with cold abscess of chest wall, excision of chest wall abscess was performed in 28% and excision of abscess and rib was performed in 72% of the patients. Recurrence of the disease was reported as 7.8%. They recommended preoperative and postoperative tuberculosis medication and complete resection of chest wall mass including any suspicious ribs [14]. Although WHO recommends a standard 6-month regimen, according to clinical presentation, bacillary load and response to an antibiotherapy, the treatment can be extended up to 9–12 months [15].

Faure advised on closing the skin primarily after excision of the abscess, not allowing the formation of a chronic draining sinus [5]. We put a small-sized catheter in for drainage and took it out after several days. We experienced sinus formation in only one patient. So a drain may be used after excision and debridement of the cold abscess of chest wall. The main reason of the success for not developing a draining sinus is to begin the antituberculosis medication very early. Because the control of the disease may only be possible with antituberculous drug therapy.

Chest wall tuberculosis manifests with cold abscess with or without rib involvement. Initial aspiration biopsy is usually necessary for two reasons: (1) to establish the diagnosis; and (2) to exclude malignancy and other diseases. If the initial aspiration fails, the diagnosis may be established with wide debridement and histological examination of the specimen and this procedure is probably of help in the treatment of chest wall tuberculosis. We believe that wide debridement or surgical excision adjunctive to the antituberculous chemotherapy is necessary for the effective treatment of chest wall tuberculosis.

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Appendix A. ICVTS on-line discussion

Author: *Dr. Erkan Yildirm*, Ankara Numune Education and Research Hospital, Thoracic Division, Talatpasa Bulv., Samanpazari, Ankara, 06418 Turkey

Date: 14-Nov-2003

Message: In the abstract, it was mentioned that all the patients received a four-drug antituberculous regimen for 6–12 months postoperatively and improved. I would like to direct attention to a single point about the 6th patient of whom initial aspirate was positive for AFB. Wouldn't it be wise to start antituberculous regimen as early as possible before surgery rather than postoperatively and deciding to go on performing surgery due to the result of the regimen?

Response

Author: *Prof. Ömer Soysal*, Assoc. Professor, University Hospital, Inonu University Medical Faculty, Department of Thoracic Surgery, T. Özal Medical Center, Inonu University, Malatya 44135, Turkey

Date: 03-Dec-2003

Message: The patient who was diagnosed before surgical debridement received antituberculous therapy. We believe that drainage and debridement procedures adjunct to antituberculous therapy is needed for the rapid

alleviation of symptoms and clinical recovery in the treatment of chest wall tuberculosis. Thus, we proceeded with surgery and did not wait for a period of time.

Author: *Dr. Ravindranath Tiruvoipati, Clinical Research Fellow, Glenfield Hospital, ECMO, 66 Glenfrith Close, Leicester LE3 9QQ, UK*

Date: 18-Nov-2003

Message: I have two questions regarding the article.

One is about the pre-operative anti-tubercular therapy(ATT). One of your patients was diagnosed pre-operatively as having tuberculosis of the chest wall. Did he receive anti-tubercular therapy preoperatively? If preoperative ATT is planned, do you wait for any particular period using anti- tubercular therapy before performing surgery, to reduce the post-operative complications like sinus formation?

The second question is about the duration of post operative ATT in patients with chest wall tuberculosis. Most patients with chest wall tuberculosis have local symptoms like pain and mass on the chest wall and this would be alleviated with surgery, as opposed to pulmonary tuberculosis. What criteria would you follow to decide on the duration of post operative ATT in these patients?

Response

Author: *Prof. Ömer Soysal, Assoc. Professor, University Hospital, Inonu University Medical Faculty, Department of Thoracic Surgery, T. Özal Medical Center, Inonu University, Malatya 44135, Turkey*

Date: 03-Dec-2003

Message: The first question was about timing of surgical debridement and antituberculosis treatment (ATT). We believe that drainage and debridement procedures adjunct to medical therapy is needed for rapid alleviation of symptoms and clinical recovery in patients with chest wall tuberculosis. The patient who was diagnosed before surgery received antituberculosis treatment. But, we proceeded with debridement without waiting for a period of time.

The second question was about the duration of postoperative antituberculosis therapy. Indeed ATT period for chest wall TB is not clear. It varies between 6-12 months. Nowadays the trend is towards 6 months. According to our clinical experience, the period for clinical recovery of patients and resolution of the lesions may have some differences. So, the ATT period for each patient may be adjusted individually.