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Emergency surgery for lung cancer with abscess formation after transbronchial biopsy

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Abstract

Abscess formation in lung cancer after transbronchial biopsy (TBB) is a rare complication with no standard consensus on a coping strategy or prophylaxis. We describe an instructive case of lung cancer which developed into an abscess after TBB. An 80-year-old man with poorly controlled diabetes mellitus underwent TBB for diagnosing a mass lesion in the left upper lobe. The TBB specimen confirmed a diagnosis of lung cancer, and he was scheduled for radical surgery. However, the tumour was revealed to have progressed into an enlarged abscess 24 days after TBB. Prompt use of meropenem failed to relieve the infection, hence we performed emergency left upper lobectomy. Poorly controlled diabetes mellitus was considered to be a risk for the formation of a tumour abscess after TBB. It was difficult to control the infection with conservative treatment using antibiotics; emergency surgical resection was considered to be the safest strategy for recovery.

Introduction

Abscess formation after transbronchial biopsy (TBB) done for diagnosing lung cancer is a rare complication. In spite of its life-threatening course after onset, there is no standard consensus on coping strategies or prophylaxis because the condition occurs rarely. We report an instructive case of lung pleomorphic carcinoma, which developed into an abscess after TBB. We treated the patient successfully with emergency surgical resection.

Case Report

An 80-year-old man who had never been a smoker was referred to our hospital because of an abnormal chest X-ray finding. Chest computed tomography (CT) revealed a mass lesion, 36 mm × 30 mm, in the upper lobe of the left lung, invading the parietal pleura (Fig. 1A). On mediastinal window, the tumour contained small cavities, which suggested necrosis in the central part of the tumour (Fig.1B, arrow). Laboratory studies revealed normal values of tumour markers for lung cancer and an elevated value (8.0%) of HbA1c (the normal value is <6.5%). As primary lung cancer was strongly suspected, we attempted diagnosing with TBB. We used flexible bronchoscopy (BF TYPE 260; Olympus Corporation, Tokyo, Japan) and biopsy forceps (Radial Jaw 4, standard 2.0 mm; Boston Scientific, Marlborough, MA, USA) in our diagnostic procedure. TBB of the mass suggested non-small-cell lung carcinoma, and investigations for distant metastasis, including systemic CT and brain magnetic resonance imaging, showed negative results; the patient was diagnosed with clinical stage cT3N0M0, indicating radical surgery. Because poorly controlled diabetes mellitus was assumed to be a risk factor for bronchopleural fistula, we decided to administer insulin treatment before surgery in addition to an oral hypoglycaemic agent that the patient had used regularly. However, on the day of hospital admission for induction of insulin treatment, 24 days after TBB, he developed a high fever of 38°C and purulent sputum. His white blood cell (WBC) count and C-reactive protein (CRP) levels were markedly

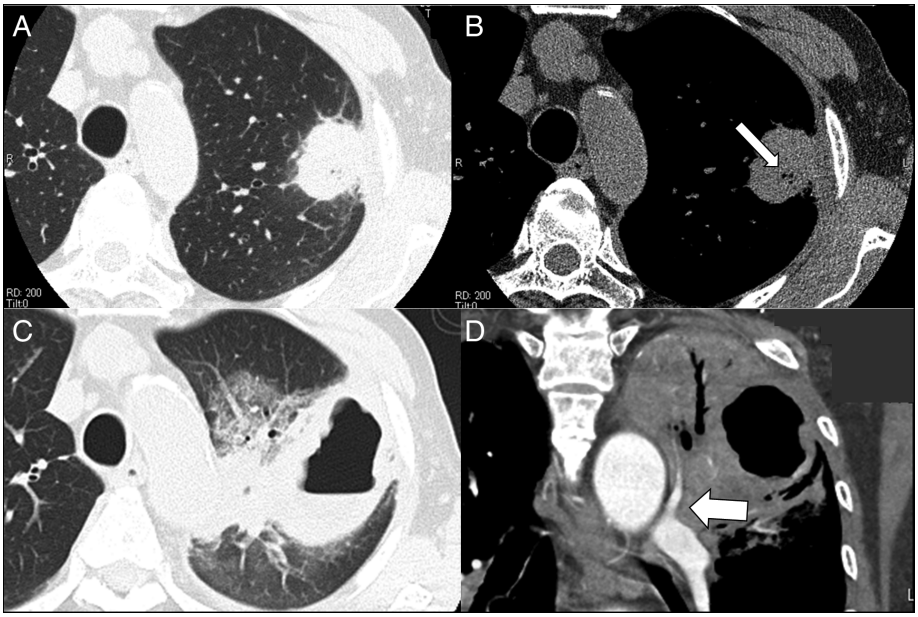

Figure 1. Chest computed tomography revealed a mass lesion, 36 mm × 30 mm, in the left upper lobe invading the parietal pleura (A). On mediastinal window, small cavities (arrow) which suggested necrosis in the central part of the tumour were evident (B). Twenty-four days after transbronchial biopsy, the tumour showed marked enlargement, 60 mm × 55 mm, with cavities with abscess formation (C). The abscess involved the pulmonary hilum of the left lung including branches of pulmonary artery (arrow) flowing into the left upper lobe (D).

elevated (WBC, 14,000/μL and CRP, 19.5 mg/dL); in addition, his diabetes mellitus was aggravated (HbA1c, 9.9%). Enhanced chest CT demonstrated marked enlargement of the tumour at 60 mm × 55 mm and cavities with abscess formation (Fig. 1C). The abscess progressed into the lung parenchyma around the tumour and involved the left pulmonary hilum, including the branches of the pulmonary artery flowing into the left upper lobe (Fig. 1D). Prompt use of meropenem (2 g/day) combined with insulin treatment for 3 days failed to relieve the infection, so we decided to perform emergency surgical resection focusing on both infection control and radical treatment for cancer. Intraoperatively, the abscess was localized in the pulmonary parenchyma without progression into a thoracic empyema (Fig. 2A). Although preoperative CT showed that the abscess involved the hilar structures, we were able to safely isolate branches of the pulmonary artery and the bronchus of the left upper lobe (Fig. 2B) and perform a successful left upper lobectomy with lymphadenectomy. Fever resolved soon after the surgery, and a negative conversion of the inflammatory reaction was confirmed on post-operative day 7, when we terminated the use of meropenem. The results of the blood and abscess cultures were negative. The histopathological examination of the surgical specimen demonstrated pleomorphic carcinoma composed of 90% giant cells and 10% spindle cells with neutrophil infiltration (Fig. 2C). Hilar lymph node metastasis confirming pT3N1M0 was evident. The patient was discharged from the hospital 11 days after the surgery.

Discussion

This instructive case suggests that TBB for diagnosing lung cancer with complication of poorly controlled diabetes mellitus may carry a high risk of lung abscess. Once the abscess has formed inside a tumour, controlling the infection with conservative treatment using antibiotics may be difficult, and treatment with emergency surgical resection may be required.

Asano et al. reported that pneumonia following bronchoscopy occurs at a frequency of −0.2% [1]. Although there is no study addressing the frequency of lung abscess occurrence after TBB, it is assumed to be a rarer situation than pneumonia secondary to TBB. There are only a few reported cases describing abscess formation after TBB done for diagnosing lung cancer in which surgical resection for infection control was performed, as observed with our case [2]. Moreira Jda et al. investigated 252 patients with lung abscess and reported that 52 (20.6%) of them required surgical treatment [3]. However, in the case of lung abscess formation in lung cancer for which radical surgery is scheduled, as in our patient, the surgeon may have to decide whether to put off the scheduled radical surgery for cancer until after the completion of infection control or opt for emergency surgery for infection control combined with radical treatment for cancer. In the current case, we abandoned the conservative treatment with antibiotics in the early phase because no signs of improvement were observed in infection control and decided to perform emergency surgical resection. We believe that our decision, executed without delay, enabled us to safely achieve lobectomy with lymphadenectomy, even though it was in the fastigium of

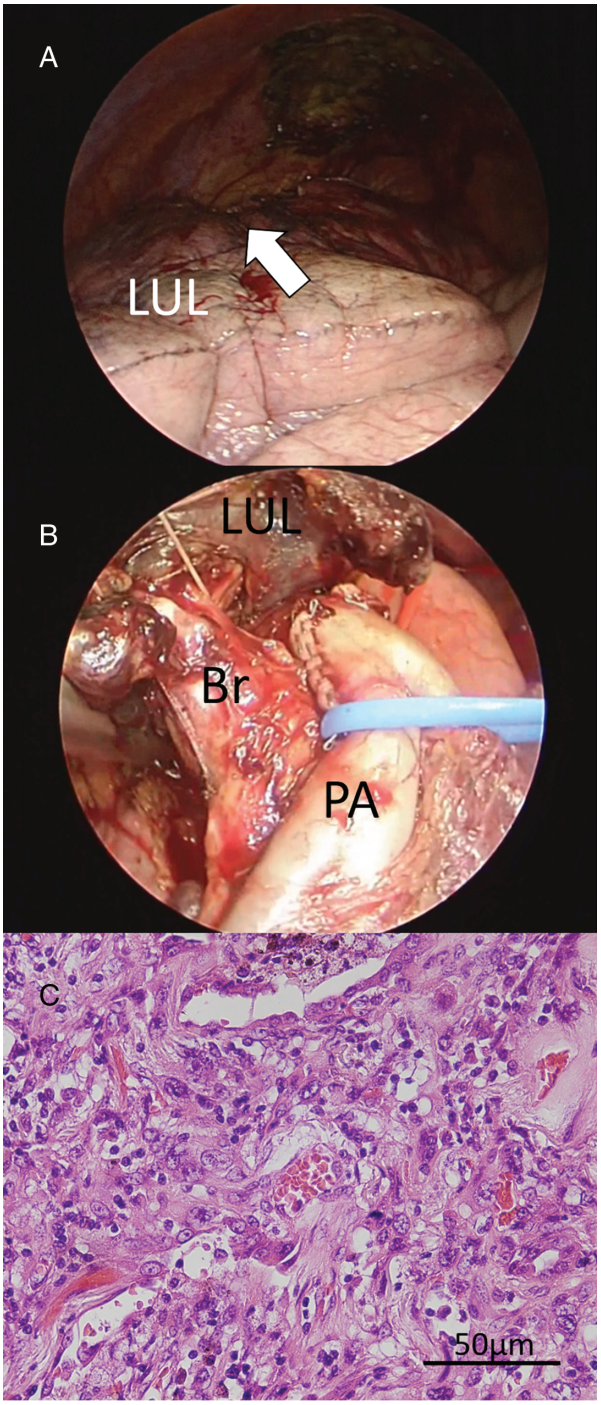

Figure 2. Intraoperatively, the abscess (arrow) was localized in pulmonary parenchyma of the left upper lobe without progression into thoracic empyema (A). We could isolate branches of pulmonary artery and bronchus of the left upper lobe safely, achieving left upper lobectomy (B). Haematoxylin and eosin staining (original magnification 400×) of surgical specimen demonstrated pleomorphic carcinoma composed of 90% giant cells and 10% spindle cells with neutrophil infiltration (C). Br, bronchus; LUL, left upper lobe; PA, pulmonary artery.

inflammation, thereby achieving both infection control and radical treatment for cancer.

The aetiology of lung abscess formation by TBB is surmised as follows: oral bacteria sucked into the forceps hole of a bronchoscope will be implanted into the tumour via biopsy forceps. Although abscess formation in lung cancer caused by such aetiology is considered to be rare, an immunocompromised host, such as the current case, with poorly controlled diabetes mellitus, is assumed to be at risk for this rare complication following TBB. According to the British Thoracic Society guidelines on diagnostic flexible bronchoscopy in adults, the routine use of antibiotic prophylaxis is not warranted before bronchoscopy for the prevention of endocarditis, fever or pneumonia [4]. However, a randomized controlled study conducted by Kanazawa reported the efficacy of azithromycin administration in preventing respiratory tract infection after TBB [5]. Based on the literature mentioned above and the experience of our case, we would like to propose prophylactic antibiotics before TBB for patients with poorly controlled diabetes mellitus as an option. Finally, we have to consider a possibility that the necrosis in the tumour can be an additional risk factor for forming abscess. The pre-operative CT revealed cavities in the tumour, which suggested already existing tumour necrosis. The presence of necrotic tissue which can be a source of infection might act as aetiology of abscess formation in conjunction with TBB procedures and diabetes mellitus in this case.

Disclosure Statements

No conflict of interest declared.
Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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