Case Report

Iatrogenic Mediastinal Emphysema and Subcutaneous Emphysema Induced by Bronchoscopic Examination

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Abstract

A 79-year-old man presented with fever of unknown origin with interstitial shadows in the bilateral lung fields. A bronchoscopic examination did not indicate any malignancy or specific interstitial disease. After the bronchoscopic examination, the patient gradually developed subcutaneous and mediastinal emphysema. As the subcutaneous emphysema and mediastinal emphysema were mild, the patient was not administered any specific treatment. However, he eventually developed severe subcutaneous emphysema and mediastinal emphysema, and did not show any transient improvement. The patient underwent another bronchoscopic examination at another centre and a lacerated wound was detected. Thereafter, emergent operation was performed.

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Key words: Bronchoscopic examination, Complication, Iatrogenic mediastinal emphysema, Subcutaneous emphysema.

Introduction

Iatrogenic mediastinal emphysema and subcutaneous emphysema usually develops as a result of chest drain tube use.[1] However, the development of iatrogenic mediastinal emphysema and subcutaneous emphysema after bronchoscopic examination is rare; *to the best of our knowledge, no such cases have been reported in the literature thus far*. In the present report, we describe a case wherein iatrogenic mediastinal emphysema and subcutaneous emphysema gradually progressed after a bronchoscopic examination.

Case Report

A 79-year-old male (performance status: 2) presented to the out-patient clinic of Ishikiri-Seiki Hospital (Higashiosaka, Japan) with a history of unknown fever. The results of laboratory analysis of peripheral blood before bronchoscopic examination were normal, except for peripheral blood eosinophilia and increased levels of C-reactive protein (Table 1). Computed tomography (CT) of the chest indicated a nodule, measuring 1cm×1cm in size at the mediastinum (Figure 1). However, subsequently interstitial shadows were observed in addition (Figure 2).

Table. Laboratory parameters

Haematology	Observations	Serum Biochemistry	Observations
Total leucocyte count (/μL)	10,490	Total bilirubin (mg/dL)	0.3
Differential leucocyte count		Blood urea nitrogen (mg/dL)	10.0
Neutrophils (%)	35.7	Serum creatinin (mg/dL)	0.76
Lymphocytes (%)	11.3	Total serum proteins (g/dL)	5.6
Eosinophils (%)	47.6	Serum albumin (g/dL)	2.4
Red blood cell count (/μL)	430×10^4	Serum sodium (mEq/L)	139
Haemoglobin (g/dL)	11.9	Serum potassium (mEq/L)	4.3
Haematocrit (%)	36.8	Serum chloride (mEq/L)	105
Platelet count (/μL)	22.8×10^4	Aspartate aminotransferase (IU/L)	10.0
Serology		Alanine aminotransferase (IU/L)	10.0
C-reactive protein (mg/dL)	3.9	Creatinine kinase (IU/L)	19.0
		Lactate dehydrogenase (IU/L)	165.0

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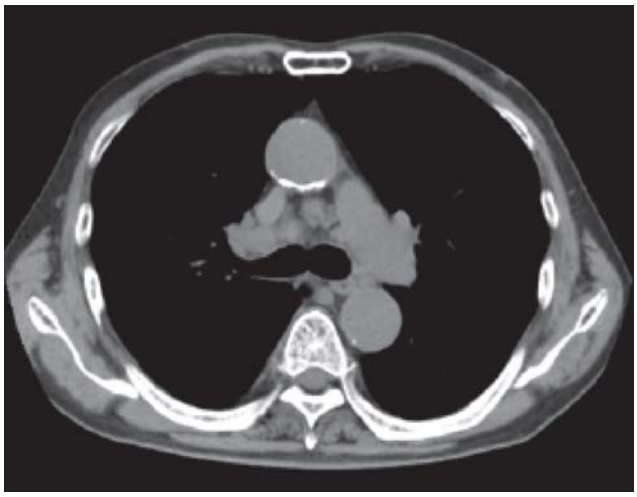

Figure 1. Computed tomography of the chest. A lymph node measuring 1cm×1cm can be seen at the mediastinum.

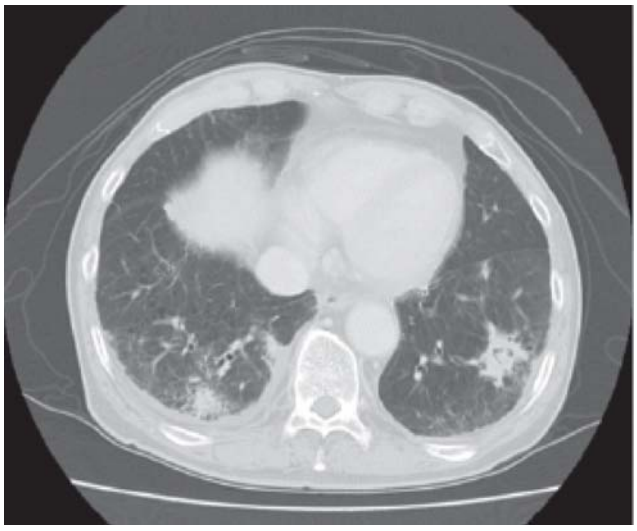

Figure 2. Computed tomography of the chest. Appearance of consolidation at several fields.

Bronchoalveolar lavage at the right B^3 region and transbronchial biopsy at the left B^9_a region on the bronchoscopic examination did not indicate any malignancy or specific interstitial inflammation. After four hours, the patient complained of subcutaneous emphysema. CT indicated the presence of occurrence of mediastinal emphysema and subcutaneous emphysema a day after bronchoscopic examination (Figure 3).

The patient was not treated with specific therapy, however, the mediastinal emphysema and subcutaneous emphysema continued to worsen (Figure 4). He was subsequently transferred to another hospital, and a second bronchoscopic examination was performed which revealed a lacerated wound measuring 1.5cm, in the trachea, around the first carina. Thereafter, an emergent procedure to suture the lacerated wound with 4-0 polydioxanone sutures-absorbable surgical sutures was performed. The patient recovered and was discharged from the hospital 28 days following surgery.

Figure 3. Computed tomography of the chest 1 day after the bronchoscopic examination. Mediastinal emphysema and subcutaneous emphysema are evident.

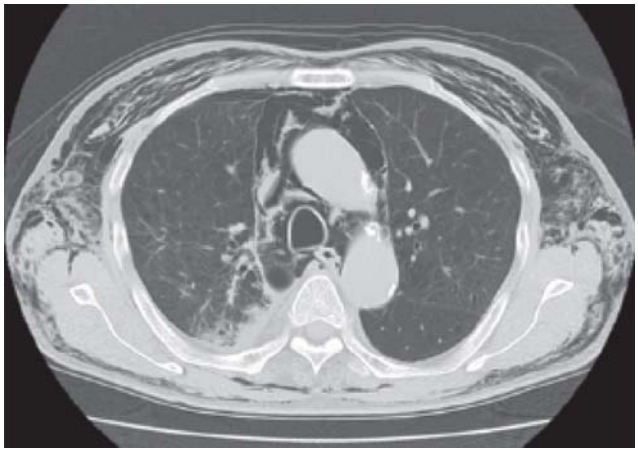

Figure 4. Computed tomography of the chest at 5 days after the bronchoscopic examination. Worsening of the mediastinal emphysema and subcutaneous emphysema can be seen.

Discussion

The complications of bronchoscopic examination include pneumothorax, pneumonia and bleeding.[2] However, *cases of iatrogenic mediastinal emphysema and subcutaneous emphysema due to a lacerated wound in the central airway are rare; to our best knowledge, no such cases has been reported thus far in the literature*. Although cases wherein an iatrogenic lacerated wound was induced by a bougie in the right main bronchus on intubation with an airway tube have been reported,[3] cases of iatrogenic lacerated wound as a result of a bronchoscopic examination have not been reported.

Severe lacerated wounds as a result of road traffic injuries may develop. However, a severe wound, such as that noted in the current case, may have developed subcutaneous wound after bronchoscopic examinations. In this case, the patient was transferred to another centre and underwent another bronchoscopic examination, wherein a lacerated wound with a size of 1.5cm was detected. Hence, suturing of the wound was performed.

Several risk factors may be associated with the development of lacerated wound. The patient was receiving oral steroids for a long duration for the treatment of idiopathic hyper-eosinophilic syndrome, and therefore, the airway might be more vulnerable in this patient. Moreover, the effect of sedation was only minimal because of hypovolaemic state during bronchoscopic examination and it was difficult for the patient to completely remain at rest.

As cases of subcutaneous emphysema and mediastinal emphysema after bronchoscopic examination are very rare, there is no "gold standard" treatment for the same. *To the best of our knowledge, this is the first report to describe a case of lacerated wound due to bronchoscopic examination.* Although other complications of bronchoscopic examination have been observed, such as pneumonia, bleeding, pneumothorax, and other related conditions,[2] the association between bronchoscopic examination and mediastinal emphysema has not been appropriately considered. Hence, new strategies for assessing mediastinal emphysema and subcutaneous emphysema are warranted.

In conclusion, we herein describe the first report of a case of severe mediastinal emphysema and subcutaneous emphysema associated with lacerated wound in the trachea after bronchoscopic examination. To improve assessments of complications associated with bronchoscopic examination, additional data are needed regarding the natural history of hyper-eosinophilic syndrome, diagnosis, extent of the risk of bronchoscopic examination while receiving treatment with oral corticosteroids, and vulnerability of the airway due to corticosteroid treatment.

References

1. Ernst A, Gerard A, Johnstone D. Interventional pulmonary procedures: guidelines from the American College of Chest Physicians. *Chest* 2003;123:1693–717.
2. Mitchell DM, Emerson CJ, Collyer J, Collins JV. Fiberoptic bronchoscopy: ten years on. *Br Med J* 1980;2:360–3.
3. Tacquard C, Collange O, Olland A, Degot T, Steib A. Post-intubation tracheal rupture: poor healing of the tracheal wall. *Can J Anaesth* 2014;61:357–61.