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Tracheobronchial lesions in eosinophilic pneumonia

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ABSTRACT

Background: Eosinophilic pneumonia (EP) is characterized by eosinophil infiltration in the lung parenchyma. However, tracheobronchial lesions associated with the disease have been poorly described. To clarify the frequency and characteristics of cases with tracheobronchial lesions in EP, we performed a retrospective review of EP patients.
Methods: We included 36 EP cases seen from January 2004 to December 2007 at the Kinki-Chuo Chest Medical Center. The incidence of tracheobronchial nodules and associated clinical features were analyzed.
Results: Of these 36 patients, 29 had chronic eosinophilic pneumonia (CEP); 1, acute EP; 3, drug-induced EP; 2, allergic bronchopulmonary aspergillosis; and 1, parasite-related EP. Only 2 of the 29 CEP cases had tracheobronchial lesions. For both of these cases, bronchoscopy revealed multiple whitish nodules on the tracheobronchial mucosa. The associated histopathological findings revealed squamous metaplasia and eosinophil infiltration in the subepithelial region. In both cases, the nodules disappeared after steroid therapy. The prevalence of tracheobronchial lesions was 6.9% in CEP patients and 5.6% in EP patients overall. EP patients were divided into 3 groups: CEP with nodules ($n=2$), CEP without nodules ($n=27$), and other EP ($n=7$). We found that the CEP with nodules group showed a relatively higher incidence of respiratory symptoms, higher white blood cell (WBC) count, and higher levels of peripheral and bronchoalveolar eosinophilia than the other groups.
Conclusions: Tracheobronchial nodules represent rare observations within the EP population, which are likely to reflect a severe disease condition.
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1. Introduction

Eosinophilic pneumonia (EP) is characterized by the infiltration of eosinophils in the lung parenchyma with or without circulating eosinophilia [1–4]. The condition can be caused by a variety of stimuli, including fungi, parasitic infections, and drugs [2,5,6]. EP can be further divided into various subtypes: chronic eosinophilic pneumonia (CEP), acute eosinophilic pneumonia (AEP), drug-induced EP, allergic bronchopulmonary aspergillosis (ABPA), Churg-Strauss syndrome (CSS), and others [7,8]. CEP was originally reported to be characterized by severe dyspnea, weight loss, and fever lasting months or years, with a typical chest radiograph showing peripheral pulmonary infiltrates [4]. Non-segmental air space consolidations that are detectable using chest-computed tomography (CT) have also been reported [9,10]. Compared to pulmonary parenchymal lesions, which are well described in the context of CEP, tracheobronchial mucosal lesions have not been studied extensively. Only 2 reported cases of CEP have involved multiple small nodules with eosinophilic infiltration that localized to large airways [11,12]. Few reports have examined the prevalence and features of such mucosal lesions in patients with EP. The purpose of this study was to clarify the frequency and characteristics of cases of EP involving tracheobronchial lesions. Some of our data were previously reported in the form of an abstract [13].

2. Materials and methods

We retrospectively reviewed our clinical charts and found 36 cases of EP seen from January 2004 to December 2007 at the Kinki-Chuo Chest Medical Center (Osaka, Japan). The present study included patients diagnosed with EP after pathological examination revealed the infiltration of eosinophils admixed with histiocytes and other inflammatory cells into the airspaces and alveolar interstitium with preservation of the background structure of the lung [7,8].

We modified the criteria established by Mochizuki et al. [14] for the diagnosis of CEP. Inclusion in this study require fulfillment of both of the criteria outlined below

(A) CEP was suspected because of clinical symptoms and abnormal chest shadows that had existed for more than 1 month, with the exclusion of other diseases (e.g., infection) and eosinophilic pneumonias of determined origin.
(B) At least one of the following conditions was satisfied:
  (1) Histopathological diagnosis of CEP as determined by a surgical lung biopsy.
  (2) The presence of numerous eosinophils in transbronchial lung biopsy (TBLB) specimen.

The diagnoses of AEP, ABPA, and drug-induced EP were based on the criteria proposed by Allen et al. [2], Tillie-Leblond et al. [15], and Allen et al. [16], respectively. In brief, BAL was performed by instilling a total of 150 mL of normal saline from three 50-mL aliquots and retrieved using a handheld syringe. The procedure has previously been described in detail [17].

Table 1 – Laboratory data on admission.

	Case 1	Case 2
Blood examinations		
WBC (/μL)	24,900	20,300
Neutrophils (%)	33.4	21.0
Lymphocytes (%)	9.2	8.9
Monocytes (%)	1.9	3.2
Eosinophils (%)	55.4	66.8
Basophils (%)	0.1	0.1
Hb (g/dL)	10.5	11.9
Ht (%)	33.9	36.5
PLT ($\times 10^4$/μL)	41.9	42.3
AST (IU/L)	21	129
ALT (IU/L)	20	279
LDH (IU/L)	257	379
CRP (mg/dL)	4.26	3.74
ANA	$< \times 40$	$< \times 40$
PR3-ANCA (EU)	<10	<10
MPO-ANCA (EU)	<10	66
IgE RIST (IU/mL)	1316	172
Site	Right $B^3{}_b$	Right B^4
BALF analysis		
Total cell count ($\times 10^5$/mL)	11.25	7.07
Macrophages (%)	4.1	15.6
Lymphocytes (%)	3.8	2.8
Neutrophils (%)	2.2	0
Eosinophils (%)	87.7	81.2
Basophils/mast cells (%)	2.2	0.4
CD4/CD8	1.22	0.73

WBC, white blood cells; Ht, hematocrit; PLT, platelets; T-Bil, total-bilirubin; ALP, alkaline phosphatase; AST, aspartate amino transferase; ALT, alanine amino transferase; CPK, creatine phosphokinase; CRP, C-reactive protein; ANA, anti-nuclear antibody; ANCA, anti-neutrophil cytoplasmic autoantibody and RIST, radio immunosorbent test.

To analyze the characteristics of EP patients with tracheobronchial nodules with respect to the overall population of EP patients, we investigated the following variables: age, sex, smoking status, respiratory symptoms, percutaneous oxygen saturation, pulmonary function, and laboratory data. This retrospective study was approved by the Ethics Committee of the National Hospital Organization, Kinki-Chuo Chest Medical Center (Approved date: September 8, 2010; Approved #: 287). All data in Table 2 are expressed as the median (range).

3. Results

3.1. *Frequency*

A total of 36 patients with EP were included in this study: 29 patients with CEP, 1 patient with AEP, 3 patients with drug-induced EP, 2 patients with ABPA, and 1 patient with parasite-related EP. All 36 patients underwent bronchoscopic examination at the time of diagnosis. Two CEP patients had nodules in the tracheobronchial mucosa. The prevalence of tracheobronchial nodules was 6.9% (2/29) in CEP patients and 5.6% (2/36) in EP patients overall. These 2 cases are described below.

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