Case Report

A Giant Bulla of the Lung Mimicking Tension Pneumothorax

Mohsen Sokouti MD1*, Samad Golzari MD2

1. Dept. of Thoracic Surgery, Imam Reza Hospital, Tabriz University of Medical Sciences, Tabriz, Iran.
2. Dept. of Respiratory Medicine, Imam Reza Hospital, Tabriz University of Medical Sciences, Tabriz, Iran.

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Abstract

Herein, we report a case of giant bulla of the right lung in a 35 year old woman. She had respiratory distress and non productive cough for four months. Computed tomography of the chest revealed a giant bulla of the right lung mimicking tension pneumothorax. Being diagnosed with pneumothorax she was treated with closed chest tube drainage and as her condition did not improve after chest tube insertion was referred to our center. Her condition didn’t improve even with the second chest tube insertion so we decided to proceed with thoracotomy. By performing a right thoracotomy, a giant bulla with diameters of 30×25×25 cm was discovered and resected. Giant bulla should be included in the differential diagnosis of pneumothorax.


Keywords: Giant Bulla “ Lung “ Tension Pneumothorax “ Surgery

*Corresponding Author: Mohsen Sokouti MD, Thoracic Surgery, Department of Thoracic Surgery, Imam Reza Hospital, Tabriz University of Medical Sciences, Tabriz, Iran. Tel: +98 411 -3366634 Fax: +98 411 -3373997 E-mail: sokouti_m @ yahoo. Com
**Introduction**

Bullae are defined as sharply demarcated, air-filled spaces within the parenchyma of the lung, measuring one centimeter or greater in distended diameter, which are formed as a result of the destructive process of emphysema or alpha-1 antitrypsin deficiency. They are restricted by a fibrous wall and can be trabeculated due to remnants of alveolar septa. Acquired immunodeficiency syndrome, any type of smoking, intravenous drug abuse, sarcoidosis, and vanishing lung syndrome, genetic disorders like Ehlers-Danlos or Marfan syndrome and cystic lesions of the lung have been reported to be associated with the development of bullous emphysema. Bullae can produce signs and radiologic appearances of pneumothrax and it is important to differentiate them before treatment. The differentiation between giant bulla and pneumothrax can be very difficult and often leads to inaccurate diagnosis and management. Herein we present a case of giant bulla of the lung misdiagnosed as a tension pneumothrax.

**Case report**

A 35-year-old woman was admitted to Imam Reza Hospital affiliated to Tabriz University of Medical Sciences, Tabriz, Iran, in April 2009 with a history of chest pain and mild respiratory distress and four months of nonproductive cough. She was referred to our center because of failed treatment of tension pneumothrax with a chest tube. On admission, the patient had one constantly leaking chest tube at right hemithorax. Skin of right side of her back and right foot were extremely loose with mild brown pigmentation. Dermatology consult was requested. The lesions were reported to be indicative of connective tissue disorder. Respiratory sounds were not audible over right lung but tactile fremitus was absent. She did not have a history of smoking or drug abuse (cocaine, heroin and marijuana). On physical examination vital signs were normal. Cardiac examination was also normal. There was no cyanosis, clubbing or peripheral edema. Chest roentgenogram, demonstrated a large right thoracic radiolucency with flattened diaphragm believed to be pneumothrax and mediastinal shift to the left and a chest tube in the right hemithorax. Computed tomography of the chest revealed right pneumothrax with mediastinal shift to the left suggestive of tension pneumothrax and absent shadow of collapsed right lung (Figure 1). After insertion of the second chest tube into the right hemithorax, right lung was expanded about 30% for two days while diaphragm remained flattened (Figure 2). Eventually right lung collapsed completely while air leakage from bottle of the chest tube drainages continued (Figure 3). The diagnosis was not made until surgical exploration was performed. She was scheduled for thoracotomy. After right thoracotomy, a large giant bulla with dimensions of 30×25 ×25 cm was found while one chest tube was in it and another one was in the pleural space. The origin of the giant bulla was from inferior surface of right lower lobe of the lung. The bulla was excised. Major vascular bleeding of the bulla wall at the inferior surface of the right lower lobe was controlled. Two small bullae measured 2×1×1 cm were also found in exploratory thoracotomy, one in the right upper and the other one in the middle lobe surfaces and both of them were excised. Right lung was completely expanded during surgery. After performing extensive parietal pleurectomy for pleurodesis, two chest tubes were inserted in the right pleural cavity. Mild air leakages were continued postoperatively from chest bottles until 16 days. The patient tolerated the operation well and she was successfully managed. She remained well during a six month follow up period. Pathologic examinations revealed pleural and emphysematous bullae of the lung.
Discussion

Giant bullae refers to the enlargement of one or more bullae to such a degree that they fill more than one third of the hemithorax.\textsuperscript{5} Anatomically, bullae have thin outer walls with variable thicknesses that contain relatively thin remnants of distending emphysematous lung. They have tendency to grow based on check valve mechanism and do not participate to a great extent in ventilation or gas exchange.\textsuperscript{1} Klingman divided bullae into two groups: those with structurally normal lung tissue (20\% of patients) and those in which the rest of the lung exhibits abnormal tissue (80\% of patients).\textsuperscript{6} Giant bullae are often first detected on chest X-ray and manifested as thin walls with sharply demarcated areas of avascularity.\textsuperscript{7} Pneumothorax can usually be considered in differential diagnosis. Using some clinical and radiologic criteria, giant bullae can be differentiated from pneumothorax. CT scanning of the chest, especially HRCT, is the most useful and accurate imaging procedure and must be obtained before surgery. The size, location and number of the bullae will be visualized by this procedure. On CT scanning, bullae appear as avascular areas with curvilinear boundaries.\textsuperscript{2} Without visualization of the outer wall of the bullae, a large airspace in the chest could be pneumothorax or bullae. Double wall sign is an available sign to help distinguish a pneumothorax from adjacent giant bullae.\textsuperscript{8, 9} The presence of giant bullae in one or both upper lobes, occupying at least one third of the hemithorax and compressing surrounding normal lung parenchyma are the other radiologic appearances of giant bullae. If signs of tension such as tracheal deviation or mediastinal shift are seen, that confirms diagnosis of tension pneumothorax is probable. Patients who have nonfunctioning bullae that compress normal tissue and occupy space in the chest cavity will benefit the most from surgical procedure.\textsuperscript{10} Indications of surgery for giant bullae are increasing bullae size, pneumothorax, pulmonary insufficiency, hemoptysis and infection of bullae. It should be considered that better results may be expected in patients without underlying lung disease.\textsuperscript{11} Because of a very large bulla and failed treatment, our patient underwent right thoracotomy, bullectomy and pleurodesis with excellent outcome.
Gokce and associates have reported a similar finding in 35-year-old woman. Their patient’s giant bulla was diagnosed as a tension pneumothrax in emergency ward, and chest tube was inserted for treatment. Waseem and associates described a case of giant bulla in a 40-year-old man that was initially managed by insertion of a chest tube. Her chest x-ray had been interpreted by radiologist as a large left pneumothrax. After performing CT scan of chest, left giant bulla with pneumothrax was detected. At surgery left pneumothrax and giant bullae were found and the patient was treated with bullectomy and pleurodesis. However there are some complications associated with incorrect diagnosis and management such as prolonged massive air leak, infection and mortality which should be born in mind.

References