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Tuberculous Cold Parietal Abscesses in Immunocompetent Subjects

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Abstract **Original Research Article**

Tuberculosis of the chest wall is a rare extrapulmonary localization, affecting mostly the immunocompromised and rarely the immunocompetent. Clinically, it presents as an abscessed collection or a tissue mass making the diagnosis difficult, especially in the absence of other signs, hence the interest of a bacteriological and/or histological confirmation. Extensive surgery accompanied by anti-bacillary chemotherapy is the treatment of choice.

Keywords: Tuberculosis, chest wall, cold abscess, immunocompetent.

INTRODUCTION

Tuberculosis (TB) is a major public health problem, particularly in developing countries, despite the numerous strategies of tuberculosis control (TC). TB is mainly a lung disease, but extra-thoracic TB accounts for an increasing percentage, reaching 20-40% of all sites [1]. The most frequent extra-pulmonary involvement is in the lymph nodes and pleura, but rare and unusual localizations have been described, especially of the chest wall [2]. The aim of this work is to describe the epidemiological aspects, diagnostic, therapeutic and evolutionary particularities of tuberculous cold abscesses of the chest wall in immunocompetent patients.

METHODS

A retrospective descriptive study was conducted, in the Department of Respiratory Diseases of the CHU Ibn Rochd of Casablanca, collating 25 cases of cold abscesses of the chest wall, in immunocompetent patients, over a period of 20 years (2001-2021). Excluded from this study were patients with empyema of necessity, ossifluent abscesses, Pott's disease, and chest wall abscesses without histological or bacteriological confirmation.

RESULTS

The average age of our patients was 34 years with extremes ranging from 18 to 67 years and a male predominance (14 men and 11 women). A history of treated tuberculosis was noted in three (12%) cases; however, no cases of concomitant active tuberculosis or known tuberculosis infection were reported. Smoking was noted in eight (32%) cases, diabetes in three (12%) cases, hypertension in two (8%) cases, with no known drug addiction. The onset of symptoms was progressive in all cases. It was dominated by chest pain in one third of the cases and autopalpation of a thoracic parietal mass (Figure 1). The mass was bifocal in 12 (48%) cases, unique in 10 (40%) cases and multiple in three (12%) cases, not very sensitive in 18 (72%) cases and painful in seven (28%) cases. The size, consistency and location of the parietal mass are reported in Table 1. The adjacent integument was normal in 15 (60%) cases. Altered general condition was noted in all our patients, while fever was absent. The intradermal tuberculin test was positive in 23 (92%) cases. Chest radiography showed a parietal opacity in 10 (40%) cases, a parenchymal opacity in eight (32%) cases, a pleural opacity in six (24%) cases, excavated opacities in three (12%) cases, a pleural cap in two (8%) cases and it was normal in three (12%) cases. The thoracic ultrasound, performed in nine (36%) patients, showed a thick-walled liquid formation in seven (77.7%) cases and in two (22.3%) cases the echostructure was heterogeneous tissue simulating a tumoral origin. The thoracic CT scan performed in 12 (48%) patients showed, in addition to the parietal abscess (Figure 2), parenchymal involvement in eight (66.6%) cases, pleural involvement in five (41.6%) cases, costal lysis in five (20%) cases, sternal and vertebral lysis in two cases each (16.6%) and mediastinal adenopathies in three (25%) cases. Diagnostic confirmation was bacteriological and/or histological in all cases (Figure 3). Human immunodeficiency virus serology was negative in all patients. The parietal cold abscess was isolated in six (24%) cases and associated with other

tuberculous localizations in 19 (76%) cases (Figure 4). Anti-bacillary treatment was initiated according to the 2SRHZ/7RH regimen in 11 (44%) cases, the 2RHZE/4RH regimen in 10 (40%) cases, the 3RHZE/5RH regimen in two (8%) cases, and according to the 2 SRHZ / 1 RHZ / 5 RH and 2 RHZE / 7 RH regimens in one (4%) case each (Table 2). Surgical removal of the abscess was performed in 16 (64%) cases and evacuation of the parietal abscess in nine (36%) cases. The evolution under treatment was favorable in all cases with complete disappearance of the parietal abscesses and return to normal of the eroded bone structures.

Table 1: Clinical features of thoracic cold abscesses

	Number	Percentage (%)
Number		
Bifocal	**12**	**48**
Unique	**10**	**40**
Multiple	**3**	**12**
Site		
Antero-superior	**8**	**32**
Antero-basal	**5**	**20**
Postero-Superior	**3**	**12**
Postero-basal	**3**	**12**
Right axillary	**4**	**16**
Left axillary	**2**	**8**
Size (large diameter, in centimeters)		
3 – 10	**15**	**60**
11 – 20	**7**	**28**
21 – 27	**3**	**12**
Consistency		
Firm with central fluctuation	**13**	**52**
Totally fluctuating	**8**	**32**
Firm	**3**	**12**
Fistulization to the skin	**1**	**4**

Figure 1: Double thoracic cold abscess, left axillary and parasternal, in a 42-year-old patient

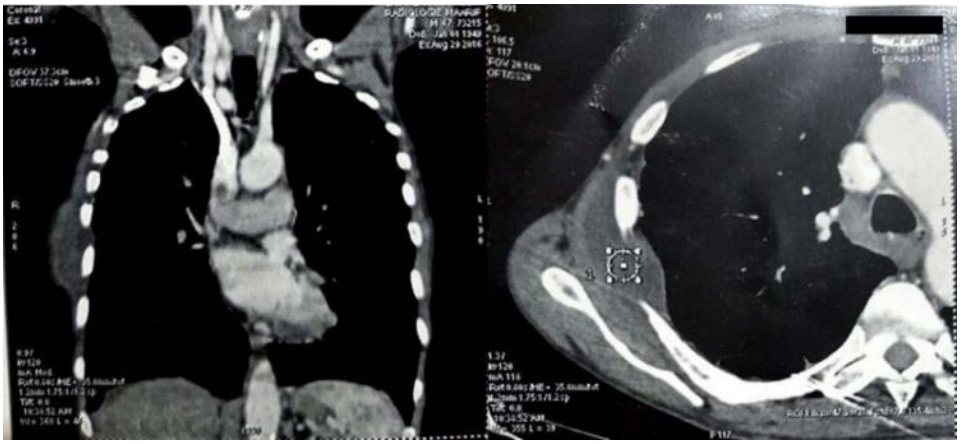

Figure 2: CT scans showing a right parietal abscess with bone lysis

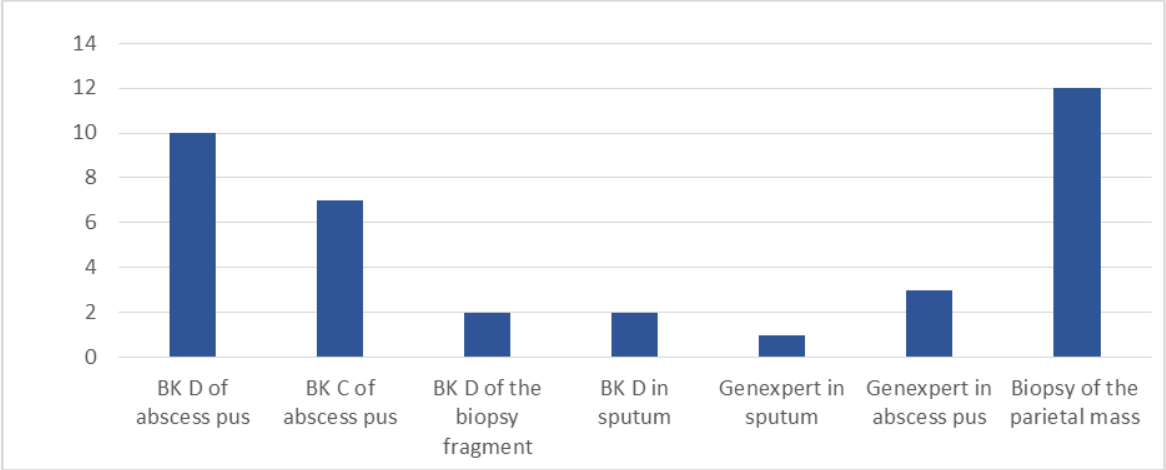

Figure 3: Bacteriological and/or histological diagnostic confirmation

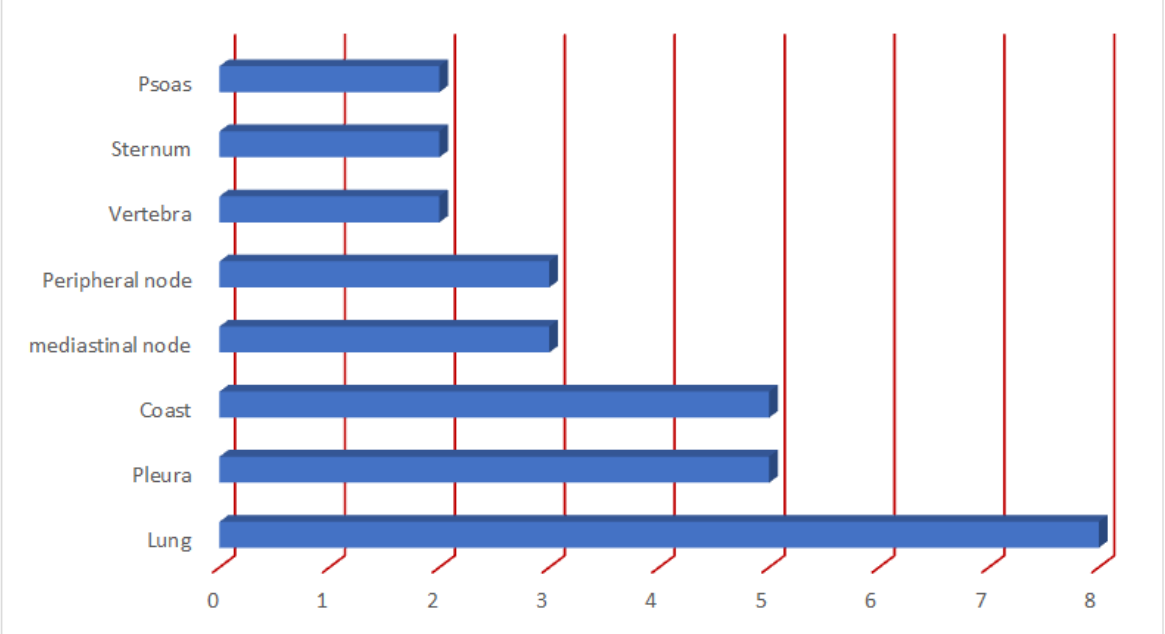

Figure 4: Distribution of patients according to associated tuberculosis locations

Table 2: Distribution of patients according to anti-bacillary treatment initiated

Therapeutic regime	Number	Percentage (%)
2 SRHZ / 7 RH	11	44
2 RHZE / 4 RH	10	40
3 RHZE / 5 RH	2	8
2 SRHZ / 1 RHZ / 5 RH	1	4
2 RHZE / 7 RH	1	4

DISCUSSION

Thoracic parietal tuberculous cold abscesses, represent a rare and unusual form of extra-pulmonary tuberculosis, often described in immunocompromised patients [3]. They constitute 1% of musculoskeletal localizations and 1-2% of all tuberculosis cases [4]. The pathogenesis of this entity is often explained by three mechanisms represented by a direct extension from an underlying pleuropulmonary focus or a lymph node involvement of the chest wall (internal mammary chain, intercostal nodes...), or by a hematogenous dissemination after reactivation of a dormant tuberculous focus. However, primary involvement has been reported, although it is exceptional [4, 5]. Cold abscesses mainly affect young adults and elderly subjects over 50 years of age with multiple comorbidities and rarely children [6, 7]. In our series, the average age of our patients was 34 years, which was similar to the studies of Joo Ket and Paik *et al*., which were respectively 34.3 and 33.3 years [8, 9]. They are observed in both sexes with a slight male predominance in the majority of series from countries with a high tuberculosis endemic, particularly in Africa [10], which is consistent with our series where the sex ratio (Male/Female) was 1.2. In the study by Keum *et al*., [11], 32.4% of the patients had a history of tuberculosis or active tuberculosis, compared to 61.8% in the study by Paik *et al*., [9] and only 12% of the cases in our study, which is not consistent with the results of other studies.

The clinical picture of parietal cold abscesses is usually insidious, which may be a source of diagnostic delay [12]. This is marked by the onset of chest pain, which is usually mild but may be missed completely. Other signs may be revealing, such as hemoptysis, dry cough, bronchial syndrome, dyspnea or pleural chest pain, probably related to associated parenchymal or pleural involvement. At the stage of discovery, the cold abscess presents as a palpable mass that is often cystic or pasty or soft, and may fluctuate on physical examination, as it may be firm. Tenderness or erythema may be present, but these signs are actually suggestive of superinfection of the cold abscess [13]. These abscesses are located electively in the latero-sternal region, on the axillary line or in the latero-vertebral groove [13]. The parasternal site is the most reported in the majority of studies as well as in our study in 13 (52%) cases (Table 1).

Standard radiography is not very helpful, especially in the early stages, but a deep subpleural collection should be sought. In the advanced stages, the images, in all respects compatible with a malignant tumor, may include osteolysis, a rupture or a periosteal reaction, a pathological fracture or a soft tissue opacity. It may also reveal pleural effusion, thickening or calcification. Similarly, parenchymal involvement such as infiltration, nodulo-excavated opacities or alveolar opacities may be noted and its apical location is an argument in favor of tuberculosis origin [7].

Thoracic ultrasonography is of great help in showing a hypoechoic aspect evoking the softened character of the parietal swelling and allowing to guide the puncture for a bacteriological study and the biopsy for a histological study [7]. Sometimes, it can show a mass of tissue echostructure, simulating a tumor origin [14]. This was the case in two of our nine patients in whom thoracic ultrasound was performed.

Thoracic CT is more efficient and sensitive than conventional radiography. First, it allows the exact location of the mass to be determined, thus eliminating certain differential diagnoses made at the clinical stage, such as an empyema of necessity by visualizing the pleural fistula at the wall [6], an involvement of the mammary gland, a pulmonary tumor with exo-thoracic invasion, or a muscular or osteo-cartilaginous involvement. In a second step, it allows to specify the texture of the parietal mass, being of heterogeneous density often with central hypodense zones of necrosis. Finally, in the third stage, it allows a lesion assessment to be made, specifying the extent of the mass, its relationships with the surrounding area and, above all, any other subclinical tissue, bone or parenchymal locations not detected on conventional radiography. In our series, the thoracic CT scan allowed the detection of costal lysis in five cases, sternal and vertebral lysis in two cases each, and even mediastinal adenopathies in three cases not visualized on the thoracic radiograph [3, 4].

Bone scintigraphy is more efficient in detecting clinically or even radiologically silent bone locations by showing foci of hyperfixation [6].

The diagnosis of parietal tuberculosis remains difficult in the absence of other pulmonary or extra-pulmonary localizations suggestive of tuberculosis, especially since other neoplastic or infectious conditions may have the same clinical and radiological appearance [12]. Therefore, bacteriological and/or histological diagnostic confirmation is required. The

bacteriological diagnosis is based on the presence of bacillus Koch (BK) on direct examination and culture on Lowenstein-Jensen medium. Currently, thanks to technological advances, especially in molecular biology, new means of bacteriological diagnosis have been made available to the clinician, notably the Xpert MTB/RIF (Genexpert), which detects the presence of Mycobacterium tuberculosis in less than 2 hours, along with the most frequent mutations (rifampicin resistance) [7, 15]. In our series, bacteriological confirmation was obtained by direct examination for BK in abscess pus in 10 cases and in sputum in two cases. Biopsy of the abscess or abscess shell also confirms the diagnosis by showing epithelial-gigantocellular granulomas with caseous necrosis [12]. In the absence of bacteriological confirmation and clinical, radiological and/or pathological signs suggestive of tuberculosis, other diagnostic methods can be used, such as the tuberculin intradermal reaction and IGRA (interferon gamma release assays). However, IGRA tests are more specific and sensitive than the tuberculin test for identifying latent tuberculosis in a population at risk of developing active tuberculosis, without differentiating between old and new infection [12]. In our series, the tuberculin TST performed in all our patients was positive in 23 cases.

Although there is no consensus on the therapeutic management, several authors advocate the combination of surgery with anti-tuberculosis treatment to ensure a definitive cure and reduce the risk of recurrence [16]. Surgical treatment consists of resecting the abscess in its entirety, removing the underlying necrotic tissue (ribs, cartilage, sternum), and of course removing any fistulous pathway [16]. In a series by Paik *et al*., [8] of 89 cases of cold chest wall abscess, surgical flattening of the abscess was performed in 28% of cases, associated with removal of the ribs in 72% of cases. Recurrence was reported in 7.8% of cases. The standard drug treatment for tuberculosis in pre- and postoperative care is a two-month course of quadruple therapy (isoniazid, rifampicin, ethambutol and pyrazinamide) followed by dual therapy (isoniazid and rifampicin), with a total treatment duration of six to nine months [3, 4]. All our patients had benefited from anti-bacillary treatment, associated with surgical removal of the abscess in 15 cases and evacuation punctures in nine cases with very satisfactory results and no case of relapse was recorded.

The prognosis is usually favorable, with early and adequate treatment. However, recurrence and complications are possible, in particular fistulization and locoregional and distant dissemination [3, 11].

Prevention is mainly based on BCG vaccination, improvement of the quality of life, screening and correct treatment of patients infected with koch's bacillus whether it is a patent or latent infection [17].

CONCLUSION

Chest wall tuberculosis is a very rare condition, which may simulate parietal tumors or pyogenes or actinomycosis infections, hence the interest of bacteriological and at best histological evidence. The search for extra-thoracic and thoracic tuberculosis locations is necessary in order to adapt the duration of treatment, which is essentially based on the combination of anti-bacillary chemotherapy and surgical excision, but the best therapeutic means remains prevention.

Conflicts of Interest: The authors declare no conflicts of interest.

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