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CASE REPORT

A Case of Organizing Pneumonia Resembling Lung Cancer

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SUMMARY

Background: **Organizing pneumonia (OP) is a pathologic diagnosis with clinical and imaging manifestations that often resemble other diseases, such as infections and cancers, which can lead to delays in diagnosis and inappropriate management of the underlying disease. In this article, we present a case of organized pneumonia that resembles lung cancer.**
Methods: **We report a case of initial suspicion of pulmonary malignancy, treated with anti-inflammatory medication and then reviewed with CT suggesting no improvement, and finally confirmed to be OP by pathological biopsy taken via transbronchoscopy. A joint literature analysis was performed to raise clinicians' awareness of the diagnosis and treatment of OP.**
Results: **Initially, because of the atypical auxiliary findings, we thought that the disease turned out to be a lung tumor, which was eventually confirmed as OP by pathological diagnosis.**
Conclusions: **The diagnosis and treatment of OP requires a combination of clinical information and radiological expertise, as well as biopsy to obtain histopathological evidence. That is, clinical-imaging-pathological tripartite cooperation and comprehensive analysis.**
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KEYWORDS

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INTRODUCTION

Organizing pneumonia (OP) is histologically characterized by granulomatous tissue plugs, which are mainly found in small airways, alveolar ducts, and peribronchiolar alveoli [1]. OP is a clinical, radiologic, and histologic entity classified as an interstitial lung disease [2]. The clinical features of OP patients lack specificity, so clinicians are prone to overlook the disease and misdiagnose it as general infectious diseases or lung lesions caused by other reasons, leading to delayed or even erroneous treatment that further aggravates the symptoms. Therefore, early correct diagnosis and standardized treatment are very important for prognosis.

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CASE REPORT

The patient is a middle-aged male with hypertension, who was admitted to the hospital on April 15, 2023, with the main cause of "coughing and sputum for 1 week". Coughing and coughing up sputum, occasionally with blood in the sputum, with fever, no chills, snoring at night, sometimes waking up with suffocation, no other abnormality, appeared 1 week ago after being exposed to cold. The patient took oral "cough-relieving and phlegm-reducing" medicines (details unknown) on his own, with no further fever, but still coughing and phlegm. On the day of admission, he was first seen in an outside hospital, and the chest CT report showed "increased texture in both lungs, nodular foci in the posterior basal segment of the lower lobe of the left lung, and cords and stripes in the middle lobe of the right lung and the lingual segment of the upper lobe of the left lung". He was admitted to our hospital for further diagnosis and treatment. Admission examination: T 36.6°C, P 106 beats/minute, R 20 beats/minute, BP 160/110 mmHg. Respiration was shallow and rapid, both lungs were clear on percussion, respiratory sounds were thick in both lungs, no dry or wet rales were heard, heart rate was 106 beats/minute, rhythm was uniform, and no pathologic murmur was heard. Ancillary tests, laboratory tests: leukocytes 7.7 x 10^9/L, basophils 0.08 x 10^9/L, monocytes 0.62 x 10^9/L, platelets 381 x 10^9/L, glucose 6.40 mmo1/L. Coagulation and calcitonin were normal. Sleep monitoring was suggestive of obstructive sleep apnea syndrome. Comprehensive treatment such as anti-inflammatory medication, resolving sputum, and promoting the absorption of pneumonia is given. Chest CT was reviewed 2 days after admission as shown in Figure 1: nodular shadow in the lower lobe of the left lung. A bronchoscopy was performed 4 days after admission to the hospital. The cellular analysis of bronchoalveolar lavage fluid showed more ciliated columnar epithelial cells, reticulocytes, dust cells and a small number of lymphocytes were seen in the lavage fluid, and no tumor cells were detected. The pathology of the tissue (TBLB tissue of the outer basal segment of the lower lobe of the left lung) suggests: The widening of the alveolar septa and the presence of organic material in the alveolar lumen are consistent with the pathology of "organizing pneumonia". Combined with clinical features and auxiliary examination, the final diagnosis was organizing pneumonia. Methylprednisolone 40 mg intravenous injection was given 1/day for anti-inflammatory treatment, and at the same time, lung promotion and phlegm elimination, acid inhibition and gastric protection were given. After the above comprehensive treatment, the chest CT was reviewed 12 days after admission to the hospital as shown in Figure 2, the inflammatory lesion was absorbed compared with the previous one, and the symptoms improved. He was discharged from the hospital, and the oral treatment of methylprednisolone was continued.

DISCUSSION

In this case, the patient was initially diagnosed with inflammatory lung disease in a foreign hospital, and the imaging did not exclude space-occupying lesions. The patient was given antibiotic treatment in our hospital and the chest CT lesion was not resorbed and improved. Malignant tumor was highly suspected. In order to clarify the diagnosis, bronchoscopy and histopathologic biopsy were then performed, leading to a definitive diagnosis of OP. Repeat CT after glucocorticoid therapy was given in response to the pathologic findings showed improvement in the absorption of pulmonary inflammation. With this case, we conducted a literature analysis of the knowledge related to OP with the aim of increasing clinicians' awareness of the disease.

According to different studies, OP accounts for 1.8% to 13% of all interstitial lung diseases; the average age of onset ranges from 50 to 60 years old, and there is usually no significant difference in prevalence between males and females [3], but the prevalence is higher in non-smokers than in patients who smoke, and it is not clear whether there is a direct correlation between smoking and OP, or whether smoking can even be considered as a protective factor for OP [4]. OP is a nonspecific response to lung injury characterized histopathologically by the presence of loose embedding of connective tissue in the distal airways. Histopathologic manifestations of OP include: 1) Formation of fibroblastic tissue (granulation tissue plugs, also known as Masson bodies) in the distal air cavity; 2) mild mononuclear cell interstitial inflammation; 3) mild intra-alveolar cellular desquamation [5]. The alveolar epithelial reaction produces granulation tissue similar to that produced during skin wound healing. Inflammatory debris fills the alveoli and spreads to the alveolar ducts and terminal fine bronchi. These abnormalities may be associated with interstitial inflammatory infiltrates, which is why OP is categorized as an interstitial lung disease [6]. Early stages include localized exfoliation of the epithelial substrate and necrosis of type I alveolar epithelial cells, resulting in larger gaps in the substrate. Alveolar epithelial injury results in leakage of plasma proteins, fibrin formation, and migration of inflammatory cells (macrophages, lymphocytes, neutrophils, some eosinophils, and occasionally plasma cells and mast cells) into the alveolar lumen. Fibroblasts are recruited into the alveolar lumen where they proliferate and differentiate into myofibroblasts and form fibroinflammatory buds (granulation tissue), which are characteristic of OP [7]. OP can be secondary to a variety of injuries (classified as secondary OP, SOP): 1) viral infections including human immunodeficiency virus infections; 2) toxic gases such as nitrogen dioxide; 3) drug reactions; 4) radiation therapy or cancer; 5) inflammatory bowel disease; 6) connective tissue diseases such as rheumatoid arthritis, systemic lupus erythematosus, systemic sclerosis, and polymyositis [5]. When no specific etiology can be found, it is categorized as cryptogenic OP (COP). OP does not have its

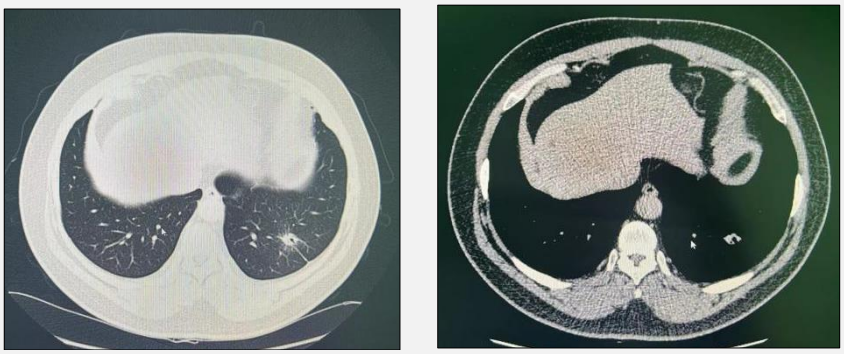

Figure 1. Irregular nodular shadow in the lower lobe of the left lung with an indistinct border with the surrounding area, which is suspected to be a pleural pull sign and burr sign.

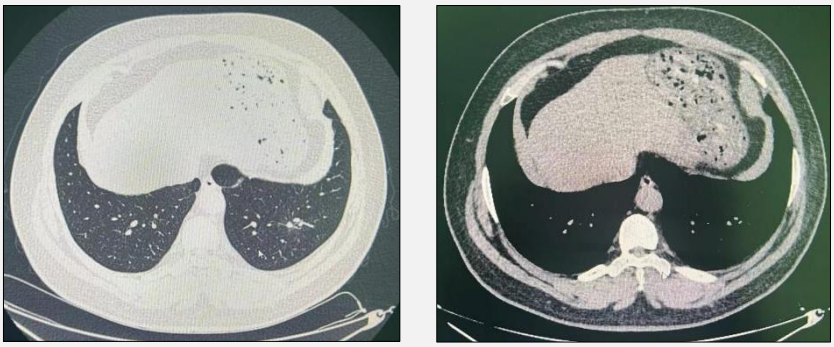

Figure 2. Inflammation in the lungs is better absorbed than before.

own specific clinical features, and the clinical presentation is usually similar to that of other diseases, such as infections and cancers; therefore, the nonspecific symptoms often delay the diagnosis. Dry cough, flu-like symptoms and exertional dyspnea are common symptoms. Fever, fatigue and weight loss are also symptoms of OP. Hemoptysis is very rare. Rapid progression of shortness of breath symptoms occurs rarely and there are no clinical features to help differentiate between COP and SOP [8]. The radiologic manifestations of OP are varied and polymorphic on computed tomography, with the most common features being solid changes and ground-glass turbidity. The most specific signs are perifollicular turbidity, reverse halo (or atoll) sign, and radiolucent solid bands containing air bronchography [9], while others include nodules or masses, bronchial wall thickening, bronchiectasis, mediastinal lymphadenopathy, and pleural effusion [3]. The treatment of choice for OP is glucocorticoids, but there is no standardized starting dose, duration, and course of glucocorticoid therapy for OP. It has been shown that glucocorticoid therapy is usually initiated within 24 - 72 hours, followed by symptomatic relief and disappearance of imaging manifestations within 3 months. Doses of prednisone higher than 20 mg/day are recommended for prophylaxis. In patients with severe or rapidly progressive disease and impending respiratory failure, treatment with methylprednisolone (500 - 1,000 mg intravenously daily for 3 to 5 days) may be necessary, and once the patient's condition improves (usually within a few days), transition to oral therapy is required [7]. Lazor et al. recommend a total course of glucocorticoids of 24

weeks [10]. Symptoms subside rapidly with steroid treatment, but may return or progress to chronic fibrosis when treatment is stopped. On the basis of clinical and radiologic manifestations, OP should be suspected when a patient with a presumed diagnosis of infectious pneumonia does not respond to antibiotic therapy, but histopathologic confirmation is usually required to rule out other possible etiologies [11]. The histologic pattern of OP can be recognized in small biopsy specimens, such as transbronchial or core biopsy specimens. Lung cancer is the leading cause of cancer-related deaths, with an average five-year survival rate of 15 percent. Smoking remains a major risk factor for developing lung cancer. Lung cancer can be categorized as small cell carcinoma or non-small cell carcinoma (e.g., adenocarcinoma, squamous cell carcinoma, large cell carcinoma). These categories are used for treatment decisions and to determine prognosis. The most common clinical manifestations of lung cancer are chest discomfort, cough, dyspnea, and hemoptysis [12]. This is similar to the clinical presentation of OP. In the case we reported, the initial admission was mainly characterized by cough and sputum with occasional blood in the sputum, and there was no obvious elevation of inflammatory indexes, which is rare in OP and common in lung cancer, and the antibiotic treatment was poorly effective after the admission, and combined with the suspicion of pleural pulling sign and burr sign on the chest CT, which was highly suspected to be a malignant tumor of the lungs at that time. The gold standard for a definitive diagnosis of cancer is also tissue biopsy, and many of the commonly used diagnostic methods for lung cancer include fiberoptic bronchoscopy puncture, transimage-guided thoracic needle aspiration, mediastinoscopy, pleural fluid analysis (thoracentesis), thoracoscopy, and surgical access [13]. However, the treatment options for the two are completely different, with glucocorticoids being the preferred treatment for OP; however, lung cancer is treated surgically and non-surgically (including radiotherapy, chemotherapy, and palliative care, etc.). The prognosis of the two is also quite different. In this case, the patient was given glucocorticoid therapy immediately after diagnosis, and his symptoms improved after treatment, and his lung imaging showed significant uptake and improvement over the previous one. By reporting this case, we hope to raise clinical workers' awareness of the diagnosis of OP and reduce missed and misdiagnosed cases.

CONCLUSION

OP is not uncommon in clinical practice and can be severe enough to endanger the patient's life due to respiratory failure. However, due to its atypical clinical symptoms and imaging manifestations, etc., it is easy to misdiagnose and delay treatment. The diagnosis of OP could not be excluded when patients presented with cough and sputum, and the lung lesions did not improve after antibiotic anti-infective treatment was given, and ancillary tests could not accurately suggest the nature of the lesions. Although the case examination is performed as an invasive operation, its diagnostic accuracy is unquestionable. The diagnosis of OP needs to be made in conjunction with relevant medical history, medication history, physical signs, and ancillary test results to rule out other diseases causing lung lesions in order to clarify the presence or absence of secondary causes of OP. With early and accurate diagnosis of OP and timely and correct treatment, patients can have a good prognosis.

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Ethical Approval:
This study was approved by the ethics committee of North China University of Science and Technology Affiliated Hospital. All procedures performed in studies were in accordance with the ethical standards. Informed consent was obtained.

Declaration of Interest:
No conflicts of interest.

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