An Anomalous Tracheal Bronchus to the Right Upper Lobe

REPORT OF TWO CASES

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As a result of advances in thoracic surgery, especially the rapid development of resection therapy for pulmonary tuberculosis, anomalies of the bronchial tree are being found with increasing frequency. Bronchial anomalies have now ceased to be only of academic interest to the thoracic surgeon. It is our purpose to report two cases, because relatively few reports in the literature are found on this subject.

Case Reports

Case 1: N. K., a 27 year old man, was admitted to the Ritsurin Hospital on July 25, 1953, with the complaints of fever, cough and a lot of sputum of one month duration. A chest roentgenogram revealed dense consolidation in the middle field of the right lung which was confirmed in the lateral roentgenogram. The middle lobe was entirely involved by inflammation. After ineffective antibiotic therapy, resection of the middle lobe was attempted on October 21, 1953. The upper and middle lobes were found to be firmly adherent to the anterior chest wall and no interlobar fissure was noted. There were many enlarged lymph nodes in the hilum.

From the technical point of view it was considered difficult to resect the middle lobe alone and so upper and middle lobe lobectomies en bloc was decided upon. Shortly after the dissection was begun at the hilum, a small cord-like bronchus supplying a portion of the right upper lobe was found below the azygos vein. After this bronchus was divided, another big bronchus which is of the same size as a normal right upper lobe bronchus and which gave off its normal branches was found about 1 cm. below the former (previously divided bronchus). It was difficult to divide this bronchus and the arteries at their stem, so they were dissected further and divided at the peripheral part of each branch. The middle lobe arteries and bronchus were divided at their stems and finally the upper and middle lobe veins divided as a whole, the upper and middle lobes were removed en bloc. Before closing the chest, it was confirmed that the anomalous bronchus arose 1 cm. above the carina.

The anomalous bronchus (Figure 1), is 0.7 cm. in diameter and it supplied a small segment of the apical anterior portion of the right upper lobe and apparently presented the arborization normally found with other bronchi. The three normal branches of the right upper bronchus gave off the normal three subdivisions.

Case 2: S. T., a 30 year old man, was diagnosed as having pulmonary tuberculosis on August, 1951, and was admitted to the Okayama City Sanatorium on October 1, 1955. A chest roentgenogram revealed few small nodules in the subclavicular region of the right upper lobe. As part of the preoperative preparation for a proposed segmental resection of the right upper lobe, bronchoscopy and bronchography were performed on October 17, 1955.

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No marked change was found on bronchoscopy. Bronchography following bronchoscopy revealed an anomalous accessory bronchus arising from the right wall of the trachea and supplying the apical portion of the right upper lobe (Figures 2 and 3). The major right upper lobe bronchus occupied its normal position and gave off two, instead of three, branches which supplied the posterior and anterior portion of the right upper lobe respectively. To confirm this finding, bronchoscopy and bronchography were repeated on November 14, 1955. This time on bronchoscopy, a small orifice of the anomalous accessory bronchus was found on the right tracheal wall 1 cm. above the carina. However, the oil failed to enter this anomalous bronchus although the two branches of the major upper lobe bronchus supplying the posterior and anterior segments were clearly demonstrated.

Apical segmental resection of the right upper lobe was done on November 29, 1955. At operation, an anomalous tracheal bronchus was found below the azygos vein and a major upper lobe bronchus was found running parallel and 1.5 cm. below the former. It was confirmed that the former supplied the apical segment and the latter the posterior and anterior segments, respectively.

COMMENT

Foster-Carter\textsuperscript{1} classified bronchial anomalies as follows:
1) Supernumerary bronchus; 2) displaced bronchus (the bronchi are normal in number but anomalous in position); 3) congenital cystic disease.

The first case reported by the authors is classified as a case of super-
numerary bronchus. Brock\(^2\) described four cases of supernumerary bronchus, three of which were seen on lung dissection and the other was found by bronchography. Gerson and Rothstein\(^3\) reported a case of supernumerary bronchus found by bronchography. Overholt and Langer,\(^1\) and also Jackson\(^5\) briefly mentioned the existence of anomalous tracheal bronchus, but described no details. McEwen\(^6\) also reported a probable case of supernumerary bronchus.

In Japan, Kozu\(^7\) reported a case found at autopsy and Kato\(^8\) a case found by bronchography.

The second case is classified by Foster-Carter\(^1\) as displaced bronchus. According to Gerson and Rothstein,\(^3\) the case reported by Monk\(^9\) as a case of an anomalous tracheal bronchus seems to be an example of this type of anomaly. Compared to the few reports in other countries, about 10 cases of this sort of anomaly have been reported in the Japanese literature.

In this anomaly, the tracheal bronchus usually supplies the apical segment alone or both apical and posterior segments as is in most cases, except in one case reported by Takeuchi\(^10\) where the anomalous tracheal bronchus supplied the apical and anterior segments.

As far as the incidence of anomalous tracheal bronchus is concerned, no definite and reliable statistics are found. Iketani\(^2\) stated that he has found one case of this type of anomaly in 400 bronchograms (0.25 per cent). Kato\(^5\) found four cases of this anomaly out of a total of 725 cases, of which 115 were autopsy specimens, 110 surgically resected specimens and 500 bronchograms. Irikura\(^12\) gave a figure of 0.6 per cent (2 cases in 320 segmental resections), Sato\(^13\) 0.3 per cent (2 cases in 657 planigrams).

**FIGURE 2**

*Figure 2: Antero-posterior bronchogram showing an anomalous tracheal bronchus (Case 2).*

**FIGURE 3**

*Figure 3: Lateral Bronchogram (Case 2).*
and Takeuchi¹⁰ 0.1 per cent (2 cases in 1100 bronchoscopies and 700 bronchograms).

It is the belief of the authors that displaced bronchi are more commonly found than supernumerary bronchi and that these anomalies are more common than shown by the statistical figures mentioned above because it could be overlooked on bronchoscopy or undiscovered by bronchography should oil fail to enter this anomalous bronchus just as happened in the present report.

Despite the presence of the anomalous tracheal bronchus, no marked variations from the usual pattern of distribution of the branches of the pulmonary artery to the corresponding bronchopulmonary segments were noted. There was only one detailed report by Monk in this regard that could be found in the literature. We would like to point out only that in our two cases, the azygos vein was always located above the anomalous bronchus, where under normal condition it is usually located above the right upper lobe bronchus.

REFERENCES