

Review Article

Radiological Profile of the Association Between Bronchopulmonary Tumors and Pulmonary Tuberculosis: A Retrospective Analysis

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Abstract

A retrospective study was conducted in the Department of Pneumology of the Mohamed V Military Training Hospital in Rabat over a period between 2016 and 2019, on all patients with a sequential or concomitant association of pulmonary tuberculosis and primary pulmonary neoplasia. The comparison was made with a control group with pulmonary neoplasia but no pulmonary tuberculosis.

14 cases of tuberculosis and bronchopulmonary cancer were collected during the study period compared to 28 controls. The average incidence was 3.5 new cases/year. The most frequent symptoms were chest pain, dyspnea and cough. General signs were marked by weight loss, anorexia, night sweats and fever.

Radiological lesions were unilateral in 88.1% of cases, and bilateral in 11.9% of cases. Tumor lesions were homolateral to tubercular lesions in 85.7% of patients and contralateral in 14.3% of patients.

The association between tuberculosis and bronchopulmonary cancer poses a problem of diagnosis and drug tolerance. The risk factors are multiple, and the prognosis is marked by an increase in the mortality rate.

Keywords: Bronchopulmonary cancer; Pulmonary tuberculosis; Radiological profile

Introduction

The coexistence of pulmonary tuberculosis (TB) and bronchopulmonary neoplasia presents a complex diagnostic and therapeutic challenge. Tuberculosis may mimic or mask the presence of lung cancer on imaging studies, and vice versa. In resource-limited settings or in areas with high TB prevalence, this association requires increased vigilance, particularly from a radiological perspective. This article explores the radiological characteristics observed in patients with both diseases, based on a retrospective study conducted at the Mohamed V Military Training Hospital in Rabat between 2016 and 2019.

Study Overview

The study included 14 patients with a confirmed sequential or concomitant association of pulmonary tuberculosis and primary pulmonary neoplasia. A control group of 28 patients with bronchopulmonary cancer without tuberculosis was used for comparison. The mean incidence of the association was 3.5 new cases per year.

Clinical-Radiological Correlation

The most frequent clinical manifestations included chest pain, dyspnea, and cough—symptoms that are common to both TB and lung cancer. Systemic symptoms like weight loss, anorexia, night sweats, and fever were also prevalent, further complicating differentiation based solely on clinical presentation.

Radiological Findings

The radiological assessment focused on the distribution and characteristics of lesions seen on chest imaging, primarily chest X-ray and computed tomography (CT).

Laterality of Lesions

- **Unilateral Involvement:** Observed in **88.1%** of cases. This dominant pattern suggests localized disease, with either TB or tumor predominating in one lung.
- **Bilateral Involvement:** Present in only **11.9%** of patients, indicating more advanced or disseminated disease.

Topographical Relationship between Lesions

- **Homolateral Lesions:** In **85.7%** of cases, the tumor and tuberculosis lesions were located in the same lung. This suggests a potential pathological relationship, such as TB scarring serving as a nidus for carcinogenesis.
- **Contralateral Lesions:** Found in **14.3%** of cases, possibly reflecting independent disease processes or metastatic spread.

Types of Radiological Lesions (Based on Broader Literature Context)

While not detailed in the abstract, typical radiological findings in such dual pathology include:

Table 1 : Radiological characteristics of the study group and the control group.

Variables	Association TP et CP (n=14)	Témoins (n=28)	P
Lesion type §			
- Excavated opacity	5 (35.7%)	0 (0%)	<0.001
- Infiltratif opacity	5 (35.7%)	0 (0%)	
- Nodular opacity	4 (28.6%)	24 (85.7%)	
- Pleurisia	0 (0%)	4 (14.3%)	
Localisations §			
- left	8 (57.1%)	4 (14.8%)	<0.001
- right	2 (14.3%)	22 (81.5%)	
- Bilatéral	4 (28.6%)	1 (3.7%)	
location §			
- Apical	10 (71.4%)	17 (63%)	0.324
- Basal	3 (21.4%)	5 (18.5%)	
- Axilar	1 (7.1%)	0 (0%)	
- Hilar	0 (0%)	4 (14.8%)	
Lobe §			
- Sup Lobe	10 (71.4%)	17 (63%)	0.954
- médian Lobe	0 (0%)	5 (18.5%)	
- Inf Lobe	4 (28.6%)	5 (18.5%)	

• **Cavitary Lesions:** Common in post-primary TB, but also seen in squamous cell carcinoma.

• **Mass Lesions:** Could represent neoplastic tissue or tuberculomas; distinction requires biopsy.

• **Nodular Opacities:** May appear in both diseases; size progression on follow-up imaging can hint toward malignancy.

• **Fibrotic Changes and Calcifications:** Often associated with old TB, but underlying or adjacent malignancies can be missed without contrast-enhanced CT (Table 1).

Radiological Challenges and Implications

Diagnosing coexisting TB and lung cancer via imaging can be difficult due to overlapping radiographic appearances. Some TB-related changes, such as scarring, cavities, and consolidations, may obscure or imitate tumor growth. Conversely, tumors may mask active TB foci or be misinterpreted as post-TB changes. Hence, radiologists must maintain a high index of suspicion when interpreting atypical or persistent lesions, particularly in patients with TB history.

Advanced imaging techniques like contrast-enhanced CT, PET-CT, and image-guided biopsy play a crucial role in differentiating between infectious and neoplastic processes.

Discussion

The radiological differentiation between pulmonary tuberculosis (TB) and bronchopulmonary tumors poses a significant diagnostic challenge due to substantial overlap in imaging features, particularly in TB-endemic regions such as Morocco. In the retrospective study conducted at the Mohamed V Military Training Hospital, which included 14 patients with coexisting TB and primary lung cancer, imaging findings were predominantly unilateral (88.1%), with tumor lesions located homolaterally to TB lesions in 85.7% of cases, suggesting a potential pathogenic link between chronic post-tuberculous structural damage and tumor development. This observation aligns with epidemiological studies indicating that TB increases the risk of lung cancer, particularly squamous cell carcinoma, due to chronic inflammation, fibrosis, and DNA damage

induced by mycobacterial infection [1,2]. Computed tomography (CT) remains the cornerstone imaging modality in this context, with malignant lesions often presenting as spiculated, lobulated masses with pleural retraction, contrast enhancement, or cavitation, whereas typical TB findings include satellite nodules, tree-in-bud opacities, calcified lymphadenopathy, and cavitary lesions with thinner, smoother walls [3,4]. However, thick-walled or irregular cavitations may appear in both conditions, especially when malignancy arises in a post-TB cavity, limiting the diagnostic specificity of CT alone. FDG-PET imaging may offer additional metabolic information but lacks specificity in high TB burden settings, as both malignancy and active TB demonstrate intense FDG uptake, often with overlapping SUVmax values [5]. As such, reliance on SUV values without morphological correlation can lead to misdiagnosis. Recently, radiomics has emerged as a promising adjunct, with studies showing that quantitative CT features such as texture, shape, and perilesional characteristics can distinguish TB from lung cancer with high accuracy, achieving AUCs above 0.90 in some models [3,6]. Nevertheless, the integration of radiomics into routine clinical practice is still limited by technical, logistical, and validation constraints, particularly in low-resource settings. Clinically, the coexistence of TB may delay the diagnosis of lung cancer, especially when empirical anti-tuberculous treatment is initiated based on non-specific symptoms and radiologic findings. Given the predominance of tumor lesions occurring within the same lung as TB involvement in this study, it is imperative for radiologists and clinicians to maintain a high index of suspicion for malignancy in patients with a history of TB, especially when radiological features are atypical, progressive, or discordant with typical TB evolution. In such scenarios, tissue biopsy remains the definitive method for diagnosis and should not be delayed when imaging suggests a possible neoplastic process.

Conclusion

The radiological profile of patients with concurrent pulmonary tuberculosis and bronchopulmonary cancer in this Moroccan cohort showed a clear predominance of unilateral and homolateral lesions. This pattern underscores the potential pathological and anatomical link between the two conditions. Radiologists must be aware of this association, especially in TB-endemic regions, to avoid misdiagnosis and ensure timely treatment.

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