ฝีในปอดในเด็ก: รายงานผู้ป่วย

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บทคัดย่อ

บริบท โรคฝีในปอดพบได้ไม่บ่อยในเด็กแต่เป็นภาวะความผิดปกติของระบบทางเดินหายใจที่รุนแรง ข้อมูลเกี่ยวกับโรคฝีในปอดในผู้ป่วยเด็กยังมีจำกัด

วัตถุประสงค์ เพื่อศึกษาลักษณะอาการทางคลินิก ภาพรังสีทรวงอก เอกซเรย์คอมพิวเตอร์ และการรักษาของโรคฝีในปอดในเด็ก

กรณีศึกษา รายงานผู้ป่วยเด็ก จำนวน 2 ราย ที่ได้รับการวินิจฉัยเป็นโรคฝีในปอด เข้ารับการรักษาในโรงพยาบาลมหาวิทยาลัยบูรพาช่วงเดือนพฤษภาคม พ.ศ. 2564 และเดือนกรกฎาคม พ.ศ. 2565 อาการนำของผู้ป่วยที่พบบ่อยที่สุด ได้แก่ ไข้ น้ำมูก ถ่ายเหลว และอาเจียน การวินิจฉัยโรคโดยใช้ภาพรังสีทรวงอกและเอกซเรย์คอมพิวเตอร์ พบตำแหน่งฝีในปอดบริเวณปอดขวาส่วนล่าง ในระยะเริ่มต้นได้รับการรักษาด้วยยาปฏิชีวนะครอบคลุมเชื้อก่อโรคที่สงสัยทางหลอดเลือดดำ ผู้ป่วยรายแรกไม่ตอบสนองต่อการให้ยาต้านจุลชีพ ต้องได้รับการเจาะระบายหนองผ่านทางผิวหนัง ผลตรวจหนองด้วยปฏิกิริยาลูกโซ่โพลีเมอเรส (polymerase chain reaction) พบเชื้อ *Aggregatibacter segnis* เป็นต้นเหตุ การติดตามอาการภายหลังการรักษาผู้ป่วยทั้งสองรายหายเป็นปกติ

สรุป อาการทางคลินิกของเด็กในระยะเริ่มต้นอาจทำให้วินิจฉัยโรคฝีในปอดได้ยาก หากไม่ได้ตระหนักถึงโรคฝีในปอดอาจทำให้การวินิจฉัยและการรักษาล่าช้าออกไป แนะนำให้ยาปฏิชีวนะที่เหมาะสมทางหลอดเลือดดำในระยะเริ่มต้นของการรักษา การพยากรณ์โรคฝีในปอดในเด็กค่อนข้างดีหากได้รับการวินิจฉัยทันท่วงทีและได้รับการรักษาอย่างเหมาะสม

คำสำคัญ ฝีในปอด เด็ก

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Lung abscesses in children: A case report

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Abstract

Introduction: Because lung abscesses are uncommon in children, not a lot of information is available about this condition. However, it remains a severe respiratory condition.

Objective: To describe the clinical manifestations, chest X-ray and, CT scan findings, and the management of children with lung abscesses.

Case presentation: This retrospective descriptive study collected data from the medical records of two patients admitted to Burapha University Hospital between May 2021 and July 2022. The, two children had lung abscesses. Commonly presented symptoms include fever, rhinorrhea, diarrhoea, and vomiting. The diagnosis was established by chest radiographs and a CT scan. The locations of the lung abscesses were in the right lower lobe. Empiric intravenous antibiotics were the initial treatment for the lung abscesses. However, the patient didn't respond to antibiotics in one case, leading us to perform percutaneous drainage. Subsequent pus analysis using polymerase chain reaction (PCR) identified *Aggregatibacter segnis* as the causative organism. Encouragingly, both cases achieved full recovery following treatment.

Conclusion: Early clinical manifestations in children can pose challenges in diagnosing lung abscesses. A lack of awareness of lung abscesses may lead to a delayed diagnosis and treatment. Appropriate intravenous antibiotics are recommended as the initial treatment for lung abscesses in children. With a timely diagnosis and appropriate treatment, lung abscesses in children have a favourable prognosis.

Keywords: Lung abscess, Children

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Introduction

A lung abscess is a thick-walled cavity in the lung that contains purulent material resulting from a pulmonary infection, that has led to suppurative necrosis and the destruction of the involved lung parenchyma.[1,2] Lung abscesses are classified as primary or secondary depending on their underlying conditions.[1,3,4] A primary lung abscess occurs in previously healthy children without a specific lung disease. Secondary lung abscesses occur in children already with, or with a predisposition to, an underlying lung condition.

Lung abscesses are uncommon in children, with an estimated incidence of 0.7 per 100,000 hospital admissions each year.[5] For example, from January 2015 to December 2019, three-hundred and seventy-five children with air bronchograms on their chest computed tomography scans (CT scans) from Siriraj Hospital were included, in a sample group. Of the 375 children, 182 had pneumonia. Lung abscesses only accounted for 4.9% from this group.[6]

The clinical manifestations of lung abscesses in the children included fever, cough, tachypnea, dyspnea, and chest pain. Fever and cough were the most commonly presented symptoms.[1-3, 7-9] Chest radiographs, ultrasonography, or a CT scan usually establishes the diagnosis. On chest radiographs, the characteristic appearance of a lung abscess is seen as a thick-walled cavity with an air-fluid level.[1,3] Or, on a colour Doppler ultrasonography, the abscess is a well-demarcated capsular structure surrounding a hypoechoic core, without internal vascularity.[10] Additionally, its appearance can be as an air-fluid level with a thick-walled cavity that contains mobile, central fluid occurring in the midst of an area of consolidated lung on the CT scan.[1]

The etiology of lung abscesses can be due to various aerobic bacteria such as *Streptococcus spp.*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumonia*, *Haemophilus influenza*, *Pseudomonas aeruginosa*, as well as anaerobic bacteria such as *Bacteroides spp.*, *Fusobacterium spp.*, and *Peptostreptococcus spp*.[4,9] *Streptococcus pneumoniae, Staphylococcus aureus*, and anaerobes are the most frequent organisms that cause lung abscesses.[1,2,7,9] Empiric broad-spectrum antibiotics are the initial treatment for a lung abscess until the causative organism is found. If the medical treatment fails, then percutaneous drainage is advisable. Surgical open drainage or a lobectomy are reserved for cases in which medical treatment fails and percutaneous drainage is not possible.[1,2,7,9]

This study reports on two cases of lung abscess in children from Burapha University Hospital.

Objective

To describe the clinical manifestations, chest X-ray, CT scan, and management of children with lung abscess.

Case presentation

A retrospective descriptive study collected data from the medical records of patients admitted to Burapha University Hospital from May 2021 to July 2022.

Case 1

A 9-month-old male infant was brought to the hospital with fever, rhinorrhea, diarrhoea, and vomiting over the previous two days. His past history revealed a full-term gestation period, no perinatal complications, and no other significant issues in his medical history. A physical examination revealed the following: body weight, 8.3 kg (10-25 percentile); height, 72.0 cm (10-25 percentile); body temperature, 38.3 °C; heart rate, 140 beats per minute; respiratory rate, 40 breaths per minute; peripheral oxygen saturation, 98%. He had an injected pharynx and no sign of dehydration. His abdomen, heart, and lungs were all within normal limits. Initial laboratory studies showed a low level of haemoglobin (10.4 g/dl), leukocytosis with neutrophils predominant (WBC 25,690 cells/mm^3; N 73%, L 20%; platelet count 340,000 cells/mm^3), and low serum sodium (Na 132 mmol/L). There was no detection of stool abnormalities in a stool examination and culture tests. His initial diagnosis was acute gastroenteritis, and he was treated with ceftriaxone for three days.

During hospitalization, the patient still had a fever, no tachypnea, and no sign of respiratory distress. A blood culture was negative. Further investigation revealed, from a chest X-ray, a rounded opacity with a cavity in the right lower lung fields (Figure 1). The chest CT scan confirmed the diagnosis of a lung abscess in the right lower lobe (Figure 2). The antibiotic was changed to piperacillin with tazobactam. On the seventh day of antibiotics, as the fever persisted, percutaneous drainage was performed, and the purulent discharge was aspirated. After two days, the patient was afebrile; he improved, the percutaneous catheter was removed, and he was transferred to the general ward for intravenous antibiotics. The pus culture was negative. The result of the pus polymerase chain reaction (PCR) for bacterial identification (16S ribosomal RNA) reported *Aggregatibacter segnis*. The antibiotic was changed to ceftriaxone and then oral amoxicillin with clavulanic acid. Echocardiography and immune workups were normal. He was treated with intravenous antibiotics for three weeks, followed by oral antibiotics for five weeks. A follow-up visit with the pateint showed a complete recovery with the disappearance of the cavity.

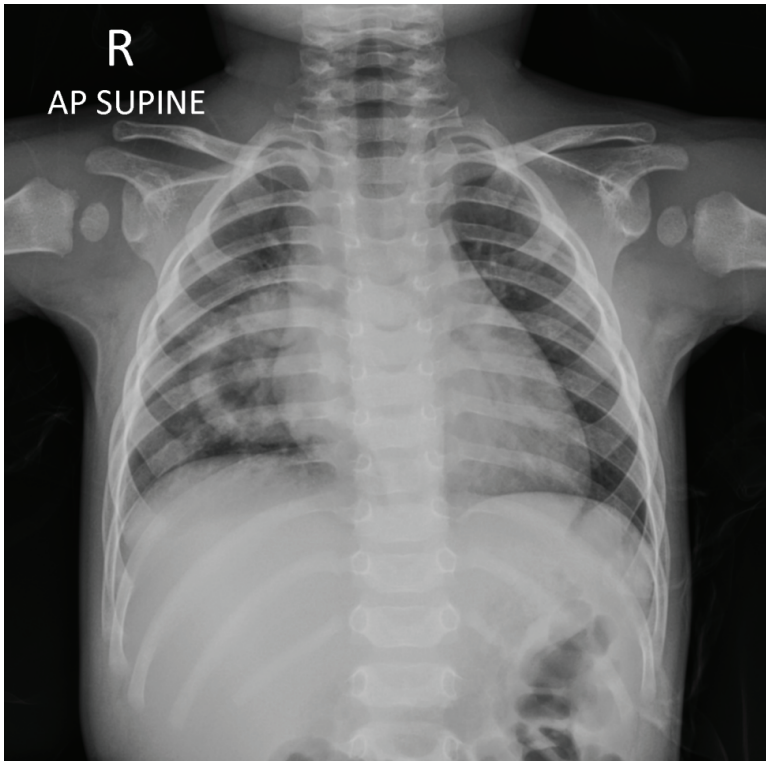

Figure 1 Chest X-ray showing a rounded opacity with a cavity in the right lower lung fields.

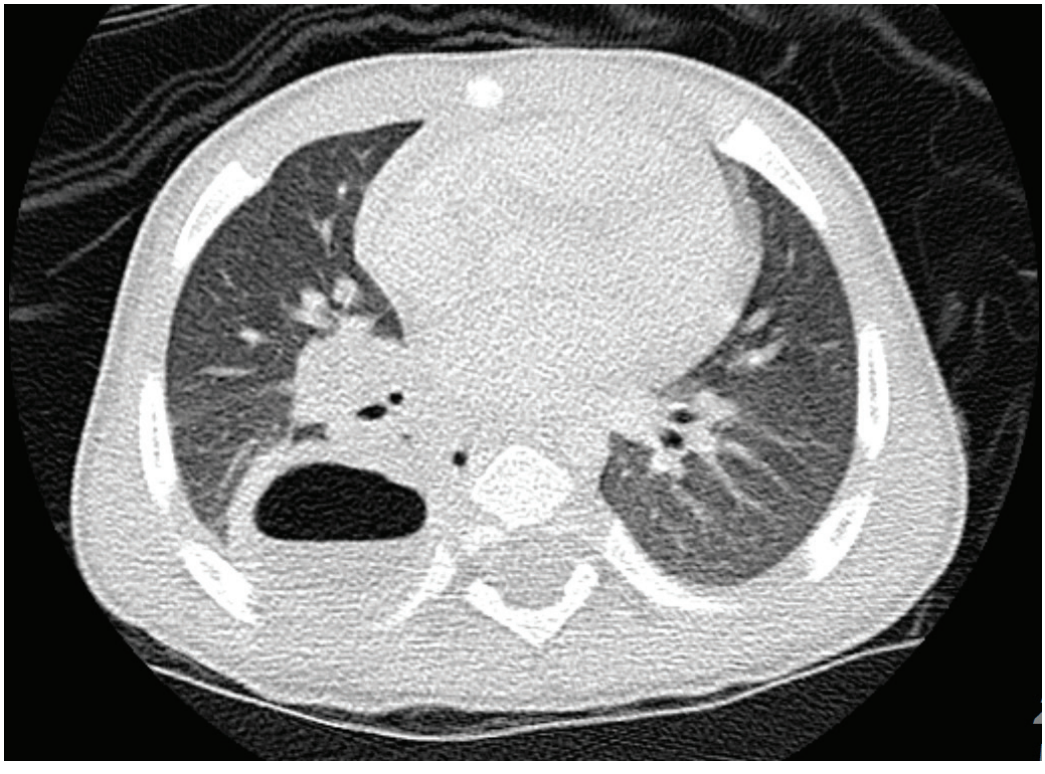

Figure 2 Chest CT scan showing a 3.1x3.8x3.7 cm enhanced thickened-wall cavitary lesion with an internal air-fluid level at the right lower lobe.

Case 2

A 15-month-old male was brought to the hospital with a week-long fever, cough, and rhinorrhea. After two days, he had a high-grade fever, diarrhoea, and vomiting. He was a previously healthy child with an unremarkable history. A physical examination revealed the following: body weight, 9.3 kg (10-25 percentile); height, 80.0 cm (50-75 percentile); body temperature, 39.0 °C; heart rate, 144 beats per minute; respiratory rate, 36 breaths per minute; peripheral oxygen saturation, 99%. He had abdominal distention and no sign of dehydration. His heart and lungs were all within normal limits. Initial laboratory studies showed a low level of haemoglobin (9.4 g/dl), leukocytosis with neutrophils predominant (WBC 25,090 cells/mm^3; N 71%, L 27%; platelet count 410,000 cells/mm^3), and low serum sodium with metabolic acidosis (Na 134 mmol/L, HCO_3 16 mmol/L). There was no detection of stool abnormalities in his stool examination. Imaging was performed to determine the cause of the abdominal pain and distention. Acute abdominal series radiography revealed a patchy opacity in the right upper lung fields, and an unremarkable abdomen. His diagnosis was acute gastroenteritis with pneumonia, and he was started on ceftriaxone and azithromycin. Influenza, RSV, and COVID screenings were all negative.

The pateint's fever persisted during hospitalization. Serum Mycoplasma IgM, blood culture, and stool culture were all negative. The laboratory tests revealed increased inflammatory biomarkers: C-reactive protein (CRP) at 81.90 mg/L and erythrocyte sedimentation rate (ESR) at 92 mm/hr. On the fifth day of admission, the repeated chest X-ray showed a patchy opacity with a cavity in the right lower lobe (Figure 3). The chest CT scan confirmed the diagnosis of a lung abscess in the right lower lobe (Figure 4). He was treated with clindamycin and ceftriaxone. The patient was afebrile and clinically improving. Ten days later, he developed a generalized maculopapular rash and possible allergy to the clindamycin. The antibiotic was changed to amoxicillin with clavulanic acid, and switched to oral form. He was treated with intravenous antibiotics for the next two weeks, followed by oral antibiotics for six weeks. The follow-up consultation with the patient showed a complete recovery with the disappearance of the cavity.

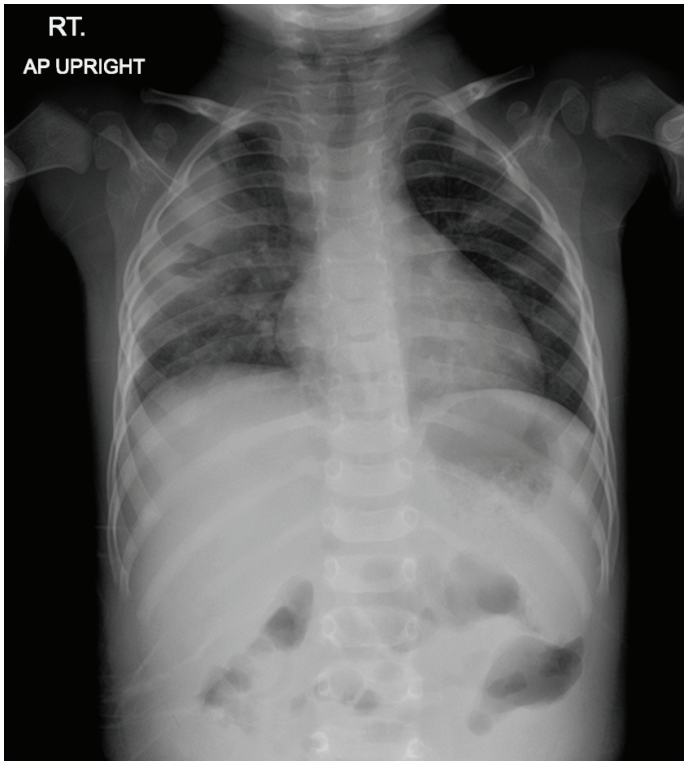

Figure 3 Chest X-ray showing a patchy opacity with a cavity in the right lower lobe.

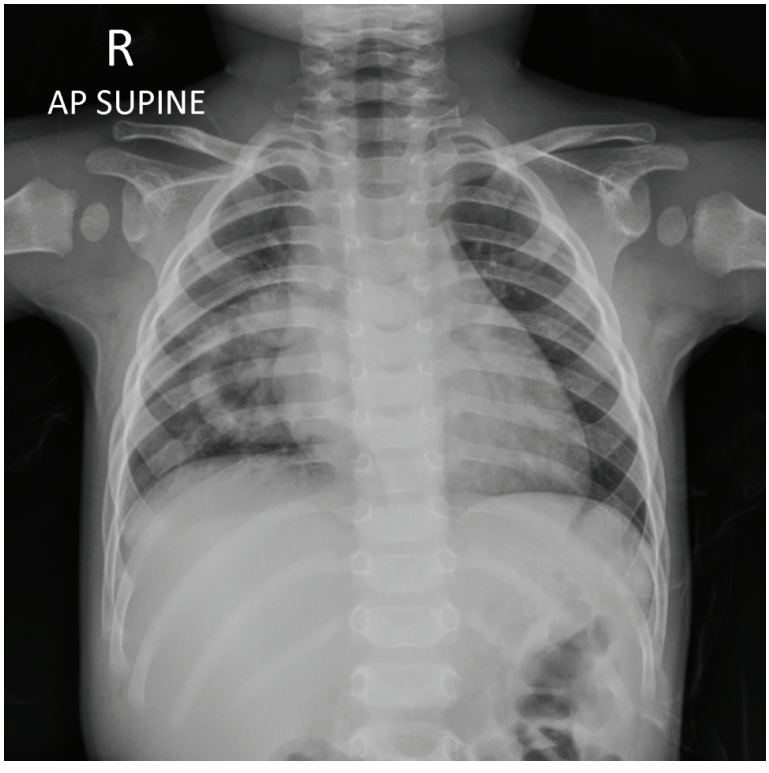

Figure 4 Chest CT scan showing a 2.1x3.0 cm enhanced thickened-wall cavitary lesion with internal air-fluid level at the right lower lobe.

Discussion

Pediatric lung abscesses are an uncommon problem. Previous literature has reported fever and cough as the most evident symptoms of a lung abscess.[1-3,7-9] In our study, the distinctive symptoms were fever, rhinorrhea, diarrhoea, and vomiting. Previous studies have reported fever (82-100%)[1-3], cough (65-91%)[1-3], rhinorrhea (27%)[3], vomiting (24-28%)[1,2], and diarrhoea (5%)[2] as presenting symptoms of lung abscesses. It can be seen that diarrhoea is an uncommon symptom of a lung abscess. Chest radiographs usually establish the diagnosis of a lung abscess, but in some instances, it can be challenging to make a differential diagnosis based solely on a chest radiograph; performing a CT scan to confirm a diagnosis is necessary.[4] The locations of the lung abscesses were varied on the chest CT. Our cases were both in the right lower lobe; similar to a previous literature study[2], which stated that the common site for abscesses was the lower lobes (59%), divided into the right lower lobe (26%) and the left lower lobe (33%). *Streptococcus pneumoniae, Staphylococcus aureus*, Beta-hemolytic *Streptococci*, and anaerobes are the most frequent organisms that cause lung abscesses.[1,2,7,9] *Aggregatibacter segnis* was the organism in our case. The yield of blood cultures in our cases was negative. The interventional method may increase the yield of organisms that cause lung abscesses from 30 to 60%.[9]

Aggregatibacter spp. are gram-negative bacilli, facultative anaerobe and fastidious bacteria. This genus contains four species: *Aggregatibacter actinomycetemcomitans, Aggregatibacter aphrophilus, Aggregatibacter kilanii, and Aggregatibacter segnis*. These bacteria are part of normal oral flora. *Aggregatibacter spp.* is a member of the HACEK group known to cause infective endocarditis. *Aggregatibacter segnis*, (formererly named *Hemophilus segnis),* has rarely been identified as a cause of invasive infections.[11] However, the infection caused by *A. segnis* may be underreported and misidentified as *Hemophilus spp.* by conventional culture methods. The 16S ribosomal RNA sequencing analysis can help to identify this organism.[12-14] Two to three years ago, *A. segnis* was identified as a cause of skin and soft tissue infection, necrotic appendicitis, bacteremia and infective endocarditis.[12-14] Lung abscesses caused by *A. segnis* have never been reported. Antimicrobial susceptibilities of 63 isolates of *Hemophilus* and *Aggregatibacter* species in bacteremic patients reported a high susceptibility to Amoxicillin/Clavulanic acid (89.7%), Cefixime (98.3%), Cefotaxime (98.3%) and Cefuroxime (91.4%).[12]

The mainstay of treatment for a lung abscess is intravenous antibiotics. It was recommended that intravenous antibiotics be given for 2-3 weeks, followed by oral antibiotics for 4-8 weeks.[1] Ceftriaxone and clindamycin[2,3,9] are the initial treatments for a lung abscess until the causative organism is found, similar to our

case. In our study, after clinical improvement, intravenous antibiotics were switched to oral amoxicillin with clavulanic acid. If the medical treatment fails, then percutaneous drainage is advisable. Percutaneous drainage is an applicable minimally invasive procedure for lung abscesses, not only to reduce the abscess but also to identy the pathogenic organism.[15] Pigtail catheters have shown a faster recovery time for fever and other symptoms of lung abscesses.[9] In our study, the first case failed to respond to antibiotics, and percutaneous drainage was performed. Two days later, the patient was afebrile and clinically improving. The prognosis for children with lung abscesses is overwhelmingly favourable.[1]

Conclusion

The early clinical manifestations in children make it difficult to diagnose lung abscesses. Lack of awareness of lung abscesses may lead to a delayed diagnosis and treatment. Appropriate intravenous antibiotics are recommended as the initial treatment for lung abscesses in children. Generally, lung abscesses in children have a favourable prognosis when diagnosed and treated appropriately.

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