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Respiratory distress in the newborn: giant lobar emphysema.

Author and Affiliation

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Abstract

Congenital giant lobar emphysema (CGLE) is a rare pulmonary malformation characterized by air trapping in a lobe, usually the upper lobes, due to a valve mechanism. We present the case of a one-month-old newborn with respiratory distress, cyanosis, and dry cough, diagnosed with CGLE based on clinical findings and imaging. Chest X-ray and CT scan revealed right upper lobe hyperinflation with mediastinal shift. A right upper lobectomy was performed with a favorable outcome.

CGLE predominantly affects males and is often diagnosed postnatally, though antenatal detection is possible. Surgical lobectomy is indicated in symptomatic cases, while asymptomatic patients may be managed conservatively.

Keywords

Congenital giant lobar emphysema, respiratory distress, lobectomy

Main Article

Clinical case:

A one-month-old newborn was admitted to the pediatric emergency department for management of respiratory distress. The onset of symptoms dates back to birth, with the development of tachypnea worsening during crying and feeding, accompanied by episodes of dry cough.

Clinical examination revealed a tachypneic, cyanotic newborn with intercostal retractions and bulging of the right hemithorax, associated with auscultatory wheezing and an oxygen saturation (SaO2) of 90% on room air. The patient was placed on oxygen therapy, and a chest X-ray was performed, revealing hyperinflation of the right pulmonary field, displacing the mediastinum (Figure 1).

A follow-up CT scan without contrast injection and without sedation showed hypovascular hyperlucency with expansion of the right upper lobe, pushing the mediastinum and trachea to

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the left, associated with atelectasis of the right lower lobe and the contralateral pulmonary field (Figure 2).

The combination of radiological and clinical findings is consistent with congenital giant compressive lobar emphysema (CGLE).

A right upper lobectomy was performed, with a favorable clinical outcome.

Discussion

Congenital giant lobar emphysema (CGLE) is a rare bronchopulmonary malformation characterized by the distension of a pulmonary lobe, most often affecting the upper lobes, caused by air trapping due to a valve mechanism. This condition exhibits a male predominance (65% vs 35%) [1-2].

Clinically, the first symptoms appear early in infancy, typically presenting as dyspnea and dry cough, worsening during crying or feeding. Cyanosis may be a revealing feature of the disease. On clinical examination, a distended and hyper-resonant hemithorax is often found [2].

The diagnosis should be considered antenatally in cases where ultrasound reveals an enlarged, hyperechogenic lung or pulmonary lobe, and T2-weighted MRI shows a hyperintense signal. Polyhydramnios may also be associated with this condition [3]. The risk of neonatal respiratory distress is higher when the lesion is large and associated with mediastinal deviation [4].

Postnatally, the diagnosis becomes more straightforward. On chest radiography, the affected lobe appears distended and hyperinflated, with a fine vascular network, which is a key radiological feature to differentiate CGLE from pneumothorax. The mediastinum is displaced toward the contralateral side, and the adjacent lobe is compressed [5].

CT imaging is particularly valuable in evaluating the emphysema, demonstrating a distended, hyperlucent lobe with vascular rarefaction. The other lobes appear denser, due to poor aeration and collapse. In cases of large emphysema, there is often retrosternal herniation of the affected lobe toward the opposite side. CT plays a critical role in ruling out obstructive emphysema secondary to extrinsic bronchial compression by a mediastinal mass, or, more rarely, due to an endoluminal bronchial lesion [6].

Bronchoscopy has limited indications due to its invasive nature and the diagnostic accuracy of CT. However, when performed, bronchoscopy can exclude conditions such as bronchomalacia, pulmonary atresia, or intrabronchial foreign bodies [7].

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Surgical treatment via lobectomy is necessary if the child is symptomatic, with the timing of intervention depending on clinical severity. Lobectomy allows re-expansion of the collapsed lobes. In asymptomatic children, conservative management with close monitoring is considered, as some cases of lobar emphysema may regress spontaneously [2, 8-9].

Figures:

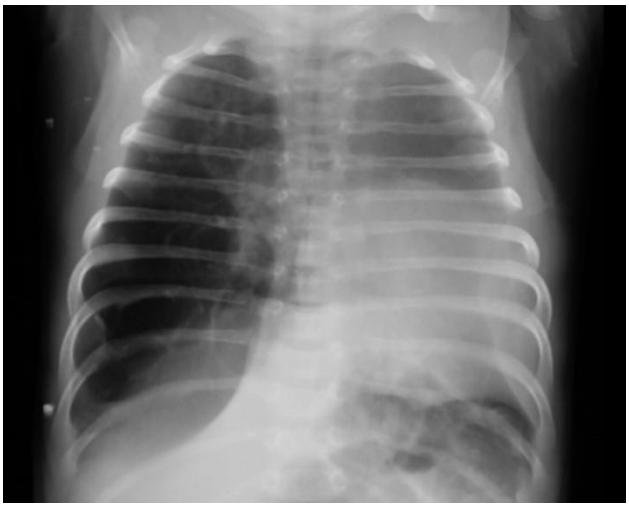

***Figure 1**: Frontal chest radiograph showing hyperinflation of the right lung field, displacing the mediastinum.*

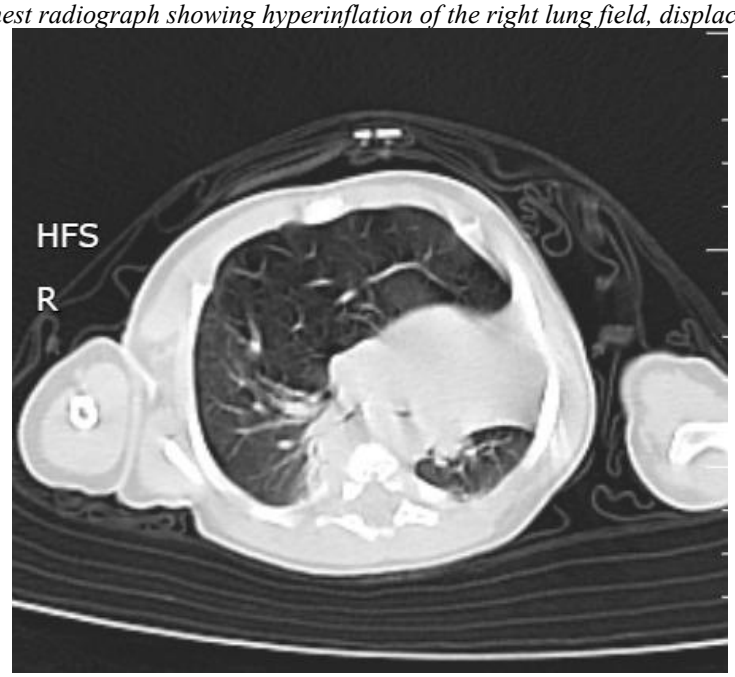

***Figure 2**: Thoracic CT scan, parenchymal window: hypovascular hyperlucency with expansion of the right upper lobe, displacing the mediastinum and trachea to the left, associated with atelectasis of the right lower lobe and the contralateral pulmonary field.*

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