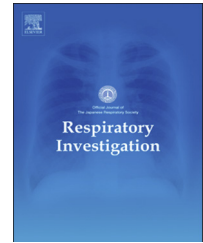


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Original article

Nine pulmonary aspiration syndrome cases of atypical clinical presentation, in which the final diagnosis was obtained by histological examinations



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ABSTRACT

Background: While pulmonary aspiration syndrome (PAS) is primarily clinically diagnosed, atypical PAS cases can be misdiagnosed clinically and are more accurately diagnosed histologically. To elucidate clinicopathological features of these rare cases, we examined PAS cases determined by histological examination of transbronchial lung biopsy (TBLB) specimens. **Methods:** Of 6105 TBLB cases investigated from 1990 to 2007, 11 were diagnosed as PAS based on histology. Of these, we examined 9 records in detail, as the medical records for 2 cases were unavailable.

Results: Histopathological findings indicated 8 patients with aspiration pneumonia and 1 with diffuse aspiration bronchiolitis. However, the pre-bronchoscopy diagnoses included lung cancer, mycobacteriosis, organizing pneumonia, repetitive pneumonia, fungal infection, and interstitial pneumonia. PAS was not considered before TBLB. Only 4 of the 9 patients developed subjective symptoms including fever and cough with sputum production. Laboratory findings demonstrated elevation of white blood cell (WBC) count in only 1 patient and elevation of C reactive protein (CRP) level in 4 patients. Radiographic examination revealed abnormal findings in the dorsal right lower lobes, which was the most vulnerable site for aspiration pneumonia, and also in the upper and ventral portions of the lung. Although the characteristic findings of PAS were scarce, all patients had conditions predisposing to aspiration; i.e., gastrectomy, excessive alcohol drinking, post-cerebral infarction, and sinobronchial syndrome.

Conclusions: We diagnosed 9 PAS patients on the basis of histological findings that were distinct from clinical findings. Despite presenting with variable symptoms and laboratory and radiographic findings, they all exhibited predisposing factors to aspiration.

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Abbreviations: CRP, C reactive protein; MAC, mycobacterium-avium-complex; PAS, pulmonary aspiration syndrome; TBLB, transbronchial lung biopsy; WBC, white blood cell

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1. Introduction

Pneumonia is the third leading cause of death in Japan, and aspiration pneumonia in the elderly is expected to increase further in future [1,2]. However, aspiration can cause other types of pulmonary diseases. Pulmonary aspiration syndrome (PAS) consists of aspiration pneumonia, aspiration pneumonitis, and diffuse aspiration bronchiolitis; other aspiration-related diseases include lipoid pneumonia, airway obstruction, lung abscess, and chronic pulmonary fibrosis. Aspiration pneumonia is an infection process caused by aspiration of oral bacteria, while diffuse aspiration bronchiolitis is a chronic inflammatory reaction of the bronchioles to the foreign bodies recurrently aspirated [3]. Aspiration pneumonitis, which typically coincides with disturbance of consciousness, is a chemical injury caused by inhalation of gastric contents [4].

The diagnosis of PAS is sometimes difficult, particularly when the time of the original aspiration is unknown. Although aspiration pneumonia is more common, and it is often distinct in clinical respects, the diseases classified as PAS overlap and share common pathophysiologic and clinical characteristics [3-8]. PAS is generally suspected if fever, cough, and sputum are associated with dysphagia caused by cerebrovascular diseases, neuromuscular disease, disturbance of consciousness, dementia, gastroesophageal reflux disease, gastrectomy, tumor of the larynx and pharynx, or other predisposing diseases [9]. Laboratory findings of elevated white blood cell (WBC) count and C reactive protein (CRP) level with chest radiography shadows in the lower dorsal portion of the lung support the diagnosis. Since many such patients exhibit poor general condition, and treatment with antibiotics is usually effective, invasive examinations such as bronchoscopy are often avoided [6,8,10]. As a result, surgical lung biopsy and TBLB with bronchoscopy tend to be performed in patients with atypical clinical presentation of PAS [11,12]. It has been reported that rare forms of PAS were diagnosed by bronchoscopy or open lung biopsy due to atypical clinical features. Although histological examination may often assist the diagnosis in such cases, the clinical characteristics of the patients who would benefit from biopsy have not yet been sufficiently elucidated.

The purpose of this retrospective study was to clarify the clinicopathological characteristics of PAS diagnosed through histological findings.

2. Materials and methods

2.1. Patient selection

In our hospital, we performed 6105 transbronchial lung biopsies (TBLB) from 1990 to 2007. PAS was diagnosed in 11 patients. Only 9 of these 11 cases were included in this study, because medical records of 2 were not available; clinical information was derived from the medical records of the patients.

2.2. IRB approval information

This study was approved by the ethics committee of the National Hospital Organization Tokyo Hospital Institutional Review Board on September 27th, 2012, registration number 120018.

2.3. Clinical data collection

From medical records, we determined each patient's age, gender, history of predisposing diseases, symptoms associated with acute or chronic respiratory tract inflammation caused by aspiration, laboratory findings (WBC counts, CRP levels), clinical course, and the reason for performing TBLB. Bronchoscopy findings and clinical course after bronchoscopy were also determined. Furthermore, we reviewed clinical diagnoses and radiographs (chest radiographs and CT scans) derived pre- and post-bronchoscopy. Clinical diagnoses before bronchoscopy and TBLB were obtained from the clinical diagnosis section of each patient's "Histology Application Form." Culturing of sputum and bronchial washing was performed in 8 of the 9 cases. Indigenous bacteria and *Candida* species were excluded from the data of cultured organisms from sputum.

2.4. Histological examination

TBLB specimens were fixed with formalin and stained with Hematoxylin-Eosin and Elastica van Gieson stains. If granulomas were detected, auramine, Ziehl-Neelsen, and Fungi-flora-Y® (Biomate Co. Ltd., Tokyo, Japan) stains were added to examine mycobacterial and fungal infections and detect foreign bodies originating from fungi or plants [13].

2.5. Definition of PAS

In this study, the following histological criteria were used for PAS diagnosis [14-16]: (1) presence of foreign bodies in the peribronchiolar region of the lung and not in the blood vessels, (2) presence of multinucleated giant cells, neutrophil infiltration, and granulomatous reaction around foreign bodies, and (3) presence of foreign bodies (fibrous or crystallized) engulfed in the cytoplasm of multinucleated giant cells. We diagnosed PAS when all of the above histological features were confirmed.

2.6. Statistics

In this study, statistical analyses were not performed because the sample size was too small.

3. Results

The patients' profiles and backgrounds are summarized in Table 1. Seven men and 2 women with an average age of 66.4 years (range, 60-80 years) were included in the study. All of these patients had at least 1 disease predisposing to aspiration, i.e., 5 patients with gastrectomy, 3 patients with heavy alcohol drinking, 2 patients with cerebral infarction, and

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