Pulmonary abscess and empyema:  
a case of coexistence

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Section: Paediatric radiology
Case Type: Clinical Cases
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Patient: 2 years, female

Clinical History:

Although most empyemas and intrapulmonary abscesses are caused by pneumonia, pulmonary abscess and empyema occur only in a minority of patients simultaneously. This report presents the ultrasound features compared with the roentgenographic and CT appearance of this condition in a 2-year-old child.

Imaging Findings:

A 2-year-old girl was referred to the pediatric clinic at our university hospital with complaints of dry cough and fever since four days. The patient had not received any premedication. An erect chest X-ray showed an opacification with gas-fluid-levels in the right hemithorax (Figure 1). A preexistent lung malformation (Cystic adenomatoid malformation (CAM), bronchogenic cyst ) cyst was excluded by ultrasound and CT (although it can resemble a CAM).

Sonography revealed features of both lung abscess and empyema with thickened and hypervascularized pleural layers (Figures 2b, 2c, 3b). CT additionally confirmed presence of empyema and intrapulmonary abscess (Figures 2a, 3a). The patient recovered well after closed thoracic tube drainage and antibiotic therapy. A follow-up CT-scan six months later showed a pneumatocele, few areas of dystelectasis and a pleural peel as residual changes.

Discussion:

The differentiation between an intrapulmonary abscess and an empyema is possible by assessing characteristic features of those conditions, such as the split pleura sign or the suspended microbubble sign in sectional imaging. The split pleura sign is specific for empyema and is never seen in lung abscesses (Figure 2). This characteristic sign encompasses thickening and hypervascularization of the pleural layers which are separated by a fibropurulent fluid in the pleural cavity. Furthermore the chest wall angle is acute in lung abscesses and obtuse in empyema (Figures 2, 3). Air bubbles can be seen in both conditions, the so called suspended microbubbles. They can be caused by gas producing bacteria or there is frank connection to the bronchial system with formation of a gas-fluid level (Figures 1, 3a). This is usually the case in lung abscesses, rarely in empyema when a bronchopleural fistula is present. The borders are well delineated and sharp in empyema and are irregular in intrapulmonary abscesses (Figures 2, 3). Ultrasound is accurate and widely available (e.g. third world countries) and is particular useful in patients with complete opacification of the thorax at radiography. Ultrasound allows ready differentiation of lung masses, pleural masses or atelectasis. Furthermore it helps in differentiating simple, complicated, or fibroadhesive pleural fluid collections.
**Differential Diagnosis List:** Pulmonary abscess and empyema

**Final Diagnosis:** Pulmonary abscess and empyema

**References:**


Figure 2

Description: Origin:

b
Figure 3

a

Description: Origin:

b

Description: Origin: