

CT Characteristics and Pathological Comparison of Pulmonary Fungal Infection and Its Health Effects

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ABSTRACT

In recent years, the incidence of pulmonary cryptococcosis has increased year by year, seriously affect the physical and mental health of our people, and the CT manifestations of nodular pulmonary cryptococcosis are similar to lung cancer, which has caused great concern among doctors. However, there are few reports of patch type and it is easy to neglect in clinical work.

Objective: Comparative study of primary pulmonary cryptococcosis with presented patchy shadows by CT and pathological findings, and improve the recognition. Analyze the image of illness on a person's physical and mental health. Methods: Methods the clinical data of 9 patients with primary pulmonary cryptococcosis were retrospectively analyzed. Results: CT manifestations: patchy shadows adjoining pleura (9/9), air bronchogram (7/9), halo sign (5/9), fibrotic streaks (5/9), enhanced scan significantly improved (4/4). The lesions were located in the lower right lung lobe in 5 cases, in the upper right lung in 2 cases, in the left lower lobe in 1, in the lower right lung lobe and in the right upper lobe in 1 cases. Pathological results for inflammatory granuloma, transparent circle of phagocyte cryptococcus, may be accompanied by coagulation necrosis. Special dyeing results: PAS (+), an Acid fast stain (-). Analyze the psychological impact of the disease on patients. Conclusion: Pathological finding can explain some imaging signs. Together, We need to have a better understanding of the disease and to improve the accuracy of diagnosis. Only fully aware of pulmonary fungal infections can ensure the health of the people.

Keywords: *pulmonary cryptococcosis, high resolution computer tomography (HRCT), pathological*

1. INTRODUCTION

Cryptococcus neoformans is a thick capsule of yeast, widely found in nature, inhaled into the body after the disease [1,2]. In recent years, the incidence of pulmonary cryptococcosis increased year by year, the incidence of pulmonary cryptococcosis has increased year by year, and the CT manifestations of nodular pulmonary cryptococcosis is similar to lung cancer [3,4], caused great concern among doctors, while the patch type is rarely reported, the author collected a group of 9 cases, compared with the pathologic results explain CT findings, the report is as follows, in order to improve the understanding of this disease.

2. PATIENTS AND METHODS

From January 2014 to December 2019 in clinic, out of 60 patients with primary pulmonary cryptococcosis, 6 patients present imaging sign with presented patchy shadows All patients were confirmed by pathology. 3 patients underwent pulmonary resection and 6 underwent CT guided biopsy. We

retrospectively analyzed the clinical data, imaging manifestations, pathological results, treatment, and other information of 9 cases of patients. Because of the retrospective study, the ethics committee of the three hospitals decided not to obtain the informed consent of the patient.

3. RESULTS

Within 5 years, 9 patients were included in the study, 5 males and 4 females. (Table 1) The mean age was 46.78 years (36-73 years). 2 cases of immunocompromised patients, 7 cases of normal. There were 7 cases of chest pain, cough, shortness of breath, fever and 2 cases without symptoms. The lesions were located in the lower right lung lobe in 5 cases, in the upper right lung in 2 cases, in the left lower lobe in 1 cases, in the lower right lung lobe and in the right upper lobe in 1 cases (Figure, 1). The largest lesion was 6.5cmx4.0cm. CT showed patchy, shadows, adjoining, pleura (9/9), air bronchogram (7/9), halo sign (5/9), fiber strip (5/9), and enhanced scan showed marked enhancement (4/4).

Table 1. The pathological findings are inflammatory granulomas and macrophages forming large numbers of macrophages.

| NO./Gender/ Age | History | Symptoms | Location | Size (cm) | CT presentations | Biopsy style | Pathology |
|-----------------|---------------------|----------------------------|---------------|-----------|--|--------------|--|
| 1/F/52 | Not | Cough | RIL | 5.7x1.5 | patchy shadows adjoining pleura, halo sign, air bronchogram, obvious intensify | Paracentesis | Granuloma lesions with necrosis, Cryptococcus in necrosis tissue Pas(+), Acid fast stain (-) |
| 2/F/56 | Not | Cough, short breath, fever | RUL | 5.2x2.7 | patchy shadows adjoining pleura, air bronchogram, | Paracentesis | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 3/M/44 | Not | Not | RUL | 4.3x3.0 | patchy shadows adjoining pleura, air bronchogram, fibrotic streaks, halo sign, obvious intensify | Operation | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 4/F/52 | Not | Cough | RIL | 5.7x1.5 | patchy shadows adjoining pleura, air bronchogram, obvious intensify | Operation | Granuloma lesions with necrosis, Cryptococcus in necrosis tissue Pas(+), Acid fast stain (-) |
| 5/M/40 | Postocular neuritis | Cough | RIL | 6.5x4.0 | patchy shadows adjoining pleura, air bronchogram, fibrotic streaks | Paracentesis | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 6/M/73 | Not | Cough, expectoration | LIL | 2.4x1.3 | patchy shadows adjoining pleura, air bronchogram, halo sign, fibrotic streaks | Operation | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 7/M/72 | Not | Not | RUL +RIL +LIL | 7.1*0.9 | patchy shadows adjoining pleura, fibrotic streaks | Paracentesis | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 8/M/36 | Not | Chest pain | RIL | 2.5*3.1 | patchy shadows adjoining pleura, air bronchogram, halo sign, fibrotic streaks, obvious intensify | Paracentesis | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |
| 9/F/52 | Rheumatoid | Fever | RIL | 1.1*3.1 | patchy shadows adjoining pleura, halo sign | Paracentesis | Granuloma lesions, Cryptococcus in macrophage, Pas(+), Acid fast stain (-) |

Pulmonary resection was performed in 3 cases and puncture in 6 cases. The pathology is inflammatory granuloma. In the macrophage, there is a clear round Cryptococcus, accompanied by coagulative necrosis (Figure 1). Special staining results: PAS (+), Acid, fast, stain (-). Antifungal therapy was performed in 6 cases, and antifungal therapy was continued in 2 cases. There were no antifungal agents in 1 case after operation. No recurrence occurred in 9 cases after treatment. Antifungal therapy improved markedly for

12 months in case 1. In case 4, the biopsy of the external hospital pathologically considered pleural mesothelioma and no tumor cells, and CT examination after one month of three generations of cephalosporin treatment did not see improvement, which decides surgical treatment. In case 6, outside the hospital PET-CT suggests that the lesion is highly metabolic and considers malignancy, which decides surgical treatment.

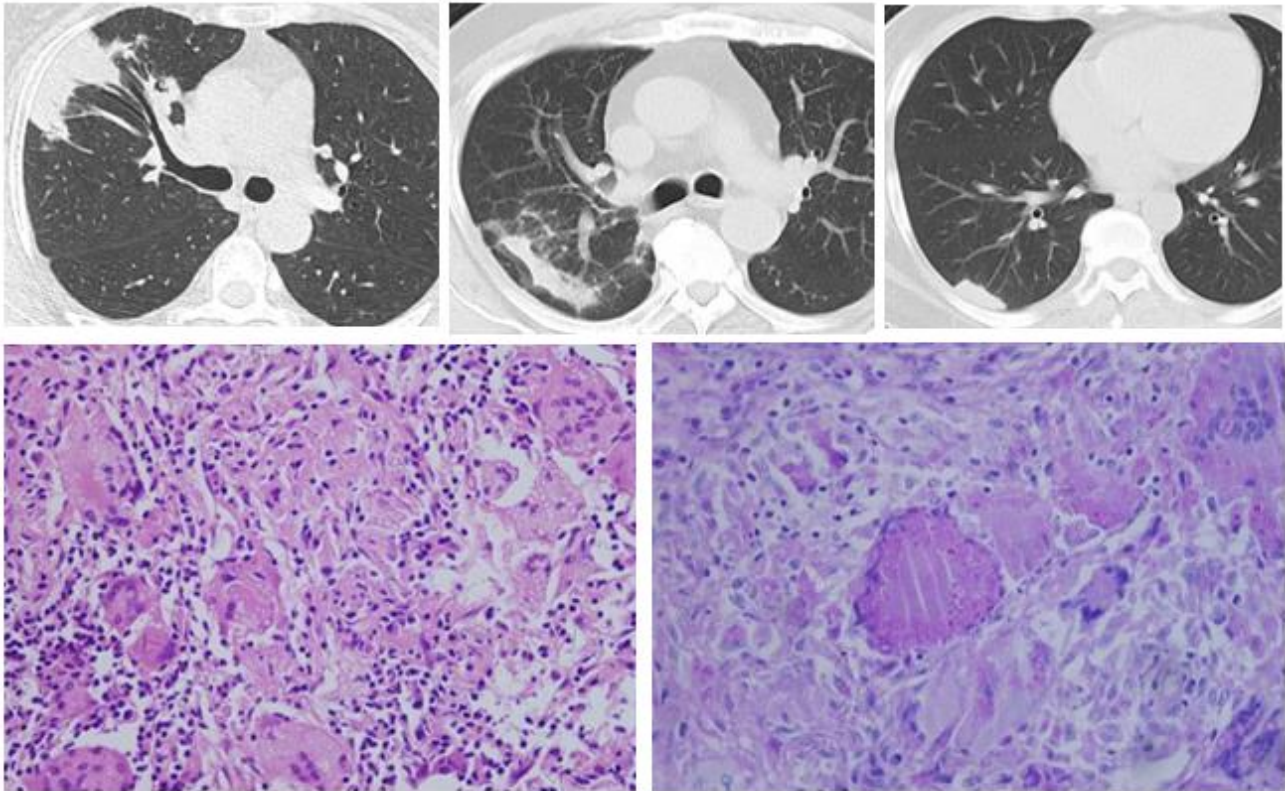


Figure 1. CT showed patchy shadows near the pleura in lungs.

CT signs are bronchial air signs. In pathological sections we can see inflammatory granulomas compressing bronchioles, or inflammatory granulomas enclosing and pulling bronchioles. CT signs halo signs are very common. In pathological sections we can see inflammatory granuloma and normal lung tissue before seeing foam cells in the transition zone. CT signs showed fibrostripes around the lesion. The pathological section saw a lot of fibrous tissue pulling around the inflammatory granulation tissue. This transition area is the halo sign of the CT image. This study found that pathological findings could explain some of the CT signs.

4. DISCUSSION AND CONCLUSION

Pulmonary cryptococcosis is at third place in the constituent ratio of pulmonary fungal disease, second to pulmonary aspergillosis, pulmonary candidiasis, mostly by histopathological diagnosis, which blood cultures are often negative [5-7]. The symptoms of the disease are mild and are usually manifested by symptoms of pulmonary infection, such as cough, chest pain, fever, or found in the physical examination [8,9]. Pulmonary cryptococcosis in lump form is more common, the patch type is rarely reported, easily misdiagnosed as pneumonia, especially in normal immunocompetent individuals are more likely to ignore the signs, we should fully recognize the disease imaging, improve the accuracy of diagnosis.

Comparing CT signs and pathological findings, understanding the pathogenesis of CT signs of the disease, we can further understand the disease. The lesions vary in size and shape, which are caused by a large number of macrophages that are infected with *Cryptococcus neoformans* and are formed by irregular inflammatory

granulomas. Air bronchogram is caused by inflammatory granulation tissue traction or compression airway. Halo sign is a zone of excess between inflammatory granulomas and normal lung tissue, where large amounts of foam cells are seen. Observation of halo signs on pathological HE staining pictures is often caused by inflammatory granulation tissues compressing the airways, resulting in poor alveolar inflation [10,11]. The fiber band is caused by the large amount of fibrous tissue around the granulation tissue [12-14].

In conclusion, patchy pulmonary cryptococcosis is often misdiagnosed as pneumonia. When CT is manifested as patchy consolidation of the lungs (the lower right lung, the proximal pleura), accompanied by air bronchogram, halo sign, and fiber band, the disease should be considered.

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