

Bronchogenic Carcinoma Manifesting Unilateral Hyperlucent Lung: CT Features

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— Abstract —

A case of bronchogenic carcinoma showing unilateral hyperlucent lung is presented and its CT features are described. A low attenuation mass in the left main bronchus was noted with a narrow window, and hyperlucent left lung was demonstrated with a wide window in a 55-year-old man.

Index Words: Lung, CT 60.1211

Lung neoplasm, CT 60.321

Bronchi, stenosis or obstruction 60.3231

Introduction

Obstructive hyperinflation is an unusual but well-known radiological manifestation of bronchogenic carcinoma. The frequency of unilateral hyperlucency in bronchogenic carcinoma with plain radiograph has been reported to be two percent or less (1, 2). Obstructive hyperinflation along with clinical sign of wheezing may develop distal to the obstructing tumors of the mainstem, lobar, or segmental bronchi and may be an important sign in the early diagnosis of bronchogenic carcinoma.

We report a case of a bronchogenic carcinoma manifesting unilateral hyperlucent lung in on plain radiograph and an endobronchial mass in the left main bronchus on CT.

Case Report

A 55-year-old man was admitted with a seven-month history of dyspnea and intermittent cough. Physical examination revealed decreased breathing sound in the left lung field without wheezing. Plain chest radiograph showed unilateral hyperlucent lung in left (Fig. 1A) with mediastinal shifting to the op-

posite side on expiration, suggesting a mass lesion in left main airway. CT scan performed with 5mm collimation and with contrast material showed a low attenuation mass in the left main bronchus and a lower attenuation lesion in the left upper and lower lobar bronchus, presumed to be a local tumor extension or mucoid impaction distal to the obstructing mass (Fig. 1B, C). The entire lumen of the main bronchus was replaced with the tumor. Extraluminal extension of the main mass, as well as right paratracheal and left hilar lymph node enlargement were also noted. Hyperlucent left lung was seen with wide window setting (Fig. 1D). Bronchoscopy demonstrated near complete obstruction of the left main bronchus with a slit-like opening. Bronchoscopic biopsy confirmed a squamous cell carcinoma. Unilateral hyperlucency disappeared, and audible breath sound was noted in the left lower lung field after radiation therapy of 60 Gy.

Discussion

Partial obstruction of the airways can result in hyperinflation of the lungs and is most marked when the obstruction is of the check valve type (3). Bronchial tumors may obstruct the bronchus to one lobe

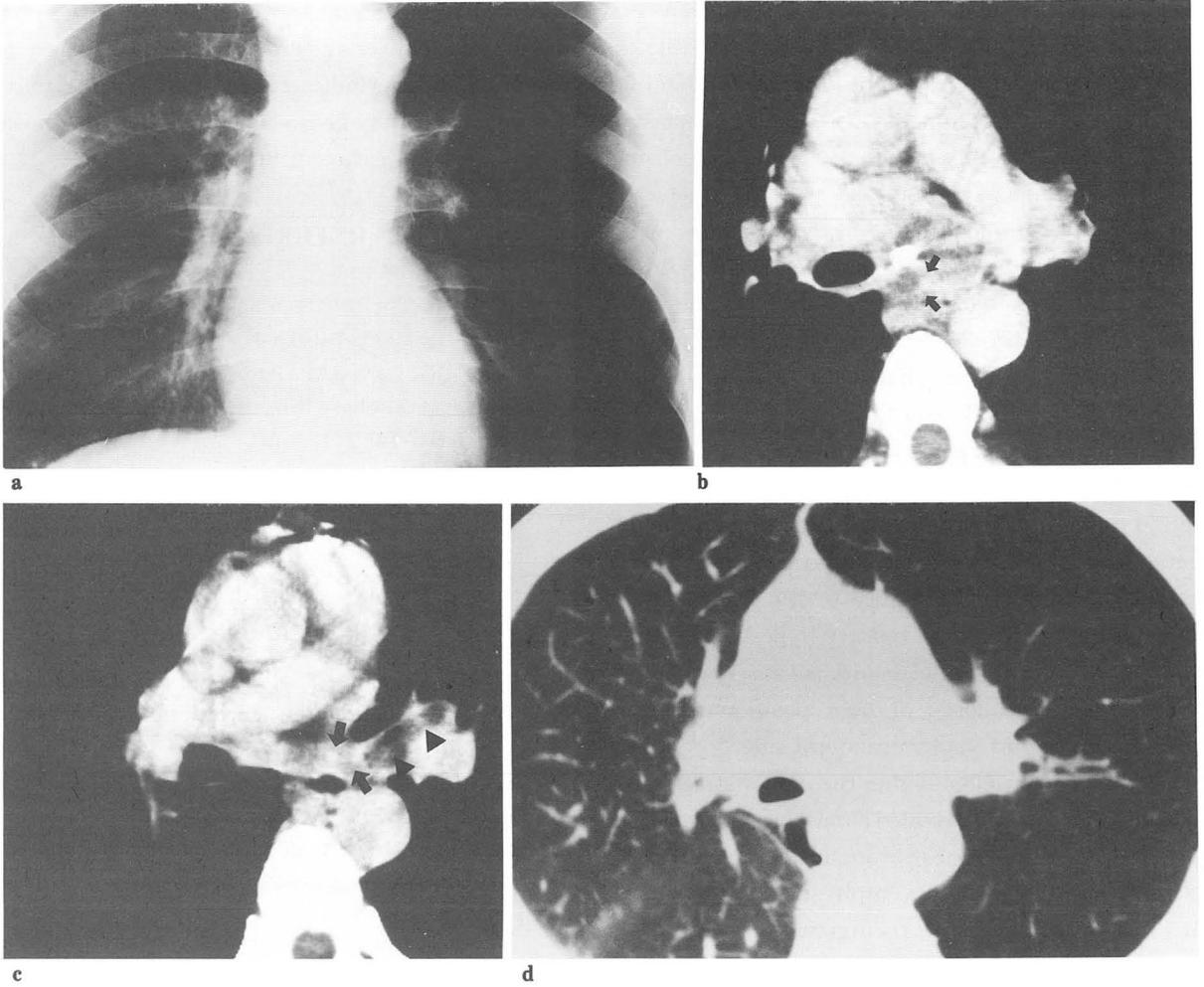


Fig. 1. Unilateral hyperlucent lung with a bronchogenic carcinoma in a 55-year-old man.

- a. Chest radiograph shows hyperlucent left lung without demonstrable mass in left hilar area.
- b. CT scan at main bronchus level shows low density intraluminal mass occupying and expanding the left main bronchus. Extraluminal extension of the lesion (arrows) is also noted. Calcified carinal node is incidentally noted.
- c. CT scan at level of bronchus intermedius shows inferior extension of the main mass (arrows) and mucus plug (arrowheads) in the left upper lobar bronchus.
- d. CT scan at main bronchus level with wide window setting shows the hyperlucent left lung with oligemia. Bullous emphysema is noted in azygoesophageal recess.

totally and constrict the bronchus to the adjacent lobe, causing collapse of the former and obstructive hyperinflation of the latter (4), which is the most common mechanism of the check valve type obstruction of the labor bronchus. In most cases of check valve obstruction of a main bronchus, hyperinflation is usually temporary because obstruction tends to become complete and atelectasis ensues (4). In our case, although the mass was in the main airway and bulky enough to obstruct the entire lumen, obstructive emphysema appeared without collapse. Another

mechanism for a hyperlucent lung of bronchogenic carcinoma is an abnormality in pulmonary arterial perfusion. Bronchogenic carcinoma may effect a reduction in pulmonary blood flow by increased intraalveolar pressure and hypoxia rather than by pulmonary artery constriction due to the mass or lymphadenopathy in the hilum. Bronchial obstruction often produces air trapping which may raise intraalveolar pressure mechanically above pulmonary arterial level and decrease pulmonary blood flow. It is also associated with an element of reflex

vasoconstriction which also occurs secondary to regional hypoxia in areas of hypoventilation (5).

Other causes of hyperlucent lungs are unilateral undercirculation encountered in absence, hypoplasia of the pulmonary vasculatures, or thromboembolism and Swyer-James syndrome as a sequel of severe unilateral pneumonia (6). CT in Swyer-James syndrome may demonstrate the patency of the central bronchial trees; characterize the presence, extent, and location of bronchiectasis; and help determine secondary parenchymal changes in the affected lung (7). Unilateral hyperlucent lung does not always go with an abnormality of the lung. In a review of about 500 well-positioned PA roentgenograms, Felson (6) found one lung slightly but diffusely more radiolucent than the other in 1.2%, and distinctly blacker in 0.8% without abnormality of the lung. Other nonspecific causes of the relative hyperlucency are thought to be a congenital or surgical absence of pectoral muscle, scoliosis, or poor positioning, and pleural disease on the contralateral side.

CT scan was well-suited to the demonstration of causative lesion and revealed a mass obstructing the left main and upper lobar bronchus completely. CT demonstrated obstructive emphysema in the entire left lung as in the simple roentgenogram with wide window setting. On this basis, one might assume that

chest radiographs on expiration, particularly in patients in the cancer age group, reveal some cases in which air trappings indicate early endobronchial mass lesion, and CT may give a clue for definite diagnosis of unilateral hyperlucent lung.

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〈국문요약〉

일측성 과잉통기를 보인 기관지암 : CT소견

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기관지암에 의한 폐쇄성 과잉통기(Obstructive Hyperinflation)는 잘 알려져 있긴 하지만 드문 소견이다. 기관지 종양이 한 엽(lobe)의 기관지를 완전히 막아서 그 엽을 허탈시키면 주변의 엽은 보상적으로 과잉통기되며, 부분적인 폐쇄일때는 체크 밸브(check valve) 기전에 의해 해당 엽의 과잉통기가 초래될 수 있다.

저자들은 최근 호흡곤란과 간헐적인 기침을 호소하는 55세의 남자에서 단순흉부사진상 호기시에 환측에서 과잉통기를 보이고, 컴퓨터 단층촬영(CT)상 좌측 주 기관지를 다 차지하는 저 밀도의 종괴(mass)를 관찰할 수 있었고, 역시 좌측의 폐에서 과잉통기를 확인할 수 있었다.