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Tracheobronchomegaly with Multiple Diverticula:A Case Report

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Tracheobronchomegaly is a rare condition characterized by marked dilatation of the trachea and main bronchi and frequently associated with tracheal diverticulosis, bronchiectasis, and recurrent lower respiratory tract infection (1,2). Mounier-Kuhn, in 1932, was the first to associate the presence of tracheobronchomegaly with the clinical syndrome of chronic, recurrent respiratory tract infection (3). Tracheobronchomegaly is believed to be extremely rare. To date, only 92 cases have been reported in the literatures (4,5).

We recently encountered a case of tracheobronchomegaly associated with multiple diverticula formation. The diagnosis was made by chest radiography, computed tomography (CT), bronchography, and CT taken immediately after the bronchography.

CASE REPORT

A 57-year-old man presented with three-day history of cough and yellowish sputum. The patient had a history of chronic productive cough for forty years and the symptom had been aggravated progressively. He was a cigarette smoker, however, the pack/year history was unknown.

He had received intermittent medication for the productive cough without hospitalization. No significant physical findings were present except weak ronchi auscultated in the right lower lung field.

Chest radiographs revealed evidences of dilatation of the trachea and both main bronchi, multiple air bubbles around the trachea and focal bronchopneumonia in right lower lobe (Fig. 1). The thoracic CT showed dilated trachea and main bronchi and multiple air bubbles around the trachea and both main bronchi as shown on chest radiographs (Fig. 2). To differentiate tracheal diverticula from pneumomediastinum, bronchography and CT was performed. On bronchography (Fig. 3) and CT taken immediately after the bronchography (Fig. 4), the air bubbles around the trachea and main bronchi showed round to oval shape and were nearly entirely coated with contrast media representing tracheal diverticula rather than pneumomediastinum.

On chest radiography, the maximum diameter of the trachea was measured to be 35mm and 28mm, respectively in transverse and

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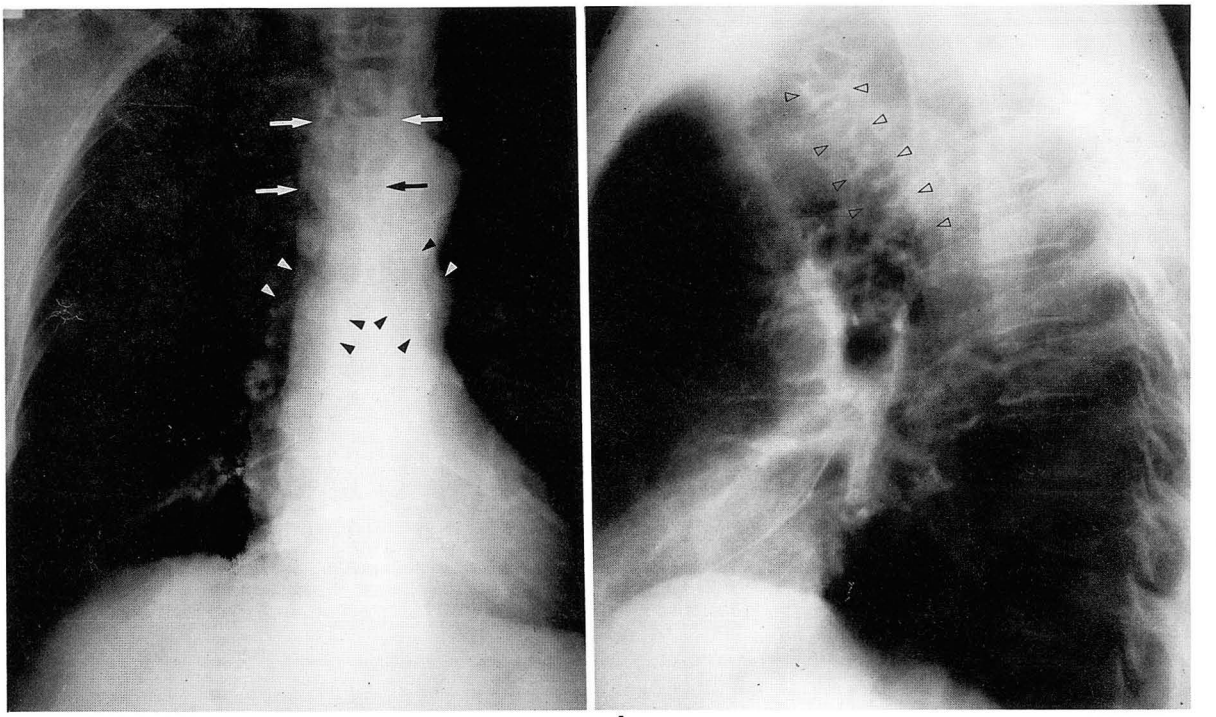

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Fig. 1. a. Chest PA demonstrates dilated trachea (arrows) and both main bronchi (arrowheads) and bronchopneumonia in right lower lobe.
b. In lateral view, multiple air bubbles (open arrowheads) are seen behind the dilated trachea.

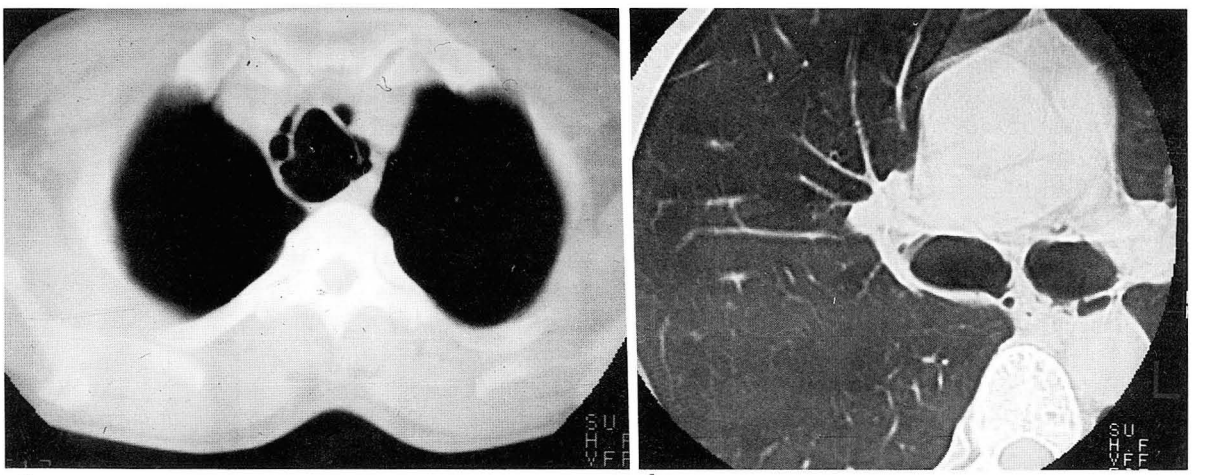

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Fig. 2. a,b. Thoracic CT shows multiple air bubbles around the dilated trachea and both main bronchi.

sagittal directions. The transverse diameters of right and left main bronchi were 27mm and 26mm. The maximum transverse and sagittal diameters of the trachea were 33mm and 24mm on CT.

DISCUSSION

Tracheobronchomegaly has been described by a variety of names, including Mounier-Kuhn

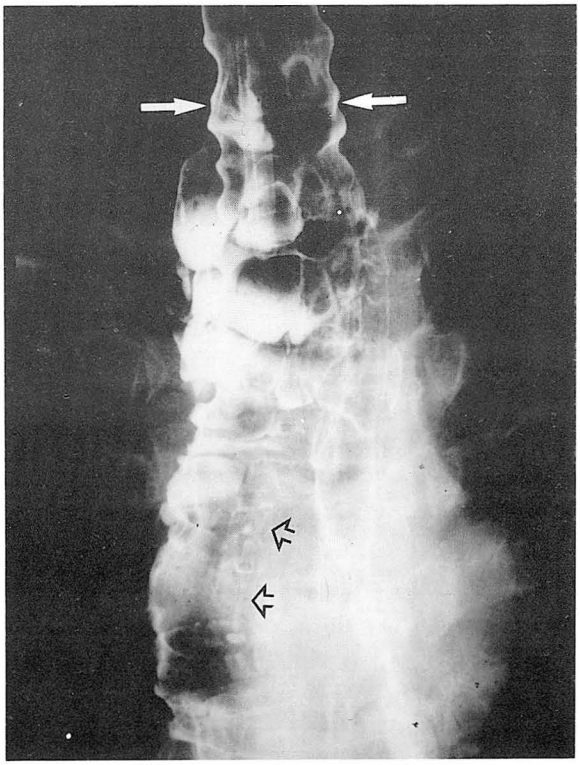

Fig. 3. In bronchography, multiple air bubbles around the trachea (arrows) and right main bronchus (open arrows) are filled with contrast media representing multiple diverticula rather than pneumomediastinum. Esophagus is filled with contrast media by aspiration.

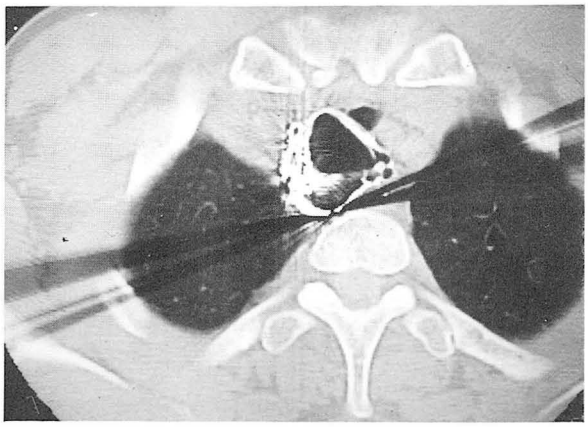

Fig. 4. Immediate CT after bronchography. Multiple air bubbles coated with contrast media are well seen around the trachea.

syndrome, tracheal diverticulosis, tracheobronchiectasis, tracheocele, tracheomalacia, and tracheobronchopathia malacia. The common denominator is the dilatation of trachea and main bronchi with abrupt transition to a normal caliber of the peripheral airways (3,4).

The cause of the tracheobronchomegaly is unknown in the majority of the cases although the fact that the tracheobronchomegaly can result from either congenital or acquired origin has been suggested.

The congenital tracheobronchomegaly is thought to be due to a congenital defect of the elastic tissue and muscle fibers of the tracheobronchial tree, which allows the trachea and main bronchi to dilate (1,2,6). Complete absence of the cartilaginous elements has also been described (2). Because of the weakness of the muscular elements, broad diverticulum-like protrusions of redundant musculomembranous tissue develop between the cartilaginous rings (1).

Several acquired conditions can result in tracheobronchomegaly that may closely resemble the one seen in congenital origin. Tracheobronchomegaly may result as a complication of chronic intubation and prolonged ventilatory support (4,7). Tracheobronchomegaly may also result from the increased traction on the tracheal walls as a secondary complication of diffuse pulmonary fibrosis (8). Although a congenital defect in connective tissue was suggested as the basis of tracheobronchomegaly, most cases, however, were presented in the third or later decades of life and showed no evidence of connective tissue disorders (4). Our patient had no clinical and radiological evidence of connective tissue disorders or pulmonary fibrosis and no history of chronic ventilatory support.

There is often a history of cigarette smoking in patients with tracheobronchomegaly and it seems likely that smoking and other irritants exacerbate the condition rather than cause it (1,4,6). There is almost an invariable history of chronic infection but this could be the result of the widened airways, causing inefficient clearance of secretions (2).

The degree of major airway dilatation in

tracheobronchomegaly is usually sufficient to exceed the normal mean transverse diameter by 3 SD (standard deviations) (1,2).

Breatnach and co-workers (9) measured the tracheal air column on posteroanterior and lateral chest radiographs of 808 adults with no clinical or radiographic evidence of respiratory disease. According to them the upper limits of normal (mean + 3SD) for the transverse and sagittal diameters of trachea were 25mm and 27mm in men and 21mm and 23mm in women respectively. Tracheal dimensions larger than these diameters on standard chest radiographs indicate tracheomegaly. They observed no significant variation between measurements taken at multiple levels of trachea. Woodring et al (5) examined chest radiographs of 200 normal adults with no clinical or radiographic evidence of thoracic disease. The transverse inner diameter of the right and the left main bronchi were measured at the midpoint, usually about 1cm below the carina. In men the upper limits of normal transverse diameter (mean + 3SD) of the right and the left main bronchi were 21.8mm and 18.4mm, and those of the women were 19.8mm and 17.4mm. To our knowledge, there have been no reports on the CT measurements of normal bronchial dimensions. Lee et al (10) evaluated tracheal dimensions on CT of 100 healthy adults. They found that the upper limits of normal (mean + 3SD) transverse and sagittal diameters of the trachea were 23.4mm and 25.2mm in men and 18.9mm and 19.4mm in women (10). Our patient fitted into the above criteria of tracheobronchomegaly in both chest radiographs and CT.

Radiographically, tracheobronchomegaly is manifested not only by the dilatation of trachea and bronchi but also by the protrusion of redundant musculomembranous tissue between the cartilaginous rings, resulting in an irregularly corrugated or scalloped appearance of the air columns. Such folds of mucous membrane with saccular outpouches are described as tracheal or bronchial diverticulosis (2,4,11,12). In our case the saccular pouches of the airways were much larger than the previously reported cases and seemed to be separated from the trachea and bronchi mimicking pneumomediastinum. The bronchography and CT taken after bronchography, however, distinctly visualized the multiple diverticula around the trachea and main bronchi, and therefore we could exclude the possibility of pneumomediastinum.

Because tracheobronchomegaly can be overlooked on plain chest film and multiple air densities around the trachea can easily be mistaken as pneumomediastinum, careful examination of simple chest radiography and use of CT with bronchography are required for the detection and a better understanding of tracheobronchomegaly.

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〈국문 요약〉

다수의 게실을 동반한 기관기관지거대증 : 1례 보고

인하대학교 의과대학 방사선과학교실, 인제대학교 의과대학 방사선과학 교실*

박 찬 섭·김 정 숙*

기관기관지거대증(tracheobronchomegaly)은 기관 및 주기관지의 심한 확장을 보이며 기관게실, 기관지확장증 및 반복하는 하부기도감염을 잘 동반하는 드문 질환이다. 1932년에 Mounier-Kuhn이 반복하는 만성 기도감염을 동반하는 기관기관지거대증을 처음 기술한 이래 지금까지 전세계적으로 92례가 보고된 바 있으며 국내에서는 아직 보고된 예가 없다.

최근 저자들은 단순흉부촬영, 전산화단층촬영(CT), 기관지조영술 및 기관지조영술 후 곧 이어 시행한 CT에서 다수의 게실을 동반한 기관기관지거대증을 경험하였기에 보고하는 바이다.