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Case Report

Tracheal bronchus: a challenge for anaesthesiologists

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ABSTRACT

Tracheal bronchus is an aberrant bronchus that arises most often from the right tracheal wall above the carina and is the result of an additional tracheal outgrowth early in embryonic life. The incidence of tracheal bronchus is approximately 0.1-2%. The presence of congenital anomaly of the central airway can be of great significance to anaesthesiologist and though a rare anomaly it can still be a challenge for proper positioning of DLT and establishing OLV in the hands of junior anaesthesiologists. We report a case with tracheal bronchus arising from right tracheal wall diagnosed when we had difficulty in placing the left DLT. Identification of tracheal bronchus on the chest radiograph and CT-scan of chest before surgery is useful. We do strongly recommend as in other reports, giving the patient an alert card indicating the diagnosis of tracheal bronchus.

Keywords: Anaesthesia, Lobectomy, Bronchoscopy, Hemoptysis, Trachea

INTRODUCTION

Tracheal bronchus is an aberrant bronchus that arises most often from the right tracheal wall above the carina and is the result of an additional tracheal outgrowth early in embryonic life. The incidence of tracheal bronchus is approximately 0.1-2%.[1] The presence of congenital anomaly of the central airway can be a challenge for proper placement of double lumen tube to the anaesthesiologist.[2] This anomaly is usually diagnosed incidentally during bronchoscopy or computed tomographic scanning performed for various respiratory problems.[3,4] Occasionally, it represents the underlying etiology for chronic pulmonary disease such as emphysema, atelectasis, and persistent or recurrent pneumonia, especially if it involves the right upper lobe.[5]

CASE REPORT

A 49 year female patient having diabetes was diagnosed to have cystic bronchiectasis of left lung and was scheduled for left upper lobectomy. Her chief complaint was cough with hemoptysis for 2 months difficulty in breathing on strenuous work. She also complained of generalized weakness. She gives past history of pulmonary tuberculosis and has taken a complete course of anti-tuberculous treatment.

Her chest radiograph (Figure 1) revealed cystic bronchiectatic changes in the left upper and mid-zone, CT-scan of thorax (Figure 2) showed cystic bronchiectatic changes involving the left upper lobe with air fluid level within few of the cysts and compensatory hyperinflation of the left lower lobe.

Biochemical investigations were normal. Pulmonary function tests revealed restricted pattern. Chest examination revealed decreased air entry in the left infraclavicular area with course crepts. All other systemic examinations were found to be normal.

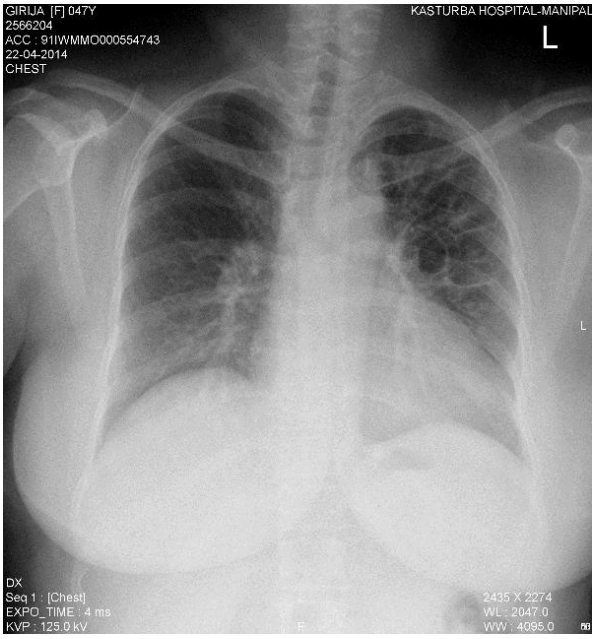

Figure 1: Chest X-ray PA view.

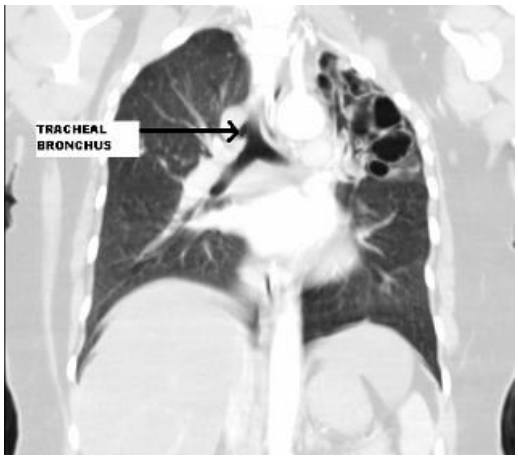

Figure 2: CT scan of thorax.

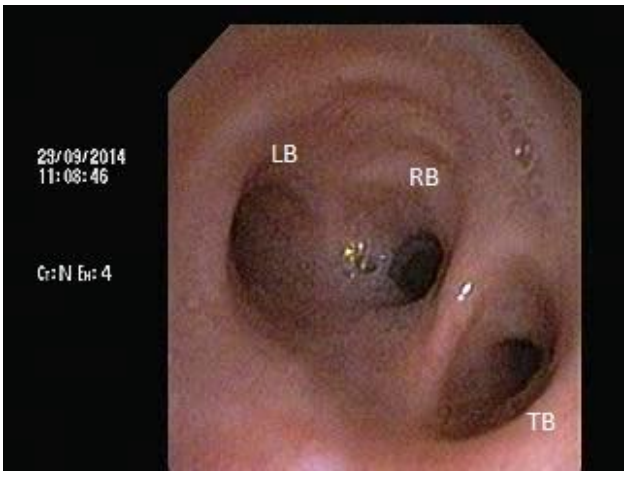

Figure 3: Fibreoptic bronchoscopy: TB - tracheal bronchus, LB - left main bronchus, RB - right main bronchus.

On day of surgery a 16 G cannula was inserted in a vein on right hand, and a thoracic epidural catheter was inserted under all aseptic precautions in T5-T6 level.

Patient was sedated with midazolam 1 mg iv and left radial artery was cannulated with a 20 g catheter, a 7F triple lumen catheter was inserted in right internal jugular vein under all aseptic precautions. Anaesthesia monitoring included 5 channel ECG, pulse-oximetry, end tidal CO_2, arterial blood pressure, central venous pressure, nasopharyngeal temperature, and urine output. Fluid warmer was used to maintain normothermia.

Anaesthesia was induced with intravenous propofol, fentanyl, followed by vecuronium and the patient was ventilated with 100 % oxygen for 3 minutes.

After laryngoscopy, a left DLT was inserted with difficulty in the desired position and on auscultation air entry was not adequate on left side of the chest so a fiber optic bronchoscopy was done to confirm the position. A trial of one lung ventilation was given but the saturation started to fall below 92%, so the DLT was pulled out and again two lung ventilation was given with 100% oxygen.

A repeat fibreoptic bronchoscopy was done by a senior colleague and an anomalous right tracheal bronchus was diagnosed. The DLT was then repositioned under guidance of bronchoscopy, so that the endo bronchial tip lies in the left main bronchus and the tracheal lumen just above the anomalous bronchial opening. The DLT was secured with cotton tape, both the lungs were ventilated and position of the DLT reconfirmed with fibreoptic bronchoscope after the patient was put in lateral decubitus position.

DISCUSSION

Sandifort first described a tracheal bronchus in 1785.[1] Its incidence is 0.1-2% and in most cases it is incidentally found during bronchoscopy or tomography.[3] Tracheal bronchus is an aberrant bronchus that arises most often from the right tracheal wall above the carina and is the result of an additional tracheal outgrowth early in embryonic life. The prevalence of the right tracheal bronchus is 0.1-2% and of the left tracheal bronchus is 0.3-1%.[1] Patient is usually asymptomatic; however can have associated localized pulmonary problems including chronic atelectasis, recurrent infection, bronchiectasis, and cysts.[4,5]

Tracheal bronchus is subdivided into supernumerary and displaced types.[1] The ectopic bronchus is supernumerary if the right upper lobe bronchus has a normal trifurcation into apical, posterior and anterior segmental bronchi. The displaced type arises from the lateral wall of the trachea and supplies one or more segments of the upper lobe, most commonly the apical segment. On repeat fiber optic bronchoscopy we confirmed our patient had displaced type tracheal bronchus. The identification of this

anatomical variant is important in patients, who need general anaesthesia with intubation but more so for patients who require one lung ventilation.

There are various classifications but Conacher has presented a simpler one that describes the anatomical relationship between the tracheal bronchus and the carina.[6]

Type I is more than 2 cm above the carina with narrowing of the distal trachea. Type II is more than 2 cm above the carina with a normal diameter of distal trachea, and type III is less than 2 cm above the level of the carina.

The presence of unrecognized tracheal bronchus in patients who are intubated may result in persistent lobar atelectasis. Other morbidities include troubled intubation, and intra-operative hypoxaemia. Accidental intubation of the anomalous lobe can cause inadequate ventilation of the remaining lung.[7,8]

In our case, the endo bronchial tip was misplaced in the right main bronchus instead of the left, thus leading to desaturation on trial of one lung ventilation and this was missed on initial fiber optic bronchoscopy as the anomalous bronchus was mistaken for a right bronchus and tracheal carina was misdiagnosed. Only after a repeat bronchoscopy, the misplacement was diagnosed and DLT tip was repositioned under bronchoscopic guidance into the left main bronchus.

We suggest a thorough fiber optic bronchoscopic exam to confirm proper placement of the DLT, by identifying the tracheal carina, two main bronchi, and the lobar bronchi.

In conclusion, although tracheal bronchus is a rare congenital anomaly it can still be a challenge in proper positioning of the double lumen tube and establishing OLV in the hands of junior anesthesiologists.[2]

Identification of tracheal bronchus on the chest radiograph and CT-scan of chest before surgery is useful. Careful chest auscultation and fiber optic bronchoscopic verification therefore remain necessary steps after every DLT placement. We do strongly recommend as in other reports, giving the patient an alert card indicating the diagnosis of tracheal bronchus.

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