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# Surgical Management of Tuberculosis Chest Wall Abscesses: Characteristics, Treatment Strategies, And Postoperative Outcomes in A Retrospective Analysis

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*(Received: 02 February 2023)*

*(Revised: 16 March)*

*(Accepted: 26 April)*

## KEYWORDS

Tuberculosis, Chest wall, rib resection, operative complications

## ABSTRACT:

Chest wall abscesses due to tuberculosis are very rare. The topic has received little attention and a limited number of patients have been enrolled. As the characteristics of this disease were identified through a review of patients treated for it through surgical management and suggestions were made for its treatment a treatment strategy, we determined which treatments were effective. We retrospectively reviewed A total of 136 tuberculous abscesses were treated surgically. There were 66 men and 70 women with tuberculosis history, 62 of who were current patients. Coughing, Symptoms include chest pain, pus discharge, and a palpable mass were the most common complaints. 24 patients were preoperatively diagnosed with bacteria. There were 102 cases of abscess excision, 26 cases of partial rib resection with abscess excision, and 2 cases of partial sternum and clavicle were removed to treat an abscess. 2 patients underwent a secondary operation after suffering postoperative wound infection in 32 patients. There were 10 cases of recurrence. All 10 patients underwent reoperations that involved the removal of an abscess and partial resection of ribs. Postoperative complications can be decreased by removing the abscess completely and obliterating the space surrounding it. Recurrence of tuberculosis may be reduced by antituberculosis medication

## INTRODUCTION

As the Republic of economic and environmental conditions improves, there is a decrease in tuberculosis incidence. There is a low incidence of skeletal tuberculosis, and chest wall tuberculosis is extremely rare [1]. An estimated 15% to 20% of tuberculosis cases occur extrathoracically, whereas fewer than 2% affect bones and joints. It is reported that 10 percent of patients with skeletal tuberculosis have chest wall tuberculosis. Symptoms of a tuberculosis abscess of the chest wall are non-existent, and the condition is challenging to diagnose, and it is frequently misdiagnosed as another benign or malignant condition [2]. A combination of medical and surgical management is very important for treating this

type of abscess, as it frequently does not respond to anti-tuberculosis medications. In terms of clinical presentation and optimal treatment strategy for tuberculous abscesses of the chest wall, few publications have been published, and most have enrolled a small number of patients. In this study, we assessed the characteristics of this disease and determined whether surgery can be used to treat chest wall abscesses caused by tuberculosis [3, 4]. Analyzing 136 patients who received surgical treatment for tuberculous abscess of the chest wall performed and we evaluated their characteristics, surgical methods, results, operative complications, and postoperative care.



**METHODS AND MATERIALS**

The hospital treated 136 patients with tuberculous abscesses of the chest wall. Retrospective analyses of these cases were conducted regarding they are clinically characterized, diagnoses are made, surgery is performed, and postoperative care is provided. It was diagnosed preoperatively after a history was taken, physical examinations, laboratory tests, and a computed tomography (CT) scan of the chest and the performance of a fistulogram. In most cases, preoperative bacteriological studies were not Culture, polymerase chain reaction, or acid fast bacilli staining are used for measurement. The pathological examination of the operative specimens confirmed the diagnosis with caused by Langhan's giant cells, caseous granulomatous necrosis, or tuberculous bacilli. These patients were excluded due to the presence of emphysema necessitatis. In this study, Patient records were used to collect all data with approval from our institutional review board.

**RESULTS**

In the study, 66 men and 70 women were surveyed. The age range for the participants was between 18 and 70 years. The prevalence of tuberculosis was 46 percent among 62 patients. 20 patients had tuberculous pleurisy among 2 had renal tuberculosis, 2 had meningeal tuberculosis and 6 had spinal tuberculosis. Twenty years earlier, another institution had removed the cavity and part of the ribs from a patient with tuberculous abscesses of the chest wall. 2 patient complained of coughing with blood-tinged sputum along with pain or tenderness at the lesion site among 80 patients, a palpable mass among 48 patients, a pus discharge among 6 patients, and a palpable mass among 48 patients. For 80 (58.8%), the right chest wall was the lesion site, for 52 (38.3%), and for 4 (2.9%), the meridional wall was the lesion site. 8 patients had multiple lesions (double in 6 cases, triple in 2 patient) while 128 patients had single lesions.

**Table 1:** Characteristics of patients with chest wall tuberculous abscesses

Characteristics	Patient count
Amount of age	18–70
Male or female (sex)	66:70
Symptoms prior to surgery	
Tenderness and pain	80
Mass that can be felt	48
Discharge of pus	6
Sputum with blood stains	2
A site of lesion	
That's right	80 (58.8)
The left	52 (38.3)
The median	8 (2.9)
Lesion count	
An individual	128 (94.1)
There are multiple	8 (5.9)
Tuberculosis history	62 (45.6)
Medication before surgery	62 (45.6)



106 patients underwent preoperative chest CTs, and 8 underwent preoperative fistulograms patients were evaluated. 24 patients were treated for tuberculosis by preoperative bacteriological diagnosis using acid fast bacilli fluorescence staining, polymerase chain reaction, or pus culture. Preoperative antituberculous medication was administered to 62 patients over a period of 2 to 32 weeks. A tuberculous abscess was highly suspected in patients who had never been treated for tuberculosis with anti-tuberculous medications. Surgery was performed without medication if the cavity had ruptured or was about to rupture.

The cavity and surrounding tissues of the abscess are completely expelled was the main objective of the surgery. When any of the following occurred, Resections of cartilage or segmented ribs were performed.

1) Perichondrium or periosteum might be involved, such as through bony destruction or formation of periosteal granulation tissue. 2) A loculated pleural abscess formed from the abscess cavity in the chest wall. 3) Pleural space was obliterated by removing the abscess cavity.

**Table 2:** A technique for treating a tuberculous chest abscess

Surgical techniques	Patient count
AE	108 (79.4)
AE+RR	24 (17.6)
AE+RR+Resection of the lungs	2 (1.5)
AE+Resection of the sternum and clavicle	2 (1.5)

26 patients were able to provide 14 rib segments. The sternum and clavicle were partially resected in two patient. During every operation, the abscess was excised and the wound was heavily irrigated with a massive amount of fluid, and dead space was meticulously obliterated with a pedicled flap or adjacent muscle mobilization. A Penrose drain was placed in the chest wall or a chest tube drain was placed in the pleural cavity in each case for primary wound closure. 108 (79%) of the cases were excisions of the abscesses cavity, 24 (17.6%) were excisions of the abscess cavity and partial rib resections, 2 (1.5%), wedge resection of the lung parenchyma with a concomitant abscess cavity excision and rib resection, and 2 (1.5%). It was not necessary to reconstruct the musculoskeletal system (Table 2).

A mortality rate of 0% was observed during the operation. It was noted that 32 patients (12.24%) had postoperative

wound infections, and these wounds were treated conservatively with conservative dressings and delayed wound closures. A pelvic fistulectomy and partial rib excision were performed in 2 patients after 3 months of conservative management. There were 8 patients who developed respiratory complications like pneumonia or atelectasis.

All cases were diagnosed with the disease according to the pathological examination. An epithelial-like histiocyte was seen on this specimen, along with granulomatous necrosis in caseous granulomas.

A 6 to 19month course of anti-tuberculin medication was administered to all patients following surgery. There were triple therapy regimens (isoniazid, ri-Dong-Yoon Keum, et al. fampin, ethambutol) or quadruple therapy regimens (triple + pyrazinamide).

**Table 3.** Recurring conditions after surgery: aspects of the patients

The patient	(First OP)	The lesion	Duration of recurrence (months)	Preoperative	Medicines	A rib involves	Treatment	Result
1	AE	Single	32 <sup>th</sup>	No effect	Nil	Presence	AE+RR	Cure
2	AE	Single	5 <sup>th</sup>	No effect	Nil	Presence	AE+RR	Cure
3	AE	Single	36 <sup>th</sup>	No effect	Nil	Presence	AE+RR	Cure
4	AE	Single	18 <sup>th</sup>	7 <sup>th</sup> month	Nil	Nil	AE+RR	Cure
5	AE+RR	Multiple	5 <sup>th</sup>	5 <sup>th</sup> month	Nil	Nil	AE+RR	Cure

Within 6 months and 38 months postoperatively, 10 patients (7.35%) developed a recurrence of the disease, resulting in a second operation on all 10. A second operation was performed on all the recurred patients to remove the abscess cavity and partially resect the rib. In eight cases, recurrence occurred only one site, while in 2 case, recurrence occurred twice. A 2 patient had concomitant rib resection at the same time as the abscess cavity excision in 8 cases. All 6 of the patients had an abscess return to a different location after the first operation because of postoperative wound complications. The only abscess recurred at a previous site and a new 2 in the patient with multiple lesions (Table 3).

## DISCUSSION

Less than 10% of skeletal tuberculosis arises from tuberculous abscesses of the chest wall. An enlarging mass, sometimes accompanied by pain, is the hallmark of this disease. It is possible to destroy bone or cartilage underneath the abscess by creating a fistulous tract into the pleural cavity [5]. An abscess of the chest wall caused by tuberculosis is caused by three mechanisms: 1) direct extension from tuberculosis of the pleura or lung, 2) This condition is a direct result of chest wall lymphadenitis and 3). Dormant tuberculosis causes hematogenous dissemination [6]. As a result of mycobacterium tuberculosis invasion into the pleural space, pleuritis can occur in the lungs or visceral pleura.

When the lymphatics develop in the pleural space, they connect to those in the chest wall, resulting in a fistulous

tract or caseous necrosis. Thirdly, tuberculous pleurisy or empyema can be aspirated or drained iatrogenically to spread to the chest wall. 44 (32.4%) of the patients in our study had tuberculosis history or are currently infected. It is generally impossible to pinpoint the exact mechanism behind tuberculous abscesses using retrospective studies based on medical records.

Some patients have multiple lesions in more than one site, but these lesions are usually solitary. Among 18 patients, 16 had single lesions, according to study [6]. A single location was present in 120 out of 128 patients in our study.

Postoperative pathologic examination is often used to diagnose tuberculous abscesses on the chest wall. In the event of an abscess, acid-fast bacteria can be detected preoperatively, polymerase chain reaction can be performed, or pus can be cultured in order to confirm the diagnosis. In order to confirm tuberculous disease or to exclude other inflammatory diseases, many authors recommend needle aspiration or incisional biopsy [2, 4-6]. Only 36.3% of needle aspirations were diagnostic, according to a study [6]. The study included 13 patients, 9 (62.29%) of whom tested positive for acid-fast bacteria, 4 (28.57%) tested positive for polymerase chain reaction, and 6 (42.86%) tested positive for culture. In spite of this, some authors recommend surgical biopsy over needle aspiration for tuberculosis diagnosis. Only three out of 80 patients received a preoperative bacteriologic diagnosis, and all 80 cases were confirmed to have tuberculous cold abscesses by postoperative pathology. Consequently, they recommended



that a preoperative bacteriological examination be avoided for tuberculosis in geographic areas with high tuberculosis prevalence. An abscess on the chest wall, a history of tuberculosis in the lung, and typical CT findings can be used to diagnose the disease clinically. According to findings [7,8], when CT findings show poorly demarcated mass lesions and no history of tuberculosis, needle aspiration or biopsy should be performed preoperatively. Preoperatively, only 12 patients were tested for acid-fast bacilli, polymerase chain reaction, or culture, and clinical information and CT findings were used to diagnose the other cases, which were then confirmed by postoperative pathology.

To assess the condition of ribs, sternum, cartilage, pleural space, and abscess cavities, it is recommended that all patients undergo chest CT scans. Additionally, the CT can check for concomitant diseases, as well as identify any inflammatory or tumor lesions in the lung parenchyma and thoracic cavity [9]. An extrapleural soft tissue mass lesion on chest CT can easily diagnose tuberculous abscess of chest wall in endemic geographic areas, according to Brown [10]. As classified by a study [10] as a chest wall abscess, there were three types of CT findings: 1) a chest wall abscess, 2) a chest wall abscess that extends into pleural space and under the ribs, and 3) a chest wall abscess that extends into the pleural space and involves most of the chest wall. According to this classification, rib involvement is not ruled out simply because the abscess is superficial. Radiologic reports of chest CTs weren't sufficient to identify the disease type in our study because chest CT films before the mid-1990s weren't available due to storage problems. Once CT scans became popular in evaluating these patients, fistulograms with contrast media were no longer taken.

There is a great deal of importance to antituberculosis medication. Many studies have reported frequent recurrence after treating tuberculosis with only medication [5,6], as well as successful treatment with antituberculosis chemotherapy alone [2,3,11]. A combination of surgical and medical treatment should be used to treat Tuberculous Abscess of the Chest Wall to reduce its recurrence rate. A tuberculous infection that persists after 1 to 3 months of medication, or worsens, should be treated with chemotherapy, [6] were maintain. Despite medication treatment periods ranging from 2 to 32 weeks, no patient received only anti-tuberculosis medication before surgery in our study. A total of 10 patients

had recurrences of the disease, 4 of whom had preoperative medications and 6 did not have them.

It is controversial to use surgical methods for treating cancer. The best treatment for this disease, according to findings [12], is antibiotics and drainage, followed by debridement and excision for the most severe cases. It is recommended that the abscess be excised and the wounds are closed initially, but the extent of the resection is unknown. To avoid resecting the chest wall and to prevent complications and recurrences, the entire abscess has to be removed, including the wall, fistulous tract, and enlarged lymph node. An underlying pleural abscess or bony destruction on the sternum may require partial removal of the rib, or when a fistulous tract overlaps the sternum, or if periosteal granulation tissue is present on the sternum. Pleural peels that have been infected should be curettaged. It is essential to thoroughly obliterate the space after extensive debridement of the lesion. An infection may develop after surgery or chronic sinusitis may result if dead space remains. As a result of inadequate dead space control, our study found that postoperative wound infections are prevalent (11.24%). Several patients underwent conservative management for three months before having surgery, which included 2 fistulectomy and partial rib resection. It is possible to decrease the incidence of wound infection by mobilizing the muscles, or by using a flap and a small indwelling catheter. Other patients with postoperative wound infections recurred at new sites, among 32 patients with postoperative wound infections.

There is a statistically significant difference between the recurrence rates for patients with debridement and drainage, and those with complete resection, as determined [7]. As per study [13] abscess recurrence rates were 16% in patients who underwent abscess excisions, but only 1.6% in those who underwent rib resections. The outcome is a decreased risk of recurrence if a wide and complete resection is performed.

To achieve an acceptable cure rate, postoperative medical treatment is mandatory. Antituberculosis therapy should last at least six to nine months if based on isoniazid and rifampin [14, 15]. A minimum of 12 months of medication is recommended [13], especially in areas that are endemic to the disease.



## CONCLUSION

For tuberculosis abscess of the chest wall, we recommend preoperative medication and complete excision. An excision of the skeletal structure is recommended if periosteal involvement is suspected. Abscesses and dead spaces should be completely removed postoperatively to decrease morbidity. Recurrence rates may be reduced with proper postoperative medical care.

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