

Pseudotumoral Pulmonary Tuberculosis: Case Report

Tuberculosis pseudotumoral pulmonar: reporte de caso

William Arciniegas Quiroga¹; Mateo Arciniegas Grisales²; Santiago Jaramillo Hurtado³

Received: 03/11/2024

Accepted: 05/11/2024

Correspondence

William Arciniegas Quiroga.
E-mail: warciniegas@utp.edu.co

ABSTRACT

Introduction: Tuberculosis continues to be a serious public health problem in the world. The presentation on radiological image is variable.

Objective: To present a case about the pseudotumoral form that has a infrequent presentation, but in the differential diagnosis it is very important to differentiate it from neoplastic disease.

Clinical case: A case of a 41-year-old woman, 2 months of posterior chest pain in the right hemithorax, chest X-ray: right mass. Computed tomography of the chest, mass located in the posterior basal right upper lobe, diameter of 3.2 × 2.2 centimeters. Biopsy was performed by video-assisted thoracoscopy, which confirmed pulmonary tuberculosis. Chest tomography follow-up with improvement of injury.

Conclusions: Tuberculosis has a lot of polymorphisms in radiological images. Tuberculosis should be considered in the differential diagnosis of lung mass. The diagnosis must include bacteriology and histopathology studies.

Key words: Tuberculosis pulmonary; Diagnosis; Radiography; Videothoracoscopy

RESUMEN

Introducción: La tuberculosis continúa siendo un problema grave para la salud pública en el mundo. La presentación en imagen radiológica es variable.

Objetivo: Dar a conocer un caso sobre la forma pseudotumoral que tiene una presentación poco frecuente, pero en el diagnóstico diferencial es muy importante diferenciarlo de enfermedad neoplásica.

Caso clínico: Se presenta el caso de una paciente de 41 años, mujer, dos meses de dolor torácico posterior en el hemitórax derecho, radiografía de tórax masa derecha. Tomografía computarizada de tórax masa ubicada lóbulo superior derecho posterior basal, diámetro de 3,2 × 2,2 centímetros. Se realizó una biopsia por videotoroscopia que confirmó tuberculosis pulmonar. Seguimiento con tomografía tórax con mejoría de lesión.

Conclusiones: La tuberculosis tiene mucho polimorfismo en imágenes radiológicas. En el diagnóstico diferencial de masa pulmonar se debe considerar la tuberculosis. El diagnóstico debe incluir estudio de bacteriología e histopatología.

Palabras clave: Tuberculosis pulmonar; Diagnóstico; Radiología; Videotoroscopia

¹ Pulmonologist, full professor of the Faculty of Medicine of the Universidad Tecnológica de Pereira. Colombia.

² General physician. Universidad CES, Medellín, Colombia.

³ General physician. Clínica del Rosario, Medellín, Colombia.

INTRODUCTION

Tuberculosis (TB) is the leading cause of death from infectious diseases worldwide. According to data from the World Health Organization, it is estimated that a quarter of the global population is infected with the tuberculosis bacillus, and between 8 and 10 million new cases of the disease occur annually. In 2021, there were 6 million cases in men, 3.4 million in women, 1.2 million in children under 15 years old, and 187,000 cases among people with HIV, with a mortality of 1.6 million people.¹

Primary TB occurs more frequently in immunocompromised individuals and children, who present with lymphadenopathy, pulmonary consolidation, and pleural effusion. Post-primary TB manifests with cavities, consolidation, and centrilobular nodules. The main diagnostic test is sputum analysis, using Ziehl-Neelsen (ZN) staining, mycobacterial culture, and nucleic acid amplification. Radiological imaging manifestations vary.²

The diagnosis of tuberculosis is based on seven criteria: clinical, radiological, epidemiological, bacteriological, tuberculin skin test (PPD, purified protein derivative), culture, and histopathology.

The classic radiological presentations of TB include: cavitary lesions, patchy cotton-wool-like alveolar parenchymal infiltrates, miliary infiltrates, nodular lesions, adenopathies, atelectasis, and nonspecific infiltrates.

Tuberculosis is often referred to as “the great imitator.” There are similarities between the presentation of lung cancer and tuberculosis when TB appears as a mass. They can have similar clinical symptoms. Differentiation through imaging depends on factors such as location, size, shape, growth rate, vascular density and blood supply, as well as the appearance of the borders, satellite lesions, calcifications, and spicules. TB often presents with satellite lesions in nearby areas due to bronchial spread, and calcifications are common.

The pseudotumoral presentation of tuberculosis is rare, and it should be suspected based on radiological imaging. Confirmation is not always bacteriological, and when bacteriological tests are negative, histopathological studies are required. These can be conducted through percutaneous needle biopsy of the thorax,³ thoracoscopic biopsy in peripheral lesions, bronchoscopy, and thoracotomy.

CASE REPORT

A case is presented of a 41-year-old woman, a housewife living in an urban area, with symptoms over the past two months of posterior chest pain in the right hemithorax, subscapular region. The pain is recurrent, progressively increasing in intensity until it becomes limiting, and lasting between 2 and 12 hours. It does not radiate and worsens with trunk movements. She doesn't have cough, expectoration, dyspnea, weight loss, fever, or night sweats. Her treatment includes tramadol, pregabalin, and lidocaine patches, which provide partial pain relief.

Personal history: hysterectomy, hypothyroidism, non-smoker, no prior contact with tuberculosis.

Physical examination: height 160 cm, weight 50 kg, heart rate 80, temperature 36.3 °C. She appears to be in pain. Cardiopulmonary auscultation was normal. There was tenderness on palpation of the chest wall in the right subscapular area.

The chest X-ray showed a non-calcified, homogeneous opacity with well-defined borders, measuring 3 x 2 cm in its largest dimensions, located in the posterior and basal segment of the right upper lobe. There were also 3 mm calcifications in the left apical region (Figure 1).

The chest CT scan revealed a 3.2 x 2.2 cm radiopaque lesion located in the posterior and basal segment of the right upper lobe. The lesion is homogeneous in appearance, bordering the chest wall, with neighboring 2 mm calcification. The lesion was not cavitated.

Cancer screening test was performed with fine-needle aspiration biopsy under CT guidance; no malignant cells observed.

A video-assisted thoracoscopic surgery (VATS) was performed, with a wedge resection of the pulmonary nodule, and a 3x2 cm sample was sent for analysis. No pleural lesions identified.

Histopathological report: the tissue sections showed numerous granulomas of epithelioid cells with central caseating necrosis and multinucleated Langhans giant cells. These granulomas were surrounded by chronic inflammatory infiltrate. The adjacent lung tissue exhibited interstitial fibrosis and moderate chronic inflammatory infiltrate. These findings are suggestive of tuberculosis. No malignancy was observed. Both the ZN staining and periodic acid-Schiff (PAS) staining were negative.

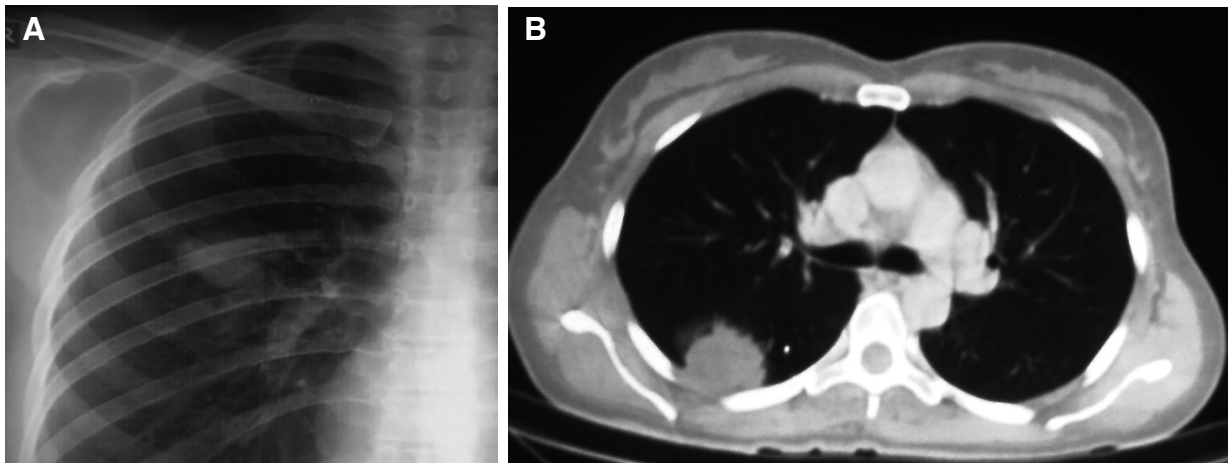


Figure 1. A. Chest X-ray shows a radiopaque lesion in the right upper lobe, and in image 1B, the chest CT scan reveals a rounded mass with spicules, located near the chest wall on the right side.

The fiberoptic bronchoscopy was normal. The results of the bronchial lavage for acid-alcohol resistant bacilli smear and mycobacterial culture were negative. Direct fungal examination and culture: negative. Bronchial cytology: high cellularity sample with inflammatory-type changes. No malignant cells observed.

Tuberculin skin test (PPD): 10 mm induration.

Complementary tests: Total body bone scan: negative for metastasis.

Spirometry: normal.

Treatment: the patient underwent a 6-month shortened regimen, supervised by the Colombian Ministry of Health, for a weight of 50 kg. The regimen included: rifampicin 450 mg, isoniazid 225 mg, pyrazinamide 1200 mg, and ethambutol 825 mg, taken daily for a total of 56 doses over 2 months (Monday to Saturday). The second phase of treatment included: rifampicin 450 mg and isoniazid 225 mg daily for 112 doses over 4 months. The treatment concluded without complications. CT scan follow-up showed multiple calcified lesions (Figure 2).

DISCUSSION

Tuberculosis still has a significant impact on public health, with its incidence increasing due to co-infection with the human immunodeficiency virus (HIV). Each year, 10,000 new cases of TB are diagnosed in Colombia.

In 10% to 30% of infected individuals, the replication of *Mycobacterium tuberculosis* is not ef-

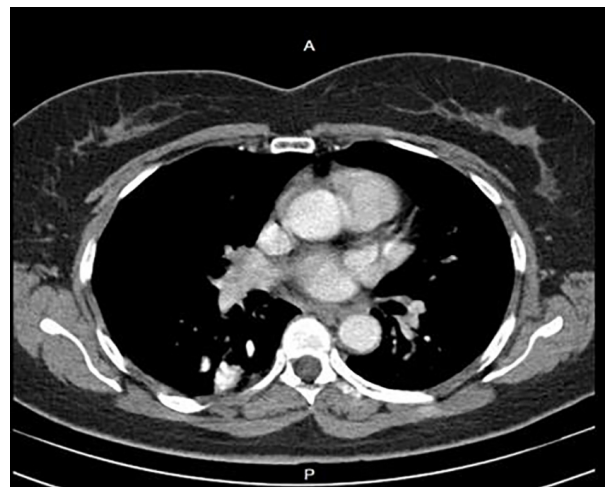


Figure 2. CT scan 3 years after completing treatment.

ficiently controlled by the immune system, leading to a primary disease. Those most susceptible are individuals with immunodeficiency and children. The remaining percentage of infected individuals develop an immune response that controls the infection within 2 to 3 weeks.

In chest imaging, the pseudotumoral form of tuberculosis is a rare presentation, even in endemic countries, and can be mistaken for lung cancer.⁴ While the radiological presentations of TB are well known, there is no pathognomonic form of the disease. The most common radiological presentation of post-primary TB is a cavitary lesion in the upper areas. The differentiation between the

pseudotumoral form of tuberculosis and carcinoma cannot rely solely on radiological findings; it must be confirmed through microbiological studies or histopathology.

In a review of the literature from 1964 to 2006, R Agarwal⁵ identified 27 reported cases of masses larger than 3 centimeters, with some cases presenting multiple masses. These cases were confirmed either through bacteriological evidence or histopathological studies, and all of them showed a response to anti-tuberculosis medication. It is difficult to confirm the diagnosis bacteriologically due to the paucibacillary nature of the condition. Therefore, multiple diagnostic approaches are required. In our case, the fine-needle aspiration for cytological study was negative, and a video-assisted thoracoscopic surgery was required to obtain a histopathological study with conclusive characteristics; the bacteriological ZN test was negative. In the literature review mentioned before, the bronchoscopy was diagnostic in only two cases, while in our case, all studies were negative for bacillus isolation. The tuberculin skin test was positive in all the cases where it was performed; in our case it was positive with a 10 mm induration. All patients showed clinical and radiological resolution with medication. In our case, there was clinical improvement, and the CT scan showed residual calcified nodular lesions.

CT scans also allow for contrast enhancement quantification. Nodules with an enhancement of less than 15 Hounsfield Units (HU) have a 99% probability of being benign and a predictive value of 95%. In contrast, values greater than 15 HU indicate a 58% probability of malignancy. Active granulomas or other infectious lesions can also show enhancement, which limits this technique.

In TB, the atypical radiological presentations include: mass, bronchopleural fistula without a parenchymal infiltrate image, persistent infiltrate in the lower lobes, cavitary lesions with air-fluid levels. Hadlock et al found that atypical radiological manifestations accounted for 8% of the cases.⁶

Percutaneous needle aspiration has a diagnostic accuracy of 90% to 95% for lesions measuring 2 cm; however, for smaller lesions, the accuracy decreases to 60% - 80%. Transbronchial biopsy has a diagnostic sensitivity for malignancy ranging from 40% to 68%, and for benign conditions, it is 41%. In our case, this aspiration technique ruled out malignancy but did not provide a defini-

tive diagnosis. A tuberculosis lesion had not been considered initially, which is why a bacilloscopy was not requested. It is common for the initial evaluation to focus on cancer tests.⁷

The most frequent complications of percutaneous aspiration include pneumothorax, occurring in 20% to 34% of cases, with the need for drainage tubes in 5% to 14%. Hemoptysis occurs in 2% to 14% of cases. In our case, there were no complications reported.

Atypical clinical manifestations are common in individuals with compromised immunity. Biopsy via percutaneous aspiration is useful for studying pulmonary nodules or masses, persistent airspace consolidation, and masses caused by pneumoconiosis.⁸ TB symptoms depend on the site of active infection. In the tumoral form, clinical signs are often nonspecific or absent. In our case, the primary symptom was chest pain.

In the tumoral form, the sputum or bronchoscopy bacilloscopy examination is mostly negative. In our case, it was negative for TB.

Delar et al reported a series of 6 cases, 5 of which were men, with an average symptom duration of 7 weeks, where the classic TB symptoms were not common. The radiological presentation was a pulmonary mass, with an average diameter of 2.3 cm and calcification in two cases.⁹

A video-assisted thoracoscopic surgery was performed due to the presence of a peripheral lesion, and the histopathological examination confirmed the diagnosis. No other reviews were found including this diagnostic method.

The advantages of the tuberculin skin test are the fact that it is technically simple to use, and has 80% sensitivity in individuals without immunosuppression. The high antigenic complexity of tuberculin affects its specificity, leading to the possibility of false positives in individuals vaccinated with BCG (Bacille Calmette-Guérin) or exposed to environmental mycobacteria. This makes the test impractical in countries where tuberculosis is endemic. The repeated administration of the tuberculin skin test may cause the immune system to remember previous hypersensitivity, a phenomenon known as boosting. This does not occur with the IGRA (interferon-gamma release assay) test.

Multimodal imaging involves combining at least 2 imaging tools for greater detail and diagnostic precision. Radiomics is a new form of computational medical imaging that involves the analysis

of images and their translation into quantitative data to an image feature algorithm. Further studies on new techniques, such as radiomics and multimodal imaging based on algorithms should be encouraged.¹⁰

In cases where positron emission tomography (PET) scans are positive, TB should be considered in the differential diagnosis because it can yield false positives for malignancy. Tumor markers like CA 19-9 and CA 125 can also be elevated in TB. Histopathological examination and cultures for TB are still the gold standard in diagnosis.

Early diagnosis and timely initiation of treatment are essential for effective control of the disease. Delays can lead to greater deterioration and increase the risk of infectivity in the community.

CONCLUSION

Pseudotumoral tuberculosis is rare. It can have nonspecific symptoms. Tuberculosis has a lot of polymorphisms in radiological images. Tuberculosis should be considered in the differential diagnosis of lung mass. The diagnosis must include bacteriology and histopathology studies. It has a good prognosis.

Conflict of interest

Authors have no conflicts of interest to declare.

REFERENCES

1. World Health Organization (WHO): Global Tuberculosis Report 2022. Accedido el 26/05/23 <https://www.who.int/teams/global-tuberculosis-programme/tb-reports>
2. Nachiappan AC, Rahbar K, Shi X, et al. Pulmonary Tuberculosis: Role of Radiology in Diagnosis and Management. *Radiographics*. 2017;37:52-72. <https://doi.org/10.1148/rg.2017160032>
3. Herrak L, Amangar N, Berri K, et al. Pulmonary tuberculosis in its pseudotumoral form; one new case. *Egypt j Chest Dis Tuberc*. 2013;62:647-9. <https://doi.org/10.1016/j.ejcdt.2013.08.007>
4. Tan KT, Kannan SK, Rajahram GS. A case of pulmonary tuberculosis masquerading as lung carcinoma. *Med J Malaysia*. 2019;74:547-8. PMID:31929486 recuperado de <https://www.e-mjm.org/2019/v74n6/pulmonary-tuberculosis.pdf>
5. Agarwal R, Srinivas R, Aggarwal AN. Parenchymal pseudotumoral tuberculosis: case series and systematic review of literature. *Respir Med*. 2008;102:382-9. <https://doi.org/10.1016/j.rmed.2007.10.017>
6. Hadlock FP, Park SK, Awe RJ, Rivera M. Unusual radiographic findings in adult pulmonary tuberculosis. *AJR Am J Roentgenol*. 1980;134:1015-8 <https://doi.org/10.2214/ajr.134.5.1015>
7. Villena-Suárez JR, Vicente W, Taxa L, et al. Tuberculosis que imita cáncer: casos derivados al Instituto Nacional de Enfermedades Neoplásicas, Lima-Perú [Tuberculosis That Mimics Cancer: Cases Referred to the National Institute of Neoplastic Diseases, Lima-Perú]. *Rev Perú Med Exp Salud Pública*. 2018;35:77-83. <https://doi.org/10.17843/rpmesp.2018.351.3602>
8. Choo JY, Lee KY, Kim MY, et al. Pulmonary Tuberculosis Confirmed by Percutaneous Transthoracic Needle Biopsy: Analysis of CT Findings and Review of Correlations with Underlying Lung Disease. *Balkan Med J*. 2014; 31:208-13. <https://doi.org/10.5152/balkanmedj.2014.13187>
9. Dalar L, Sökücü SN, Karasulu AL, et al. Tuberculosis Can Mimic Lung cancer: A Case Series. *Turk Toraks Derg*. 2013;14:30-5. <https://doi.org/10.5152/ttd.2013.06>
10. Xiang Y, Huang C, He Y, Zhang Q. Cancer or Tuberculosis: A Comprehensive Review of the Clinical and Imaging Features in Diagnosis of the Confusing Mass. *Front Oncol*. 2021;11:644150. <https://doi.org/10.3389/fonc.2021.644150>