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Case report

Empyema necessitans in an infant due to pseudomonas aeruginosa at a referral hospital in mogadishu, somalia: A case report ^{☆,☆☆}

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ABSTRACT

Empyema necessitans (EN) is a rare complication of bacterial pneumonia, especially in children. It can be caused by many infectious agents, but Mycobacterium tuberculosis is the most common cause of EN.

We report a 3-month-old girl who had EN on the 90th day of life, multidrug-resistant *P. aeruginosa* was isolated from her pleural fluid culture. We could not find another published report about EN caused by *Pseudomonas aeruginosa* (*P. aeruginosa*) in an infant.

The case highlights that children presenting with fever and chest wall mass should be immediately imaged by chest computed tomography as there might be an urgent need for intervention.

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Background

Empyema necessitans (EN) is a rare complication of bacterial pneumonia, especially in children. It is characterized by the extension of empyema from the pleural cavity into the extrapleural space where it forms a mass of purulent fluid in the soft tissue surrounding the chest wall [1]. EN is more often reported in adults than in children: only a few cases have

been reported in healthy and immunocompromised pediatric patients.

It was first described by Gullan de Baillon in 1640 when it developed after the spontaneous rupture of a syphilitic aneurysm [2].

Diagnosis is based on clinical view and radiological imaging data and then confirmed by smear, culture, and PCR from fluid aspiration. The treatment is a combination of drainage and antibiotic medications.

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Fig. 1 – AP Chest X-ray on presentation before chest tube insertion, showed soft tissue density on the right chest wall, complete opacification of the right hemithorax consistent with effusion, the right lung collapsed, the trachea and heart were shifted to the left. Heart size is normal and the left lung is clear.

Here we report a 3-month-old girl with a soft mass in the lower part of the back, fever, and difficulty breathing due to *P. aeruginosa* empyema necessitans.

Case Presentation

An infant patient was admitted to the pediatric ward to investigate a soft mass at the posterior aspect of the right chest wall, right chest pain, fever, and difficulty breathing of 1-week duration, there was no history of recent vaccination or documented antibiotic use. Her family denied any recent chest trauma.

On physical examination, there was chest wall asymmetry, with a decreased expansion of the right side, and breath sounds over the entire right side of the chest were decreased.

A chest radiograph showed soft tissue density on the right chest wall, complete opacification of the right hemithorax consistent with effusion, the right lung collapsed, the trachea and heart were shifted to the left. (Fig. 1).

A contrast-enhanced Computed tomography (CECT) scan of the chest showed a large right-sided pleural fluid collection with pleural thickening and enhancement, with the right lung compressed and displaced medially and consequent mediastinal shift. Also, a large enhancing, thick-walled abscess on the posterior aspect of the right chest wall is seen (Fig. 2 A, B, C).

A diagnosis of empyema necessitans was made based on the scan, clinical presentation, and pleural fluid culture. Subsequently, a chest tube was inserted and purulent exudates were drained, and sensitive antibiotic medications were administered and follow up chest X-ray showed improvement (Fig. 3).

The patient was discharged after the resolution of the empyema and maintained oral antibiotic treatment. The patient appeared completely recovered at the follow-up.

Discussion and conclusion

Empyema necessitans (or empyema necessitatis) is a rare complication of pulmonary infection, usually secondary to *Mycobacterium tuberculosis* infection reactivation, although it can also occur with pyogenic bacterial infection and actinomycosis [3]. It represents the extension of the pus from the pleural cavity to the chest wall (most frequently), but also to the bronchi, esophagus, breasts, or retroperitoneum [4].

The diagnostic study of choice is chest contrast-enhanced CT (CECT) and reveals the extent and nature of the disease like demonstrating a communication of empyema into the surrounding soft tissue [5,6].

On imaging, the appearances of empyema in ultrasound depend on the composition of the collection. they are not uniformly anechoic and are often septated. Ultrasound has a major role in guiding thoracocentesis.

CT Typically appears as a fluid density collection in the pleural space, with extension through the chest wall into an extra-thoracic compartment, sometimes with locules of gas, the inner walls of the empyema are smooth. They form obtuse angles with the adjacent lung, which is displaced and compressed. empyema shows enhancement of thickened inner visceral and outer parietal pleura which are separated by the collection, the so-called split pleura sign, which is the most sensitive and specific sign-on CT [7].

Clinicians should be aware that a tender chest wall mass in a child with pneumonia symptoms necessitates urgent attention including CECT chest to diagnose and determine the extent of empyema necessitans as successful treatment

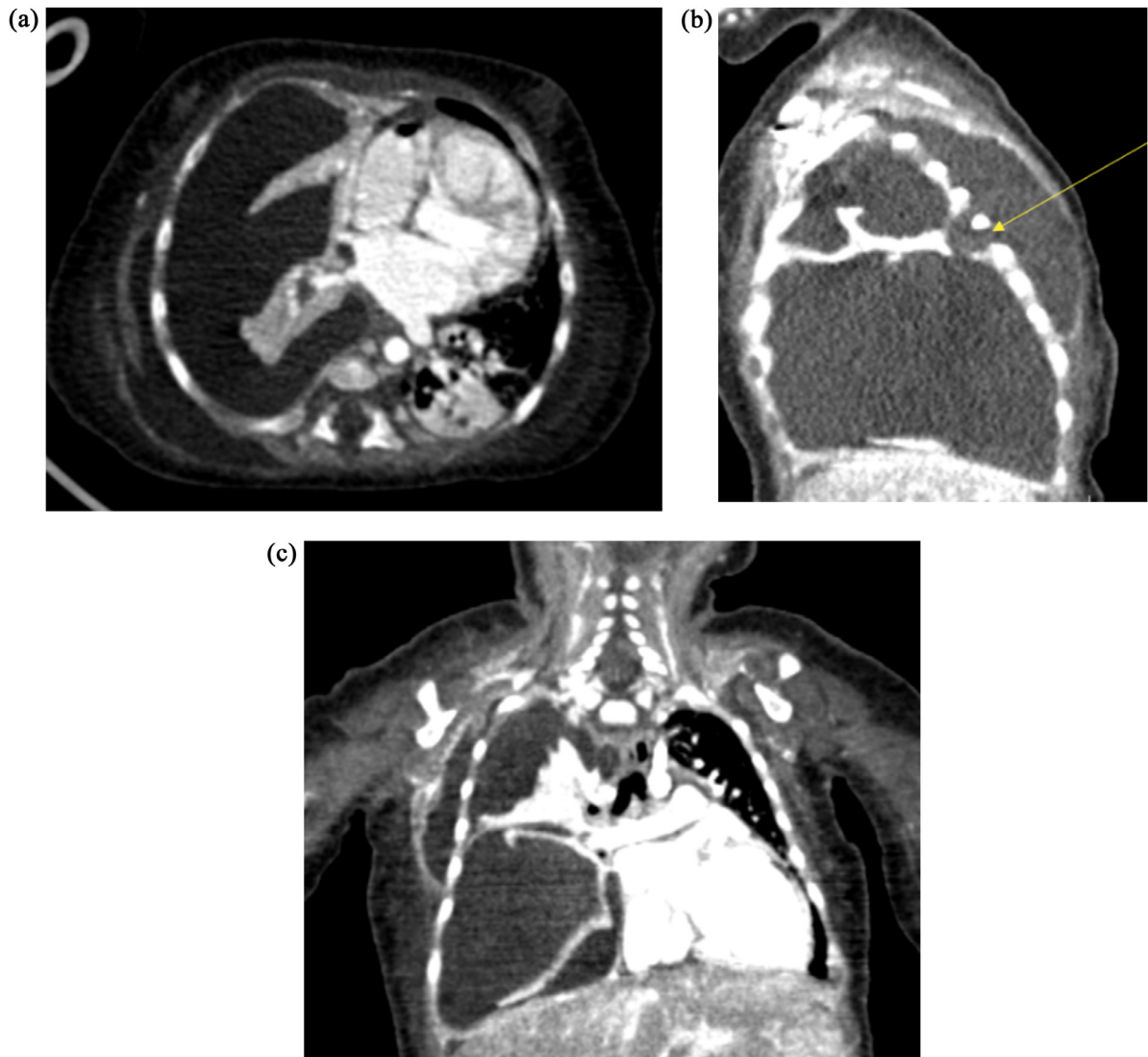


Fig. 2 – (A, B) – Axial, coronal, and sagittal contrast-enhanced chest CT shows a large right-sided pleural fluid collection with pleural thickening and enhancement, with the right lung compressed and displaced medially and consequent mediastinal shift. extra thoracic empyema was also noted. (C) A large enhancing, thick-walled abscess on the posterior aspect of the right chest wall. The yellow arrow indicates a possible communication path between intrathoracic and extrathoracic empyema.

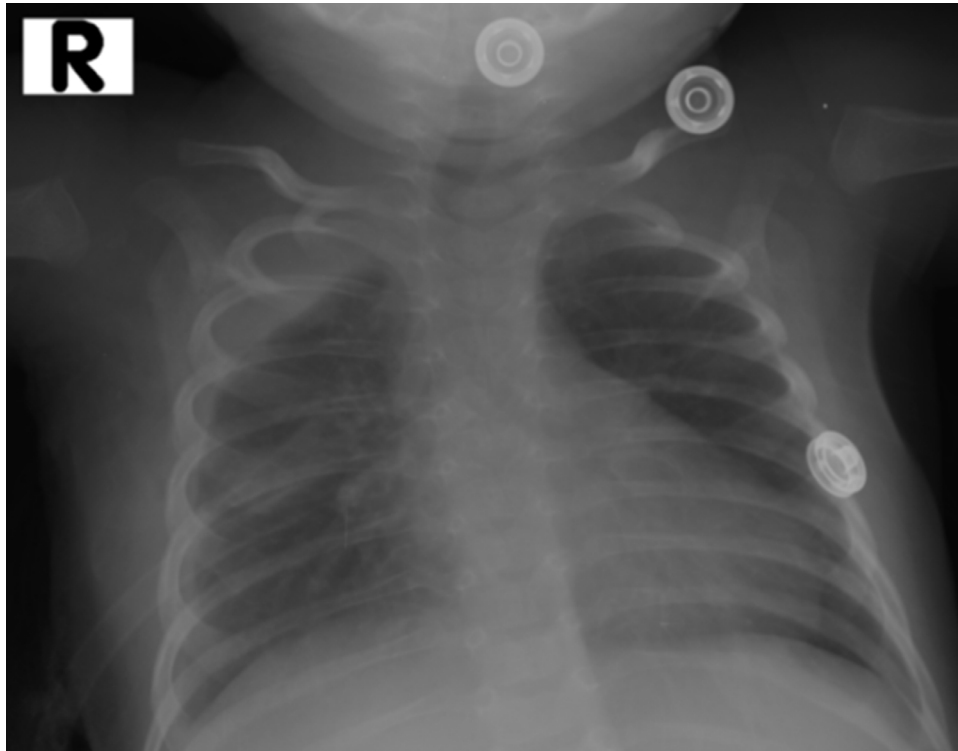


Fig. 3 – AP Chest X-ray showed improvement after chest tube insertion. The right lung expanded, trachea, and mediastinal are in a normal position after empyema drainage.

depends on the prompt introduction of antibiotics and surgery if there is not a rapid response to medical treatment.

Ethics approval and consent to participate

We took ethical approval for this case report from the ethical committee of Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital.

Consent for publication

Parents of the Patient were invited and written informed consent was obtained for their anonymized information to be published in this study.

Authors' contributions

YGM wrote the case report and discussion. MK examined the radiological films and wrote the radiology report.

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