A Rare Case of a Bronchial Anomaly Running in the Hilar Region from the Right Lower Lobe to the Middle Lobe

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Case Report

A Rare Case of a Bronchial Anomaly Running in the Hilar Region from the Right Lower Lobe to the Middle Lobe

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Abstract

A 77-year-old male was referred to our department due to lung cancer (cT3N0M0) of the right lower lobe. During right lower lobectomy, a thin duct structure was recognized in the hilar region between the middle and lower lobes that was identified to be a supernumerary bronchus upon a review of the preoperative chest CT images. Although bronchial anomalies are rare , it is important to carefully view preoperative images for any such anomalies in order to more safely perform surgery.

Key words : Bronchial anomaly・3-D CT

Introduction

Tracheobronchial anomalies are relatively rare entities ; however, they sometimes make surgical procedures complex. The development of an accessory cardiac bronchus (ACB) and/or tracheal bronchus (TB) is the most common anomaly, and the right upper lobe accounts for the majority of tracheobronchial anomalies. It has been reported that these conditions can be diagnosed using three-dimensional computed tomography, including CT-bronchoscopy and CT-bronchography[1)~3)]. On the other hand, anomalies of the peripheral bronchi are scarcely reported. We herein report a case of lung cancer associated with a peripheral supernumerary bronchus that was not recognized before surgical intervention and was first encountered during surgery.

Case presentation

A 77-year-old male was referred to our hospital for an abnormal shadow on a chest X-ray (Fig. 1a). He was a never-smoker. A physical examination and laboratory data showed no abnormalities. Computed tomography (CT) demonstrated a mass shadow in the light lower lobe with no evidence of enlargement of the lymph nodes (Fig. 1b). A transbronchial lung biopsy under bronchoscopy revealed the lesion to be an adenocarcinoma. The patient was diagnosed with Stage IIA (cT3N0M0) lung cancer,and right lower lobectomy and mediastinum lymph node dissection were performed.

Upon opening the major fissure and dissecting the peripheral region between the middle and lower lobes, a thin, elastic, hard duct structure was found just beside the pulmonary artery (Fig. 2), which was identified to be a bronchial branch after removing the stromal tissue surrounding the

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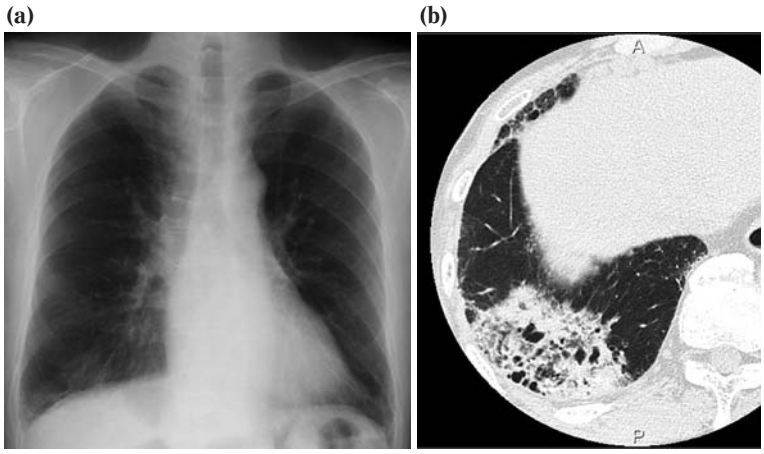

Fig. 1 (a) A chest radiograph showed a mass shadow in the lower lung field. (b) Chest computed tomography showed a 90-mm mass shadow in the right lower lobe.

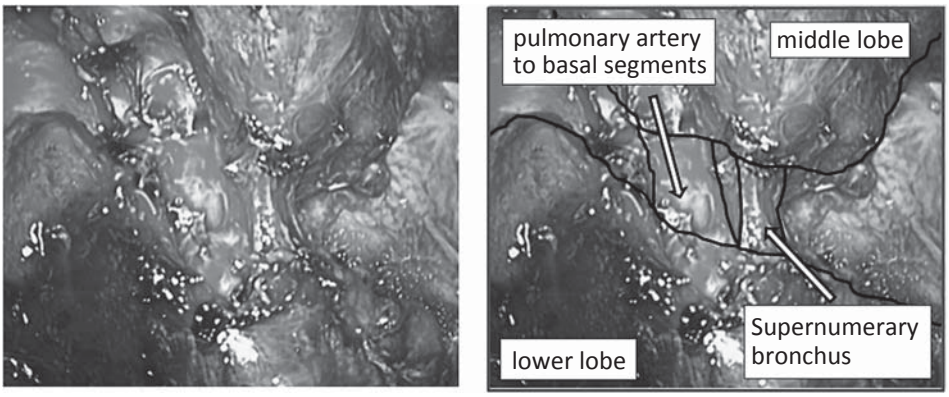

Fig. 2 An inter-lobar view of the hilar structures during right lower lobectomy. A bronchial anomaly was found beside the basal artery running between the right middle and lower lobes.

structure. Based on a careful review of the patient's computed tomographic images, a supernumerary bronchus from B8 to the right middle lobe was detected. The supernumerary bronchus had a blind end in the middle lobe and was cut using a stapler. The patient experienced no complications during his postoperative course.

Discussion

The frequency of tracheobronchial anomalies diagnosed on bronchography has been reported to be 0.64% of examined patients[4]. Tracheobronchial anomalies are separated into two groups according to the Foster-Carter classification : displaced bronchus that emerges from dislocation, and a supernumerary bronchus that emerges excessively[5]. Displaced bronchi are recognized seven times as often as supernumerary bronchus. In the series by Lee et al., 27 of 35 patients exhibited a displaced tracheal bronchus, while eight displayed a supernumerary bronchus[6]. Anomalies of the right upper lobe consisted of all anomalies reported in Japan, and accessory cardiac bronchi were found in 0.08% of cases. Tracheobronchial anomalies of the left lung are less frequent than those of the the right lung possibly due to occupation by large blood vessels[7].

Tracheobronchial anomalies were usually diagnosed using bronchoscopy or bronchography a few decades ago. Recently, computed tomography has been reported to be the best imaging modality for delineating the trachea and major bronchi and it has subsequently replaced bronchography[8].

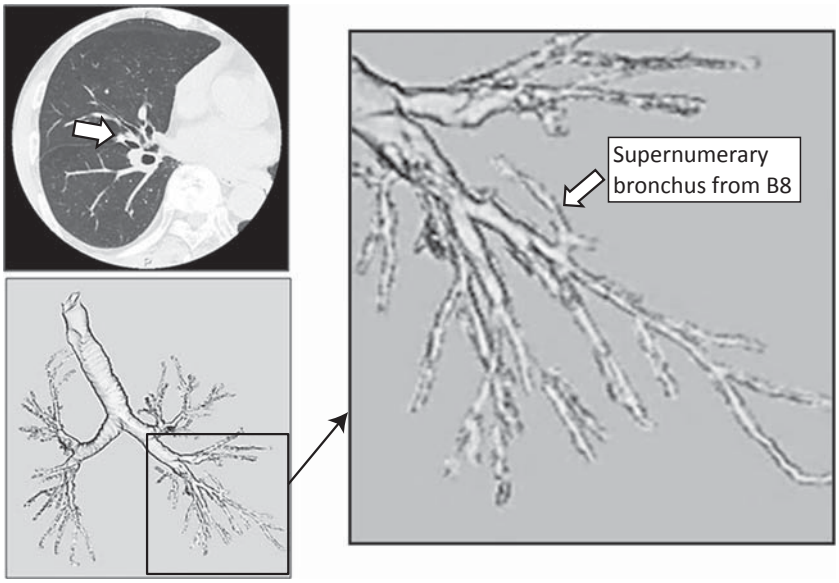

Fig. 3 3-D CT showed a supernumerary bronchus originating from B8 and extending to the right middle lobe.

Although major anomalies, such as a tracheobronchus, are usually found in the right upper lobe and accessory cardiac bronchi can be easily detected on preoperative bronchoscopy, supernumerary anomalies such as that observed in the present case, are often difficult to detect using routine preoperative examinations. Recently, the quality of computed tomography has greatly advanced, including the development of 3-D CT, CT-bronchoscopy and three-dimensional printing models, which have become available by processing data obtained with multi-detector CT scans. Such advanced tools are the best modalities for detecting minor bronchial anomalies in the peripheral bronchus. Akiba et al. reported that preoperative 3D imaging allows the clinician to visualize the operative field prior to surgery, even in patients with rare anomalies [9)10)].

In the present case, we did not recognize the bronchial anomalies until encountering the bronchus, as we did not obtain any bronchial 3-D images before the operation. After surgery, we constructed 3-D images from the computed tomographic images postoperatively (Fig. 3). These images clearly revealed that the supernumerary bronchus had emerged from the right B8 to right the middle lobe and had a blind -end in the hilar region of the middle lobe. This experience suggests that constructing 3-D images of the tracheobronchial tree as well as the pulmonary artery and vein prior to surgery is useful for performing safer pulmonary lobectomy.

In conclusion, we experienced a rare case of a peripherally located supernumerary bronchus on right lower lobectomy in a lung cancer patient. The presence of supernumerary bronchi in the peripheral bronchus is very rare; however, bronchial anomalies should be evaluated preoperatively in order to prevent unexpected complications.

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（和文抄録）

右肺中下葉間に気管支の破格を認めた肺切除の一例

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77歳男性．前医にて右下葉肺癌（cT3N0M0）を指摘され，当科紹介受診となった．当科にて右下葉切除，縦隔リンパ節郭清を施行した．術中，右中下葉間の肺動脈肺底区域枝に併走する索状物を認めた．術中に術前CTを再評価し，構造物は右中下葉間の過剰気管支と判明した．気管支の破格は稀ではあるが，手術を安全に行うためには術前画像を入念に評価することが必要と考えられる．