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PULMONARY ACTINOMYCOSIS AND MULTIPLE CAVITARY LUNG LESIONS IN A PATIENT PREVIOUSLY REPORTED WITH PULMONARY CANDIDIASIS: A CASE REPORT

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Abstract: *This paper presents the case of a 43 years old patient admitted three times in the Pneumology Department with productive cough, asthenia, important weight loss and fever. His chest CT showed multiple pulmonary cavities growing over time, ground-glass opacities and pleural effusion. Clinical symptoms and radiological signs were highly suggestive of tuberculosis, but he tested negative multiple times. Candida spp. was diagnosed through bronchial washing and treated. After a few months, the patient comes back with worsened symptoms and diagnosed with pulmonary actinomycosis.*

Key words: *pulmonary actinomycosis, pulmonary candidiasis, pulmonary cavities, tuberculosis*

1. Introduction

Cavitary pulmonary lesions are caused by a number of varying disease entities. Paying close attention to disease-specific CT findings combined with the clinical history and findings are leading to a correct diagnosis [1]. Tuberculosis manifests with fever, weight loss, cough and sometimes hemoptysis. Radiologically, upper lobe cavitary disease is a common sign in tuberculosis, often surrounded by satellite nodules [2]. The cavity wall thickness may vary considerably and pleural effusion can be seen.

Actinomycosis represents a rare invasive bacterial disease caused by Actinomyces spp. which is normally found in the mouth, digestive and genital tracts of humans.

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Pulmonary actinomycosis sums up about 20% of all infections with Actinomyces spp.. Poor dental hygiene represents the main form of bacterial dissemination in the respiratory tract. This pulmonary disease is difficult to recognize, as it can clinically mimic carcinoma or tuberculosis with symptoms like weight loss, high fever and cough with muco-purulent sputum production [3], [4]. Symptoms can be minimal even in advanced stages of disease. The standard treatment is considered to be the combination of high doses of injectable penicillin followed by oral therapy with amoxicillin for a longer period, tetracyclines being the preferred option for those allergic to penicillins. The treatment must be adapted to each patient, the antibiogram being the most important tool. It has been shown that the thoracic form of actinomycosis is more difficult to treat and requires a longer time of comparative treatment with other sites of infection. The evolution under treatment should be monitored radiologically, with the most obvious signs of resolution in about four weeks [5].

Even in the form of an extensive form of pulmonary actinomycosis, medical treatment should be considered. However, surgery remains an important therapeutic tool in the presence of complications, as well as well-defined abscesses and empyema and fistulas or hemoptysis. Even if surgical therapy is the first choice, antibiotic treatment should be followed for a few weeks after surgery, and inadequate postoperative antibiotic therapy can lead to complications such as broncho-pleural fistulas and empyema.

Pulmonary candidiasis is one of the most difficult mycosis to diagnose and treat because of the normal presence of Candida in the upper respiratory tract flora [6]. Pulmonary candidiasis is caused either by hematogenous dissemination or by direct aspiration of the microorganism into the lung. It has been described as two ways of manifestation: primary as bronchopneumonia and secondary pulmonary disease in the setting of disseminated candidiasis [7]. The standard treatment for candidemia are antifungal agents like fluconazole, amphotericin B, the combination of two or voriconazole [8].

2. Case Presentation

In this paper, we present the case of a 43 years old male patient, severely underweight (BMI= 16.27 kg/m²), chronic smoker, with occupational exposure to respiratory toxins (former construction worker). He is previously diagnosed with COPD stage II (GOLD) and known with multiple cardiovascular diseases: dilated cardiomyopathy of unknown etiology, major left bundle branch block and left ventricular failure stage II NYHA, under affirmative treatment followed at home with spironolactone and beta-blockers.

In may 2021, the patient was admitted in the Pneumology department with dyspnoea, intermittent dry cough with mucopurulent sputum, fatigue, asthenia, mild weight loss and fever suspected of pneumonia.

He was hospitalised for seven days and underwent antibiotic treatment with

Cefuroxime 1,5g and Amikacin 500mg two times a day intravenously. His chest CT (Figure 1) showed cavitary lesions with thick walls and irregular contour of 22/20 mm and 35/37 mm in dimension, located in the posterior segment of the upper lobe of the right lung and the apical segment of the lower lobe in the right lung accompanied by ground glass opacities. In the anterior and apical segment of the upper lobe, right lung, subpleural tree-in-bud micronodules, bronchiectasis, and a thin-walled cavity lesion of 16/13 mm are described. The radiological aspect along with the clinical symptoms are strongly suggestive of pulmonary tuberculosis. Sputum examination for Mycobacterium tuberculosis tested negative multiple times.

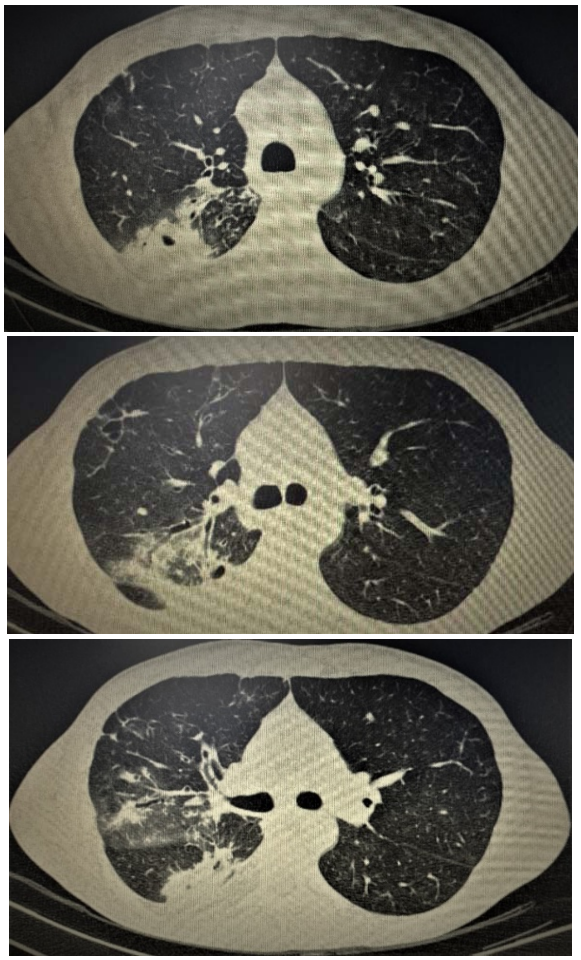

Fig. 1. *Chest CT, may 2021- radiological aspect of pulmonary cavities with different wall thickness and irregular contour, ground-glass opacity.*

A fibrobronchoscopy is done and in the right bronchial sector, the bronchus of the right upper lobe shows small amounts of purulent secretions in the segmental bronchus and bronchial aspirate is collected for multiple testing. After discharge, results came back positive for Candida ciferrii, but the patient is not compliant and refuses to undergo treatment at home.

In October, 2021 the patient comes back to the hospital accusing the worsening of symptoms. A chest CT scan (Figure 2) was done again that showed growing in the multiple cavitary lesions previously described in may, 2021, that now take up the upper half of the right lung. Cranial cavities have thin walls and are considered chronic, while the caudal cavities have thick walls and are considered acute. Severe pulmonary fibrosis around lesions is described along with mild emphysema in both lungs.

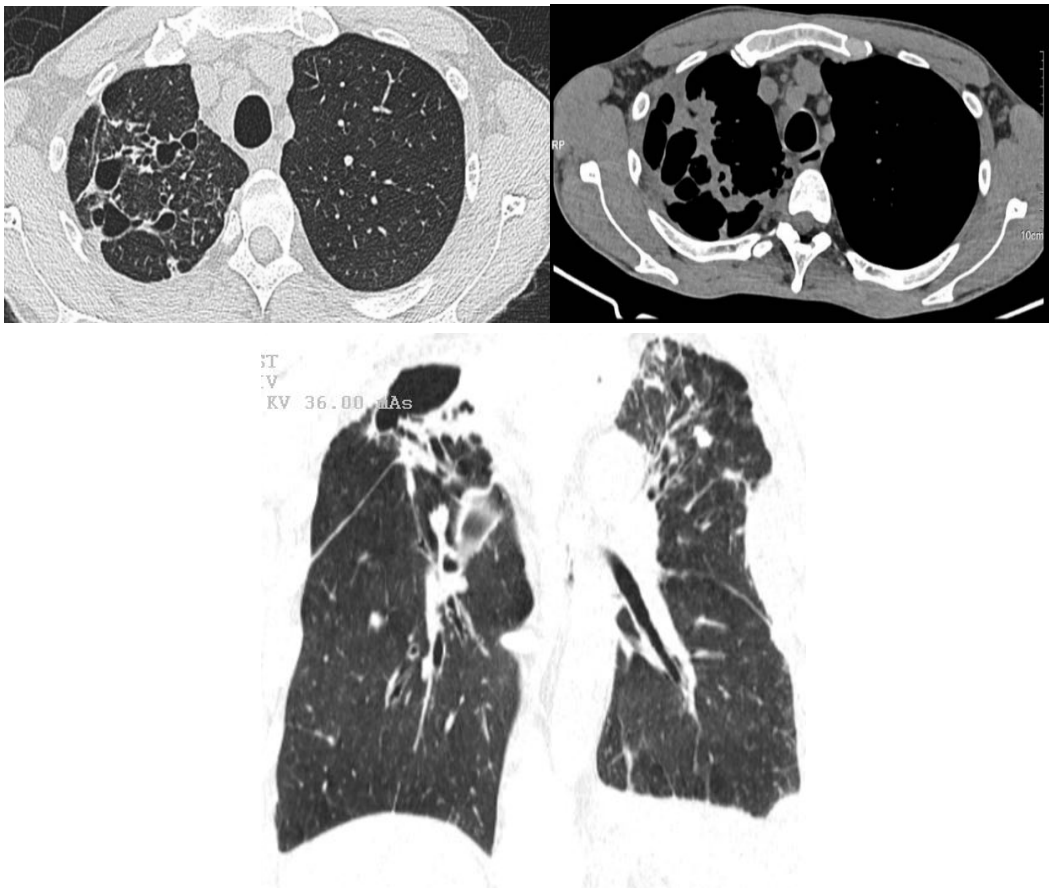

Fig. 2. *Chest CT, October 2021- chronic cavitary lesions, apical emphysema, diffuse bronchiectasis*

Multiple tests for tuberculosis were done, including sputum testing and GeneXpert with a negative result. He tested positive for Candida spp. again.

Voriconazole 200mg was prescribed 2 times a day orally for 3 months, as patient refuses admission in the hospital.

In march 2022, the patient is admitted in the Pneumology department complaining of muco-purulent cough, asthenia, important weight loss, intermittent wheezing, fever (38 degrees Celsius) and diffuse crackling rales in both lungs. A thoracic CT scan was done that showed multiple bubbles of emphysematous fibrotic lesions in the right lung, apical region; a liquid collection partially enclosed in the right latero-thoracic wall (53mm thickness and cranio-caudal extension of 100mm); a 37mm trapped fluid collection in the right lung, situated postero-bazal and a parenchymal opacity near the right hilum along with a 10mm upper mediastinal lymph node (Figure 3). Clinically, he describes the picture of a suppurative syndrome on the remaining cavities. A total of three evacuation thoracocenteses on the right side of the thorax were performed days apart. A total of 510 millilitres of greenish-yellow purulent liquid are evacuated and Actinomyces naeslundii was tested positive from the pleural liquid. The patient tested negative for tuberculosis from sputum and pleural liquid. Given the rarity of pulmonary actinomycosis and candidiasis he was tested for HIV, but negative. He was hospitalised for a total of 14 days and underwent intravenous antibiotic treatment with Cefuroxime 1g, ciprofloxacin 200mg and metronidazole 500mg/ 100ml two times a day and antifungal treatment consisting of oral nystatin 500.000 IU two times a day and intravenous fluconazole 2mg/ml. Although symptoms are partially relieved, pleural effusion continues to come back even under treatment. Surgical resection of infected tissues is recommended to the patient as there is no significant clinical improvement.

The patient was transferred to the thoracic surgery department. The surgeon recommends excision of the cavity lesions, but due to the patient's significant heart comorbidities, surgery is not possible. Therefore, placing a drain tube is the best option for the patient. It was opted for a chest tube to be inserted in the right pleural empyema cavity for drainage. The patient receives prophylactic oral antibiotic therapy with first-generation cephalo-sporins for seven days before the procedure to avoid further infection. Under local anaesthesia with 1% Xylin, 200 millilitres of thick pus were evacuated and the empyema cavity washed with saline solution. The evolution is favourable with the disappearance of the empyema sac and with transformation of the drainage from purulent into serocitrin. Drainage of a hard-to-reach postero-basal pleural sac was performed under ultrasound guidance and was partially evacuated. According to the recommendations, the patient followed another 10 days of treatment with Cefuroxime 500mg orally.

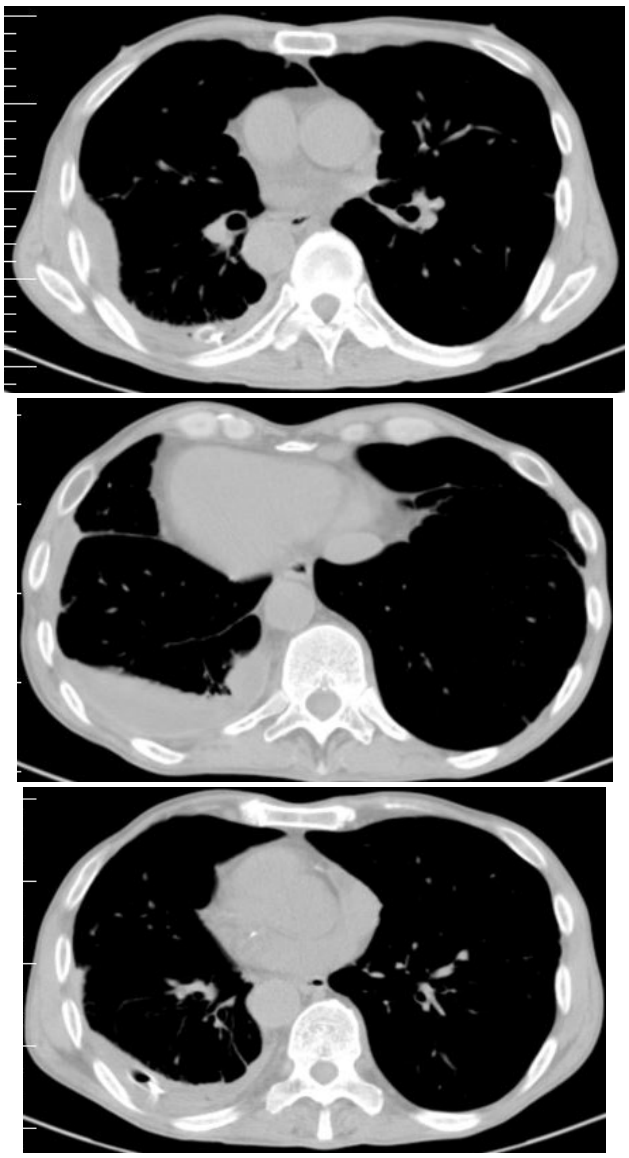

Fig. 3. *Chest CT - march, 2022 liquid collection in the right latero-thoracic wall, empyema*

In April 2022, a control chest CT scan is performed after finishing treatment. It shows a remaining pleural collection containing minimal amount of liquid (Fig. 4.1; Fig. 4.2). The patient is tested once more for tuberculosis, but negative. The general health and condition of the patient is getting better, the symptoms are remitted and the infection is in continuous regression.

The patient is receiving chronic treatment at home which consists of therapy with bronchodilators with tiotropium / olodaterol 2.5 / 2.5 micrograms two puffs a day combined with salbutamol 100 micrograms two puffs as needed. Cardiological treatment with spironolactone and furosemide

capsules 50/20 milligrams once a day, carvedilol 6.25 milligrams tablets twice a day and ramipril 2.5 milligrams one tablet a day. The patient is strongly advised to quit smoking. Also, weight gain, to reach a normal body weight index and proper hydration are part of the patient's rehabilitation program along with avoiding physical exertion, intercurrent infections, exposure to the weather (cold, fog, rain, moisture) and exposure to respiratory hazards (dust, smoke, chemicals and other irritating factors).

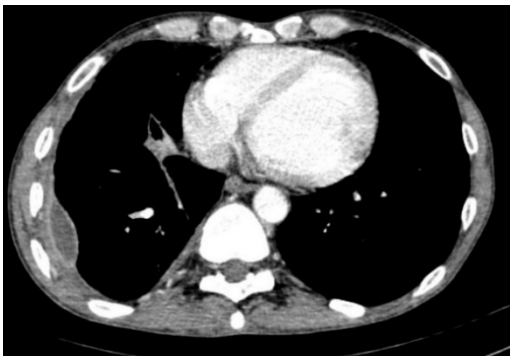

Fig. 4.1. *Control chest CT, April 2022- remaining pleural collection*

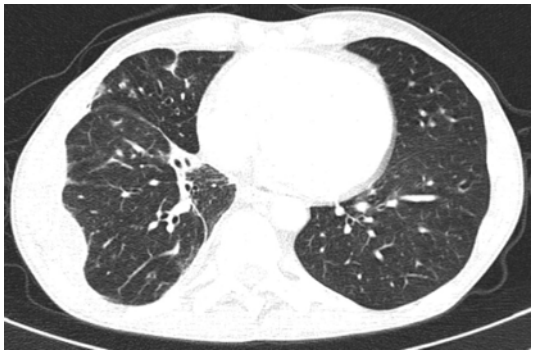

Fig. 4.2. *Control chest CT, April 2022- remaining pleural collection*

3. Discussion

This is a special case due to the chronic nature of the lesions and the poor response to treatment. Proper surgical treatment is hampered by the patient's serious heart disease. Also, from a clinical point of view, the patient's pathology can be easily confused with pulmonary tuberculosis or with a lung tumor.

The remaining lung cavities are a favourable environment for the development of microorganisms, in the present case of mycoses. Superinfection with actinomyces led to the formation of pleural empyema. The patient responded more difficult to treatment due to chronic lesions with closed walls, difficult to penetrate by antibiotics and antifungals. Thus, the placement of the drain was necessary in order to eliminate the fluid collection.

It is possible that the small remaining fluid collection will be resorbed with the continuation of the antibiotic treatment, and the patient will resume his normal life in the shortest time. It would be good for the patient to be tested for immunosuppressive diseases, given the rarity of pulmonary mycoses in immunocompetent patients.

4. Conclusions

Pulmonary candidiasis and pulmonary actinomycosis are not encountered often in practice and both present in the same patient are very rare. This case makes an interesting one as a cavitary CT aspect and clinical symptoms are suggestive for tuberculosis. Also the surgical treatment of the lung disease is difficult due to the multiple comorbidities of the patient, and thus the options were limited to the least invasive.

As clinicians it is very important to

recognize these diseases and consider them as differential diagnoses when facing abnormal lesions in the lung. Early recognition can result in effective treatment and less complications in long term.

We hope that this makes a good case for future improvement and awareness in treating pulmonary mycoses.

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