

## Giant Bullae In Lung Parenchyma — A Case Series

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### ABSTRACT

**Introduction:** Bullae are air filled spaces in lung parenchyma which develop in various diseases and cause respiratory compromise. Bulla which occupies one third of hemithorax is considered as a giant bulla.

**Case series:** This case series consists of eleven cases of giant bullae with varied clinical and radiological features. Common presentations include breathlessness, associated para-septal emphysema and complications like pneumothorax.

**Conclusion:** Patients presenting with acute chest symptoms should also be evaluated for bullous disease and Computed tomography of chest can differentiate pneumothorax from giant bullae.

**KEYWORDS:** Giant bulla, bullous emphysema, Pneumothorax.

### INTRODUCTION:

Bullae are defined on chest radiographs as sharply demarcated areas of emphysema exceeding 1 cm (2 cm on HRCT of the chest) in diameter and with wall thickness of less than 1 mm [1]. When bulla occupies a significant volume of the hemithorax it is considered as a Giant bulla (GB).

Bullae are air filled spaces within the lung parenchyma that forms as a result of deterioration of the alveolar tissue. Giant bulla result from dilatation of air spaces distal to the terminal bronchioles due to a ball-valve effect in the more proximal airways. Bullae can develop in a diseased lung (emphysema) or in a healthy normal lung [2]. According to Morgan et al., bullae forms in an area of parenchymal weakness that is ventilated preferentially. The bulla then increase in size as the force of elastic recoil of the surrounding lung tissue pulls the normal parenchyma away from the bulla thus enlarging it [3]. Bulla is in open communication with airway but does not participate in gas exchange because of relatively avascular area [2]. As the size of the bulla increases, patients experience increasing

respiratory compromise [4].

Vanishing lung syndrome includes presence of giant bullae in one or more upper lobes, occupies at least one-third of the hemi-thorax and compresses the surrounding normal parenchyma. Vanishing lung syndrome has also been reported in same family members [5]. DeVries classification of GB includes group 1 where a single large bulla is seen in a normal lung, group 2 being multiple bullae in normal lung, group 3 multiple bullae in diffuse emphysematous lung, and group 4 multiple in other lung diseases [6].

### CASE SERIES

The present case series include eleven cases who attended Prathima medical college Out-patient department or Emergency room during a period of two years (Nov 2019 to Oct 2021) presenting with giant bulla or bullae with a complication like pneumothorax, respiratory failure. Mean age observed was 40.82 years and with 54.54 % males. Patients who were less than 40 years had single large bulla and the rest had multiple who were also having COPD features. Majority presented with dyspnea or chest pain and found to be having type 1 respiratory failure. In all the cases chest radiographs showed single or multiple bullae, seen on one side or on both sides and at least one occupying one-third of the hemithorax. HRCT chest was done for all the cases. There were three smokers in the series with para-septal emphysema seen in two subjects. One subject presented with post tubercular fibrosis with bilateral bullae. Pneumothorax was diagnosed in four subjects. Single bulla was noted in five subjects observed on one side (all on left side), two subjects had a single bulla on both sides and multiple in four subjects. Further details are given in the Table 1

### DISCUSSION:

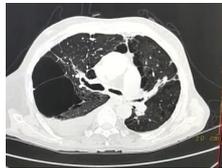
Giant bullae are seen in smokers, lesions typically seen in upper lobes. Cigarette smoking and Alpha 1 Anti Trypsin deficiency are the chief causes for emphysematous bullae formation. The mean age of giant bullous emphysema (GBE)



**Figure 3: CXR PA View Right upper lobe Giant bulla in 22-year female**



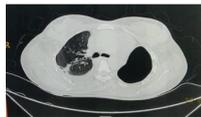
**Figure 4: chest axial cut at cardiac chambers level showing bilatetral bullae in 42-year female**



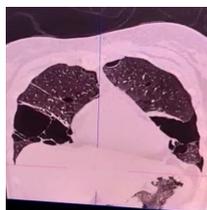
**Figure 5: CT Chest axial cut at T-5 Level showing Right Giant bulla in a 71-year male**



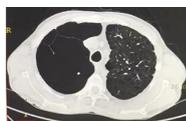
**Figure 6: CT chest Axial section showing giant bulla in left side in 17-year male**



**Figure 7: CT Chest Axial section showing left giant bulla in 25-year female**



**Figure 8: CT Chest Coronal section showing bilateral bullae in 42-year female**



**Figure 9: CT Chest Axial cut at upper trachea showing giant bulla in right upper lobe in a 50-year male**

in one study of 41 subjects was  $48.4 \pm 14.8$  years. Bullous disease involves upper lobes with sizes varying from 1 to 20 cm (average 2-8 cm). CT Scan of chest helps in complete assessment of a bulla, identifies operable from inoperable bullae, presence of generalized emphysema, measures the volume of the bulla and ventilation and compression of the adjacent lung tissue by the enlarging bulla [7]. Spontaneous resolution of giant bullae has been reported in the literature [8, 9]. Smoking cessation, inhalation of bronchodilators, infections, closure of ball valve effect by a tumor are known causes of spontaneous resolution of GBE [4]. In giant bullous emphysema, surgery allows for clinical and functional improvement. Surgical indications of bullous lung disease include patients who have nonfunctioning bullae compromising normal adjacent lung, Subjects with incapacitating dyspnea, complications such as pneumothorax and emphysema with massive hemoptysis [2]. Traditionally surgical options include plication, local excision, lobectomy, surgical resection, marsupialization. Newer methods include VATS, intra-cavitary drainage, open bullectomy.

Patients with GB occupying 30-50% of the hemi-thorax with atelectatic but normal adjacent lungs are considered for bullectomy. Bullectomy may allow for the re expansion of the compressed lung with subsequent improvement in symptoms and measures of lung functions [10, 11]. In GBE, Bullectomy is the treatment of choice [10]. LVRS is chosen for subjects with diffuse emphysema. Post-surgery patients develop improved FEV1, decreased lung volumes and improved VC, Correction of hypoxemia and hypercapnia thus improves gas exchange and reduces dyspnea [11]. Very rarely partial or complete resolution of GB occurs [4].



**Figure 1: CXR PA View showing Giant bulla on left side with mediastinal shift to the opposite side in a 28-year male**



**Figure 2: CXR AP View With left upper lobe giant bulla in 25-year female**

S.NO	Sex/Age	Site of GB	Single/Multiple	Pneumothorax	Complication
1	F / 42	Right Middle lobe and Left Upper Lobe	Multiple	Yes	Yes
2	F / 33	Left Lower lobe	Single	Yes	No
3	M / 71	Right Upper lobe	Multiple	No	Yes
4	M/17	Left Lower lobe	Single	No	No
5	M / 50	Right Upper lobe	Multiple paraseptal	No	Yes
6	F / 45	Left Lower lobe	Single	No	Yes
9	F/ 22	Right Upper lobe and Left Upper lobe	Single/ Both sides	No	Yes
10	M/ 28	Left Upper lobe	Single	Yes	Yes
11.	F/25	Left Upper lobe	Single	No	Yes

**Table 1: Profile of Subjects in the Case series**

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