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CASE REPORT

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Suspected fibrin glue-induced acute eosinophilic pneumonia after pulmonary resection: A case report

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Abstract

Air leakage is a common complication after pulmonary resection, and fibrin glue is used as a sealant to reduce postoperative air leakage. It is generally recognized that fibrin glue-induced adverse events are rare. Herein, we report a rare case of suspected fibrin glue-induced acute eosinophilic pneumonia (AEP). A 72-year-old man underwent right lower lobectomy and mediastinal lymph node dissection for right lower lung cancer. Fibrin glue was sprayed to cover the interlobar surface of the right upper and middle lobes. On post-operative day 10, computed tomography (CT) revealed ground-glass shadows around the interlobar surface of the remaining lobes of the right lung. Although antibacterial drugs were administered for suspected bacterial pneumonia, fever spike, shortness of breath, and exacerbation of ground-glass shadows were observed. Peripheral blood and bronchoalveolar lavage fluid showed increased eosinophil count, supporting the diagnosis of AEP. Pneumonia resolved after prednisolone administration. At one-year follow-up, CT showed no AEP recurrence. Drug-induced pneumonia usually develops in the bilateral lung and rarely in the hemilateral lung. In this case, pneumonia was localized around the site covered with fibrin glue, suggesting fibrin glue-induced AEP. Thus, the use of fibrin glue should be carefully considered during pulmonary resection.

KEYWORDS
bacterial pneumonia, bronchoalveolar lavage, eosinophilic pneumonia, fibrin glue, lung cancer

INTRODUCTION

Fibrin glue is used as a sealant to reduce air leakage, a common complication after pulmonary resection.[1–3] Adverse events associated with fibrin glue use in pulmonary resection such as anaphylactic shock[4] and eosinophilic pleural effusion[5] have been previously reported. Herein, we report a rare case of suspected fibrin glue-induced acute eosinophilic pneumonia (AEP).

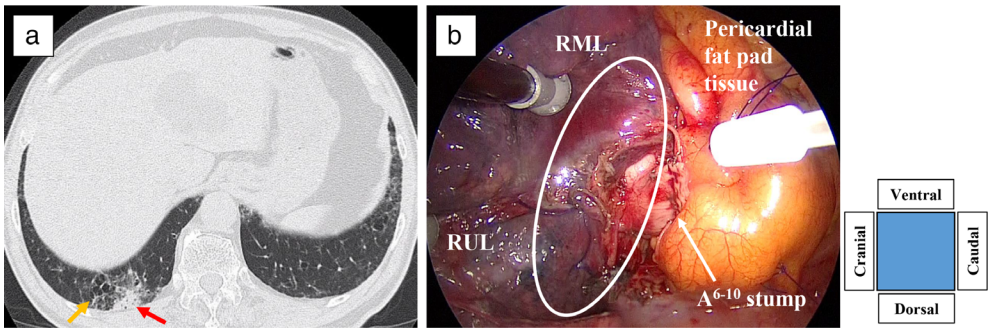

FIGURE 1 Preoperative and intraoperative imaging findings. (a) Computed tomography (CT) showing a lung nodule in the right lower lobe (red arrow) with surrounding emphysema (orange arrow). (b) Surgical findings while spraying fibrin glue on the interlobar surface of the right upper and middle lobes after right lower lobectomy (white circle). RML, right middle lobe; RUL, right upper lobe

CASE REPORT

A 72-year-old man with angina, hypertension, dyslipidemia, and a 25 pack-year smoking history was identified with a pulmonary nodule on computed tomography (CT). He had no previous history of fibrin glue use. CT revealed a 2.1-cm lung tumor in the right lower lobe with surrounding emphysema (Figure 1(a)). The nodule was classified as lung squamous cell carcinoma by transbronchial lung biopsy (TBLB). The lung cancer was diagnosed as clinical stage IA3

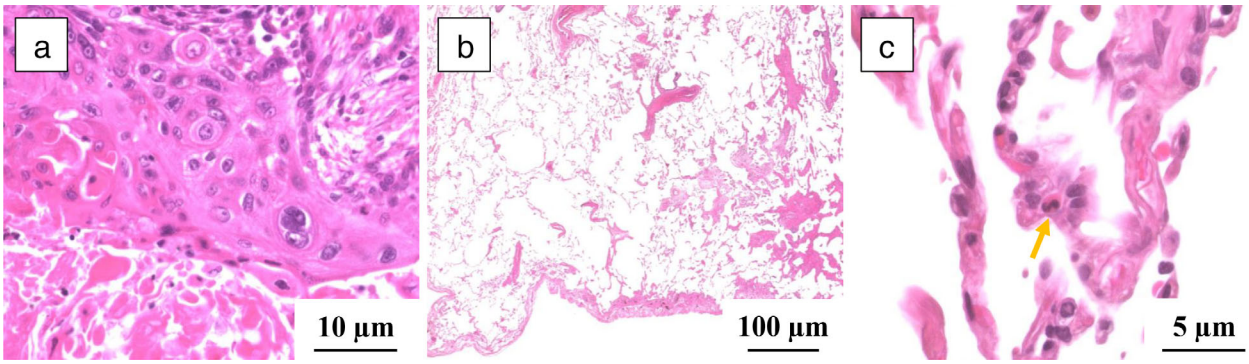

FIGURE 2 Histopathological findings. (a) A nodule showing keratinizing squamous cell carcinoma is localized at the right lower lobe. (b) Emphysematous changes around the tumor are observed. (c) Few eosinophils are observed on the alveolar wall (orange arrow), suggesting no eosinophilic pneumonia

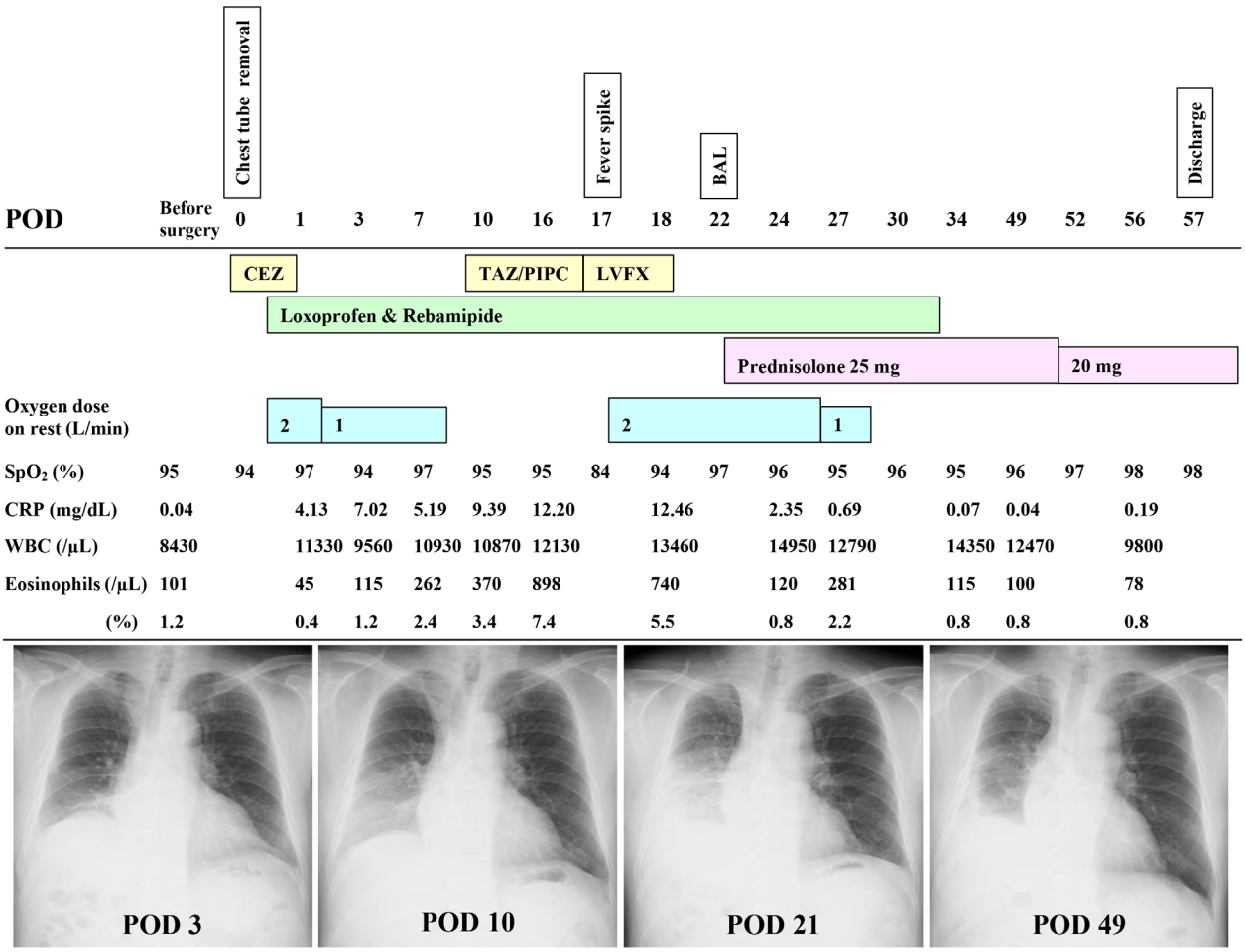

FIGURE 3 Postoperative clinical course. BAL, bronchoalveolar lavage; CEZ, cefazolin; CRP, C-reactive protein; LVFX, levofloxacin; POD, postoperative day; SpO_2, percutaneous oxygen saturation; TAZ/PIPC, tazobactam/piperacillin; WBC, white blood cell

(T1cN0M0). Right lower lobectomy and mediastinal lymph node dissection (ND2a-1) were performed by video-assisted thoracoscopic surgery (VATS), and the bronchial stump was subsequently wrapped with pedicled pericardial fat pad tissue. Fibrin glue was sprayed to cover the interlobar surface of the right upper and middle lobes (Figure 1(b)). The operation time was 128 min, and the estimated blood loss was 20 ml. Following pathological diagnosis, keratinizing squamous cell carcinoma was staged as IA2 (T1bN0M0) (Figure 2(a)). Emphysema was observed around the tumor, with no accumulation of eosinophils in the pulmonary parenchyma (Figure 2(b), (c)).

The postoperative course is shown in Figure 3. No air leakage was observed postoperatively, and the chest drain tube was removed on the operative day. The patient took loxoprofen and rebamipide for one month after surgery. On postoperative day (POD) 10, laboratory tests showed elevated C-reactive protein levels, and chest radiography showed decreased permeability of the right lower lung field. CT revealed ground-glass shadows around the major fissure of the remaining lobes of the right lung (Figure 4). Although antibacterial drugs were administered for suspected bacterial pneumonia, fever spike, shortness of breath, and exacerbation of ground-glass shadows were observed. Laboratory tests revealed eosinophilia (≥500/μl) and a negative myeloperoxidase antineutrophil cytoplasmic antibody test. Bronchoalveolar lavage (BAL) was performed on POD 22. The BAL culture showed no growth, and BAL fluid consisted of 20.5% eosinophils (Table 1). Since the patient was taking aspirin, TBLB was not performed. The patient was diagnosed with AEP, which resolved after prednisolone administration, and he was discharged on POD 57.

CT revealed diminution of ground-glass shadows at three months after surgery. Prednisolone was tapered and discontinued at five months after surgery. After discontinuation of prednisolone, a drug-induced lymphocyte stimulation test (DLST) for fibrin glue was performed at five months and one year after surgery. A stimulation index of 150% (>180% is considered positive) at both time points was obtained. At

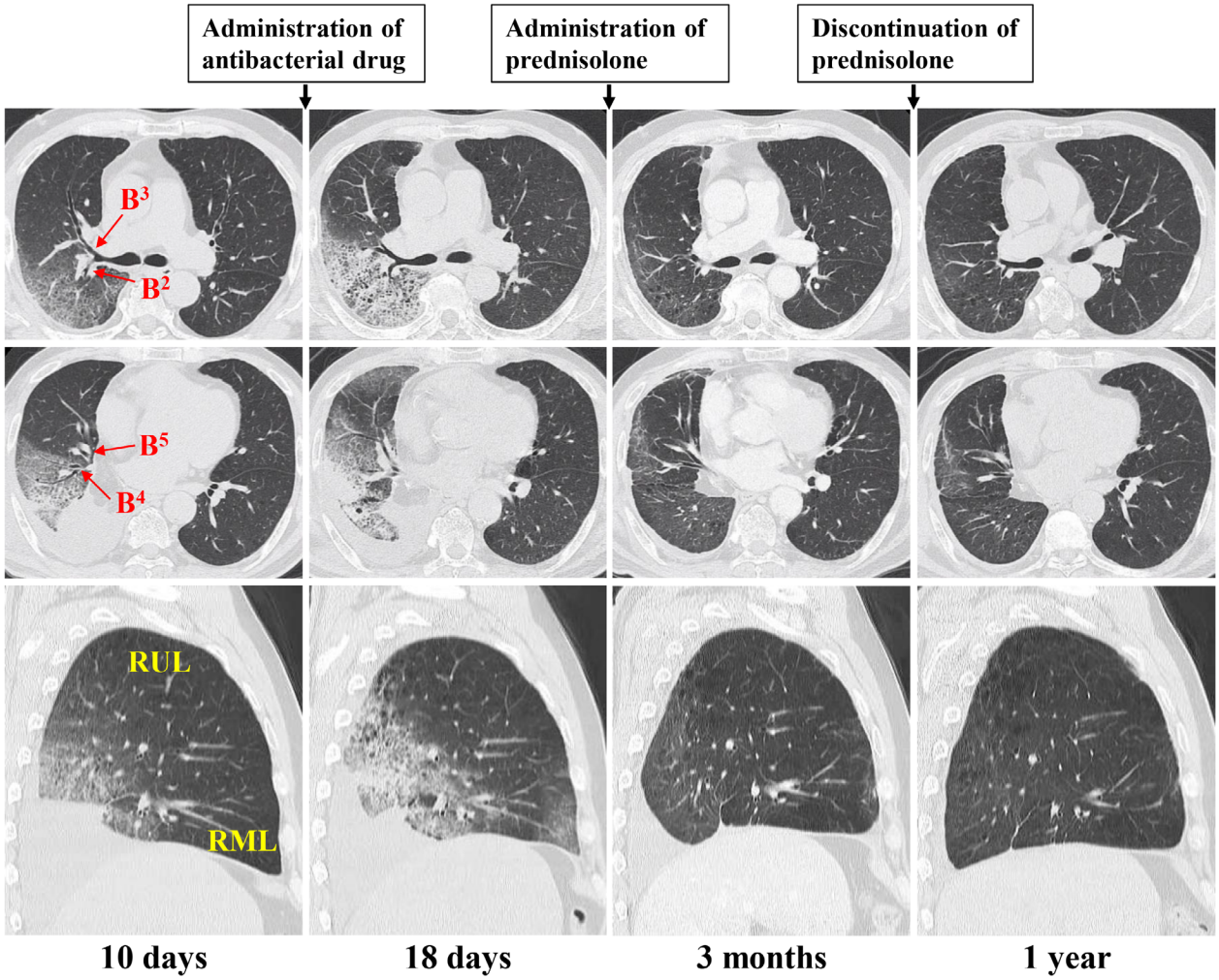

FIGURE 4 Computed tomography (CT) images of resolving pneumonia. Ground-glass shadow diminution around the interlobar surface of the remaining lobes of the right lung after prednisolone administration. No recurrence of pneumonia was observed after the discontinuation of prednisolone. RML, right middle lobe; RUL, right upper lobe

TABLE 1 Bronchoalveolar lavage fluid data

Recovery amount (ml)		73/150
Recovery rate (%)		48.7
Total cell counts ($\times 10^5$/ml)		9.5
Cell differentiation (%)	Macrophages	60.6
	Lymphocytes	13.3
	Neutrophils	4.8
	Eosinophils	20.5
	Basophils	0.0
Lymphocyte subsets	CD4 (%)	54.7
	CD8 (%)	14.8
	CD4/CD8	3.7
Culture	Negative[a]	

[a]All organisms including acid-fast bacilli and fungi.

one-year follow-up after surgery, CT showed no recurrence of eosinophilic pneumonia or lung cancer.

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

DISCUSSION

The diagnostic criteria for eosinophilic pneumonia (EP) are either of the following[6]: peripheral blood eosinophilia (≥500/μl) with abnormal chest shadows, BAL fluid consisting of more than 25% eosinophils, or dense accumulation of eosinophils in the pulmonary parenchyma on lung biopsy. Generally, patients with AEP rapidly respond to high doses of corticosteroids and do not experience relapse after their discontinuation.[6] The main causes of AEP include smoking, drugs, and fungal or parasitic infection.[7] In this case, drug-induced AEP was suspected based on the clinical course as this often develops about one week to one month after the administration of the causative drug.[8] Drug-induced pneumonia usually develops in the bilateral lung and rarely in the hemilateral lung.[9] In this case, pneumonia was only observed around the site covered with fibrin glue, suggesting fibrin glue-induced AEP. Although a provocation test using the suspected agent is the most reliable method for assessing the relationship between the agent and pneumonia, this test can cause severe lung injury.[8] Additionally, postoperative readministration of fibrin glue to the lung surface by methods other than surgery is difficult; thus, a provocation test was not performed in this case. In Japan, a DLST is widely used in the diagnosis of drug-induced pneumonia.[10] However, it has been reported that the DLST is not particularly useful in finding the causative drug in cases of drug-induced EP.[8] In this case, although the DLST for fibrin glue was negative, fibrin glue was highly suspected to be the causative agent owing to the site of pneumonia; however, the role of fibrin glue as the causative agent cannot be conclusively established.

In conclusion, in cases of pneumonia developing only on the surgical side after pulmonary resection, it is necessary to consider the possibility of fibrin glue-induced pneumonia as well as bacterial pneumonia. Therefore, the use of fibrin glue should be carefully evaluated. Our study is important in that this is the first reported case of suspected fibrin glue-induced AEP in the English literature.

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CONFLICT OF INTEREST

None of the authors has any potential conflicts of interest relevant to this report.

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