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Streptococcus Pharyngitis with Anaerobes Infection Misdiagnosed as Mycobacterium Tuberculosis Infection: A Case Report

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Abstract: *Introduction*: Pulmonary infection is a common disease in respiratory department. Different pathogens may lead to the same clinical symptoms and imaging changes, and the same pathogen may also lead to different clinical symptoms and imaging changes. It is often difficult to identify specific pathogens in pulmonary infection. Sometimes the patient's condition is delayed due to the doctor's inability to judge the specific pathogen well and the failure to carry out targeted treatment. We share this case and hope that doctors can enhance their understanding of this disease, minimize misdiagnosis and enhance the accuracy of disease diagnosis. *Case report*: This case reported a patient with recurrent fever, which was misdiagnosed as Mycobacterium tuberculosis infection and developed high fever after diagnostic anti-tuberculosis treatment. The posterior pleural effusion next-generation sequencing (NGS) confirmed that the patient was empyema caused by streptococcus pharyngitis combined with anaerobic infection. After anti-infection with teicoplanin and levofloxacin, the patient's body temperature was normal, lung shadow and pleural effusion were completely absorbed. *Discussion/Conclusions*: In clinical work, we should be vigilant against false positive T cell spot test (T-SPOT.TB), make rational use of NGS and other detection methods, identify specific pathogens as soon as possible, and carry out reasonable targeted treatment.

Keywords: Streptococcus Pharyngitis, Anaerobes, Mycobacterium Tuberculosis, Empyema, Case Report

1. Case Report

The patient, a 64-year-old male, was admitted to our department with "left chest and back pain with fever for 10 days". The patient's out-of-hospital highest body temperature was 39 C, PPD-positive, chest CT showed lung shadow with pleural effusion. Our hospital pleural B ultrasound was presented left pleural effusion (deepest 44mm). Closed pleural drainage was performed and 50-70ml yellow pleural effusion was drained every day without fever. Pleural effusion white blood cells was 1281 * 10^6/L, mononuclear ratio was 84.7% and ADA was 18.6u/l. Pleural effusion TSPOT-TB was positive (antigen A 35, antigen B 20). The patient was considered the possibility of pulmonary tuberculosis and tuberculous pleurisy, HRE diagnostic anti-tuberculosis treatment was given. But the patient still had recurrent fever (38-38.7 C), the highest body temperature was 41 C, white blood cells was 16.40 * 10^9/L, neutral ratio was 88.5%, CRP was 110.35mg/L and PCT was 16.22ng/ml. After stopping diagnostic anti-tuberculosis treatment, closed pleural drainage was performed again to drain purulent pleural effusion. NGS detection of pleural effusion was improved. NGS of pleural effusion indicated streptococcs pharyngitis complicated with anaerobic infection (Table 1). Pleural effusion indicated Streptococcus constellation subspecies, according to drug sensitivity (Table 2), adjust antibiotics to teicoplanin and levofloxacin for anti-infection, the patient has no fever, lung lesions and pleural effusion absorption.

Table 1. *Pleural effusion NGS.*

Gram staining	Species	Genera	Sequene number
Gram-negative bacteria	Prevotella intermedia	Prevotella	8144
Gram-positive bacteria	Miller Streptococci	Streptococci	2634
Gram-positive bacteria	pharyngeal isthmus streptococci	Streptococci	2239
Gram-negative bacteria	Fusobacterium nucleatum	Fusobacterium	2105
Gram-negative bacteria	Campylobacter showae	Campylobacter	614

Table 2. *Drug sensitivity of Streptococcus constellation cultured in pleural effusion.*

Bacteria	Antibiotic	Drug sensitivity
Streptococcus constellation subspecies	Azithromycin	Drug resistance
	Erythromycin	Drug resistance
	Cefepime	Sensitive
	Linezolid	Sensitive
	Levofloxacin	Sensitive
	Vancomycin	Sensitive

2. Discussion

Mycobacterium tuberculosis infection remains a major health problem worldwide [1], and the degree of difficulty in diagnosis of tuberculosis infection varies from person to person. With the progress of medical technology, more and more detection methods have emerged. In recent years, tuberculosis infection T cell spot test (T-SPOT.TB) is alive. The sensitivity and specificity of active tuberculosis and latent infectious tuberculosis have been widely recognized in clinic [2]. TSPOT.TB is a cellular immunological technique. TSPOT.TB test samples can be: blood, hydrothorax and ascites, cerebrospinal fluid and so on. Although pleural effusion tuberculosis infection T cell spot test (T-SPOT.TB) also has high sensitivity and specificity in the detection of tuberculous pleurisy. However, TSPOT. TB still has false positives and false negatives, and studies have shown that the factors that influence false negatives are tuberculous meningitis patients, while the factors that influence false positives are the cured tuberculosis patients [3]. Therefore, when a patient is considered for tuberculous meningitis or cured tuberculosis, TSPOT. TB detection has limited significance.

Miller streptococci (pharyngitis streptococci) mainly includes constellation streptococci, intermediate streptococci and pharyngeal isthmus streptococci. The flora is the normal flora of oral cavity and nasopharynx, genitourinary tract and gastrointestinal tract, and it is a conditional pathogen. The characteristics of flora are gram-positive bacteria, anaerobic / facultative anaerobic, poor growth in aerobic environment, 5% CO_2 or anaerobic environment can promote its growth [4]. Pharyngitis streptococci have gradually become one of the important pathogens causing suppurative infection, and Most of the chest infections are suppurative [5] (empyema or lung abscess), mainly empyema. Intermediate streptococci are most common in brain and liver abscesses, and pneumonia is rare.

Empyema refers to the purulent infection in which purulent exudate accumulates in the pleural cavity, and many pathogens can invade the pleural cavity to produce empyema. Among the pathogens of bacterial empyema, the incidence of anaerobic bacteria is high [6]. Some studies have shown that the average age of empyema caused by streptococcus pharyngitis is 61 or 62 years old [7, 8], which is consistent with the age and sex of the patient in this case. Pleurisy caused by streptococcus pharyngitis is older and has lower serum albumin than other pathogens [9]. Streptococcus pharyngitis and anaerobes are important pathogens of pulmonary suppurative lesions. Streptococcus pharyngitis is easily co-infected with anaerobes to cause empyema [10]. In particular, anaerobes play animportant role in the pathogenesis of pulmonary suppurative lesions [11]. There is a synergistic effect between the two, and the anaerobic environment produced by anaerobes can promote the growth of pharyngitis streptococci, but the specific epidemiology and pathology are not completely clear [12].

Adequate drainage is the key to the treatment of empyema. Pleural puncture and drainage of pus should be carried out as soon as possible to remove pus to a large extent, reduce the degree of pleural adhesion and alleviate the progression of the disease. Chest irrigation can be carried out after thoracic puncture and catheterization [13]. Depending on the patient's condition, chest irrigation can choose sodium bicarbonate alkalinization environment, reasonable local treatment of antibiotics, and urokinase to reduce adhesion. At the same time, combined with reasonable systemic antibiotic therapy to enhance the therapeutic efficacy [14]. If the curative effect of conservative treatment in internal medicine is not good, surgical intervention can be considered [15].

3. Conclusion

The article introduces a case of streptococcus pharyngitis combined with anaerobes infection misdiagnosed as mycobacterium tuberculosis. Reviewing the diagnosis and treatment process of this case report, it further deepens the understanding of TSPOT.TB, the pathogen and treatment of empyema. In clinical work, we should be vigilant against false positive T cell spot test (T-SPOT.TB), make rational use of NGS and other detection methods, identify specific pathogens as soon as possible, and carry out reasonable targeted treatment.

Authorship

Zhu Wen-fang: drafted the manuscript.

Zhang Yi-wen: revised the manuscript.

All authors contributed to manuscript revision and have read and approved the final version.

Conflict of Interest

The authors declare that they have no competing interests.

Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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