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Cavitating Consolidation: A Masquerador

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Abstract

Background

Variable presentation of cavitating consolidation

Case presentation

The patient was a 27-year-old man who complained of cough, fever, and exertional dyspnoea. He was initially diagnosed with a bacterial infection and was treated with antibiotics. This resulted in the expression of PTB, which was masked by the bacterial infection and caused the cavitating consolidation.

Conclusions

This case study raises the notion that two illnesses can exist together. So, by treating one infection, we can discover the underlying infection. Attention should be devoted to the diagnosis of cavitating consolidation.

Key words

Cavitating consolidation, Pulmonary tuberculosis

Introduction

Consolidation is a pathological term describing the state of the lung when alveolar gas has been replaced by fluid, cells, or a mixture of the two. Various terms are used to describe the morphological appearance of consolidation – 'alveolar-filling pattern,' 'air-space filling' and 'ground-glass shadowing' are examples. It is important to remember that none of these terms can determine the pathological nature of the substance that has caused the alveolar filling to appear. An identical radiographic pattern may indicate a bacterial infection, heart failure transudate, alveolar haemorrhage, Pneumocystis carinii pneumonia, or malignant infiltration of alveolar cell cancer.

However, there are other hints on a radiograph that can focus the pathology diagnosis, and one should seek these out[1].

Cavitary lung lesions are frequently found in chest imaging and frequently present a diagnostic difficulty to the hospitalist. An accelerated workup can be facilitated using a standard evaluation procedure for cavitary lung lesions. Radiographically, a lung cavity is described as a lucent area within a consolidation, mass, or nodule. A cavitary lung lesion has many potential causes that fall into infectious and non-infectious aetiologies. Bacterial, fungal, and parasitic agents are examples of infectious causes. Malignant, rheumatologic, and other uncommon aetiologies, such as pulmonary embolism-related infarcts, are examples of non-infectious causes[2].

Malignancy, It is possible to distinguish between benign and malignant disorders using the wall thickness of the cavitary lung lesions in solitary disease. According to recent studies, a wall thickness of less than 7 mm was concrete for benign disease, while more than 24 mm was highly specific for malignant disease. The lack of perilesional centrilobular nodules, in contrast to the prevalence of perilesional consolidation around benign nodules, was another malignancy. Choosing the best or most accurate diagnosis could be difficult. Making the proper diagnosis and advising the proper course of action requires knowledge of frequent and uncommon radiological findings in conjunction with pertinent clinical findings and clinical history[3].

Tuberculosis continues to be a significant threat to global health. Cavitation is a severe complication of pulmonary tuberculosis linked to poor outcomes, treatment relapse, more excellent transmission rates, and the emergence of medication resistance[4]. Patients with TB frequently have longer-lasting symptoms such as haemoptysis, fevers, night sweats, and weight loss. Airborne isolation needs to start right away for patients for whom TB is suspected. When risk factors are present, the provider should obtain three sputum samples for an acid-fast bacillus (AFB) smear and culture. Reactivation TB patients typically show abnormal chest X-rays, with 20% of those patients having air-fluid levels and most cases affecting the upper lobes. In patients with primary or reactivation TB, cavities may be present.

Lung abscess is a liquefaction necrosis of the lung tissue and the development of cavities containing fluid or necrotic debris resulting from microbial infection[3]. It is more likely to develop over the posterior segment of the right upper lobe and middle lobe, then the superior segment of the right lower lobe, and occasionally the left lung in cases of aspiration of oropharyngeal contents. To confirm the intrabronchial origin of an abscess, tumour, or foreign substance, diagnostic bronchoscopy is a necessary step in the diagnostic process. Examining sputum helps identify microbiological agents[6].

Necrotizing pneumonia is a rare and severe complication of bacterial community-acquired pneumonia (CAP). Necrotizing pneumonia is characterised by pulmonary inflammation with consolidation, peripheral necrosis, and numerous tiny cavities, and it is on a spectrum between lung abscess and pulmonary gangrene[7]. Lung abscess is suspected when there are pre-existing risk factors for aspiration (such as drunkenness and poor dentition), even though necrotizing pneumonia and lung abscess share a common pathophysiologic pathway. A subacute or chronic development of a lung abscess may be indicated by a history of cough, fever, rotten sputum,

night sweats, and weight loss. For indications of pneumonia and gingivitis, a physical examination may be important[1].

Septic embolism is an infected thrombus that has travelled through the bloodstream from a far-off infectious source and obstructed a blood vessel. Septic emboli result in two insults: the infectious insult, which causes inflammation and the potential for abscess formation, and the early embolic/ischemic insult brought on by arterial blockage and infarction. The organisms are typically recognised by cultures of the blood or other tissues involved, and the diagnosis is typically made via imaging of numerous body sites. The primary methods for treating septic emboli are prolonged antibiotic therapy and source management of the underlying infection[8]**.**

Rheumatoid is a chronic inflammatory disease that primarily affects the joints. The most frequent and typically asymptomatic lung manifestation of rheumatoid arthritis is rheumatoid nodules. Occasionally, this advances cavitary formation and produces significant clinical symptoms because of disease activity, infectious diseases, and other aetiologies. In individuals with RA and cavitary pulmonary nodules, evaluating the clinical and histological characteristics may aid in the differential diagnosis[9].

Pulmonary embolism is one of the recognised aetiologies of pulmonary cavity formation. Due to the dual blood supply of the lung, pulmonary infarction is a rare consequence of pulmonary embolism. Following an acute pulmonary embolism, patients with infected cavitating pulmonary infarction commonly exhibit fever, a positive sputum culture, and leucocytosis[10].

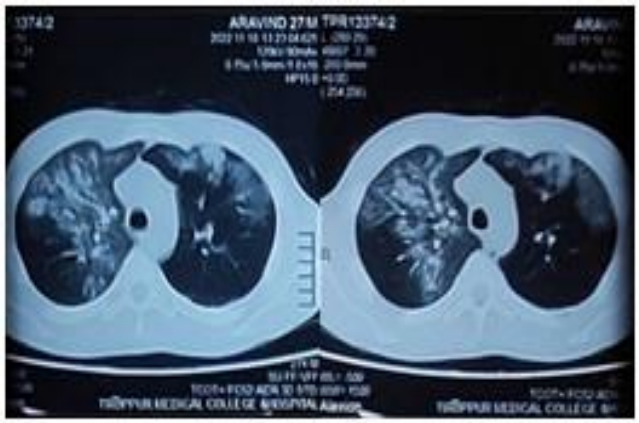
Case Report

A 27-year-old man with a history of smoking and alcoholism presents to the hospital with a productive cough, fever, and exertional dyspnoea for three days. The patient had no known complaints of SHT/DM/Asthma/Epilepsy/Chest pain. He denied haemoptysis, gastrointestinal symptoms or chest pain and reported no skin rash, arthralgia, recent travel, or sick contacts. He had no prior surgeries and had no reported allergies. The physical examination showed that patient was febrile, dyspnoeic and tachypnoeic. He had a temperature of 98.60 F, pulse rate of 94/min, respiratory rate of 20/min and blood pressure of 110/60mmHg. Clinical examination showed oxygen saturation of 86%, followed by 96% after providing CPAP (Continuous positive airway pressure). He appeared lethargic, with no conjunctival pallor, cyanosis, nuchal rigidity, or palpable lymphadenopathy. Precordial examination revealed normal heart sounds, with no murmur, rub, or gallop. His complete blood count (CBC) is notable for a white blood cell count of 24,300 cells/mm3. He had no anaemia (haemoglobin, 17 g/dL), thrombocytopenia (428,000/μL), or renal failure (creatinine, 1 mg/dL). Sputum CBNNAT was negative for mycobacterium tuberculosis.

Table 1 Pertinent laboratory findings

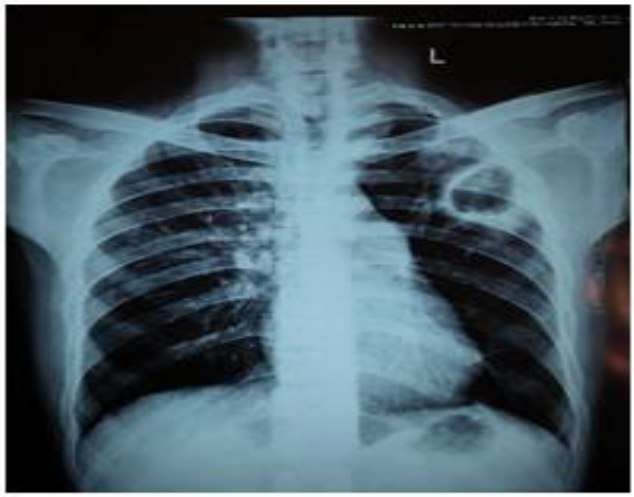
VCTC	NR
VRDL	NR
MTB	Not detected
H1N1Swab test	NA

Figure 1 The initial chest radiography(CT) revealed



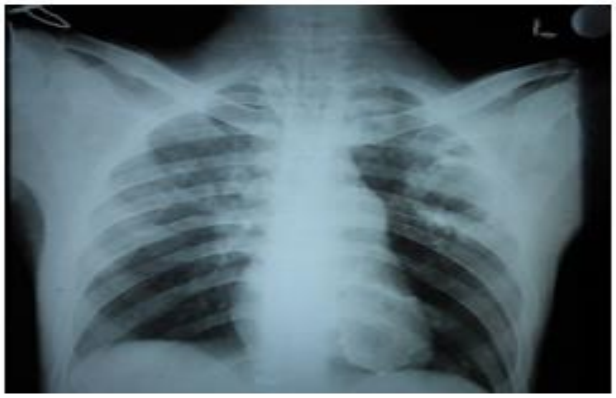
- Multifocal areas of ground glass opacifications (GGO's) with consolidation and branching centrilobular nodules with upper lobe predominance.
- Enlarged left hilar lymph node with calcification(2.3x2.5 cm).
- Endobronchial spread of infection.

Figure 2 Subsequently, four days later an X-ray is done and the results was



- Left upper zone and mid zone cavitating consolidation.

Figure 3 Chest X-ray performed at 10 days follow-up



- Serial chest X-ray shows resolution of cavitating consolidation in left upper zone and mid zone.

Therefore, the point is that two illnesses can exist simultaneously. The patient showed symptoms like weight loss, loss of appetite, and increased body temperature along with chills directed towards Pulmonary Tuberculosis. Additionally, the patient was a chronic alcoholic, which increased the risk of developing Pulmonary Tuberculosis. Thus, the patient could be labelled as having PTB and bacterial infection based on clinical presentation and investigation. Antibiotics such as Inj.Ampicillin(1gm), Inj. Metronidazole (15 mg), and Azithromycin(500mg), were initially administered to the patient to treat the bacterial infection that had later subsided. On the following days, we gave Inj.Piptaz(4.5gm), Oseltamivir(75mg), T.CPM (4mg), along with bronchodilators like Neb.Salbutamol(Q8 Hrs) and Inj.Deriphylline(2cc).The right-side lesions were all treated with this course of antibiotics. That led to the expression of PTB, which was masked by the bacterial infection and created this cavitating consolidation. As a further step, the patient received the Fixed dose combinations (4FDCs) with Tranexamic acid to facilitate the optimal drug treatment of PTB.

Discussion

A *cavity* is a lucency within a pulmonary consolidation zone, a mass, or a nodule encircled by a wall that typically varies in thickness. Non-infectious causes of cavitation include malignancy, inflammatory illnesses (e.g., Rheumatic, sarcoidosis, and Wegener's granulomatosis), pulmonary infarcts, and other unrelated disorders such as cryptogenic organising pneumonia and Langerhans' cell histiocytosis11. Cavitation is a severe complication of pulmonary TB associated with poor outcomes, treatment relapse, greater transmission rates, and the emergence of drug resistance. However, cavities are one of the least studied aspects of TB in the antibiotic era and are frequently recognised as the extreme outcome of treatment failure. Common bacteria, including Streptococcus pneumonia and Staph. aureus, Klebsiella pneumonia, H. influenzae, typical and atypical mycobacteria, fungi such as aspergillosis and pneumocystis jirovecii, and parasites can all produce cavitary lesions. Radiographically, this syndrome begins with lung consolidation and progresses to forming numerous tiny cavities that coalesce into one large cavity. An emerging factor in

cavitary pneumonia is Staphylococcus aureus. Multiple cavitary lung lesions have a wide range of differential diagnoses, including cavitary lung lesions, malignancy, tuberculosis, lung abscess, necrotising pneumonia, septic embolism, rheumatoid lesion, and pulmonary embolism.

The case report we described is negative sputum CBNNAT and sputum smear. Although the histology pattern was unclear, the unique clinical presentation, CT scan, and X-ray findings suggested the intuition of cavitary consolidation. The initial CT revealed the existence of ground glass opacifications without any distinguishable cavities. A subsequent X-ray was taken four days later, and the left upper and mid-zone showed cavitating consolidation. A follow-up X-ray taken after ten days revealed cavitating consolidation with high resolution. The diagnostic challenges associated with these cases include difficulty obtaining a microbiological diagnosis, heavy reliance on indirect markers such as immunological markers or radiological findings, and possible need for empirical antituberculosis therapy in the event of negative test results.

After receiving initial antibiotic therapy, the right-side lesions of our patient were cured. However, the previously masked pulmonary TB later began to manifest or expose, leading to cavitating lesions. Another fascinating aspect was that the patient has cavitating consolidation along with symptoms and risk factors directed towards Pulmonary Tuberculosis. Thus, the patient was labelled as one having clinically diagnosed PTB.

Conclusions

This case study demonstrates that two illnesses can coexist; as a result, we must manage both. So, by treating one infection, we can discover the underlying infection. Therefore, the correlation between clinical presentation and investigation is vital to treat all cavitating consolidation.

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