5(1): 1-4; Feb 2026
Pediatric Academic Case Reports
DOI: 10.61107/pacr.2026.182

Case Report

A case of empyema secondary to necrotizing pneumonia successfully treated with broad- spectrum antibiotics and fibrinolytic therapy in the early period

Erken dönemde geniş spektrumlu antibiyotikler ve fibrinolitik tedavi ile başarılı bir şekilde tedavi edilen nekrotizan pnömoniye bağlı ampiyem olgusu

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ABSTRACT

Necrotizing pneumonia is a rare complication of bacterial lung infections, and host factors and the virulence of the microorganism are effective in its emergence. The most common microorganisms involved in etiology are *Staphylococcus aureus, Streptococcus pyogenes, Klebsiella pneumonia, Nocardia and Streptococcus pneumonia*. Patients may present with high fever, rapidly progressing respiratory distress, cough, hemoptysis and rapid deterioration in radiological findings. Necrotizing pneumonia heals without sequelae in healthy children. However, in a small number of cases, it may be complicated by lung abscess, empyema, pneumatocele or bronchopleural fistula. A case of necrotizing pneumonia successfully treated with fibrinolytic therapy applied in the early period is presented here.

Keywords: *Necrotizing pneumonia, Antibiotic treatment, Fibrinolytic therapy, Children.*

ÖZET

Nekrotizan pnömoni, bakteriyel akciğer enfeksiyonlarının nadir görülen bir komplikasyonudur ve ortaya çıkmasında konak faktörleri ve mikroorganizmanın virülansı etkilidir. Etiyolojide en sık rol oynayan mikroorganizmalar *Staphylococcus Aureus, Streptococcus Pyogenes, Klebsiella Pneumonia, Nocardia* ve *Streptococcus Pneumonia*'dır. Hastalar yüksek ateş, hızla ilerleyen solunum sıkıntısı, öksürük, hemoptizi ve radyolojik bulgularda hızlı bozulma ile gelebilirler. Nekrotizan pnömoni sağlıklı çocuklarda sekel bırakmadan iyileşir. Ancak az sayıda vakada akciğer apsesi, ampiyem, pnömatosel veya bronkoplevral fistül ile komplike olabilir. Erken dönemde uygulanan fibrinolitik tedavi ile başarılı bir şekilde tedavi edilen nekrotizan pnömoni tanısı almış bir vaka sunulacaktır.

Keywords: *Nekrotizan Pnömoni, Antibiyotik Tedavisi, Fibrinolitik Tedavi, Çocuk*

Received: 23.01.2025 · **Accepted:** 29.04.2025 · **Published:** 13.02.2026

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Cite this article as: Guzeloglu E, Isik S, Caglayan Sozmen C, Asilsoy A. A case of empyema secondary to necrotizing pneumonia successfully treated with broad- spectrum antibiotics and fibrinolytic therapy in the early period. Pediatr Acad Case Rep. 2026;5(1):1-4.

INTRODUCTION

Necrotizing pneumonia is a rare complication of community-acquired pneumonia characterized by lung parenchymal destruction in the affected areas. Pneumonia should be suspected in patients with progressive clinical deterioration, high fever, and respiratory distress despite at least 72 hours of adequate antibiotic therapy. Ultrasound and CT are well-established methods for evaluating complicated pediatric pneumonia. Initially, conservative treatment with supplemental oxygen and IV antibiotics should be administered, and if the child remains seriously ill and the infection is refractory, surgical and invasive treatment should be performed. Good clinical responses can be obtained with early fibrinolytic therapy [1-4]. A case of successfully treated necrotizing pneumonia is presented in this case study.

CASE REPORT

A 3-year-old male patient was hospitalized due to fever, cough and respiratory distress that had been continuing for three days. The patient's vital signs on first admission were Fever: 38.3 C, Pulse: 152/min, TA: 118/82 mm Hg, RR: 48/min. During the physical examination, the patient had decreased respiratory sounds and crackles in the right lung on lung auscultation, and a PA (Posterior Anterior) Chest X-Ray revealed a pleural effusion and consolidation in the right lung. The patient's PA (Posterior Anterior) Chest X-Ray image is shown in Figure 1. Thoracentesis was performed and 50 cc of cloudy fluid was obtained. Pleural fluid examination was pleural fluid/serum protein = 0.55, pleural fluid/serum LDH = 0.62, pleural fluid LDH = 254, and was exudate. The patient's laboratory parameters were WBC: 18600/mm3, PNL: 82%, Hb: 11.9 g/dL, Plt: 482000/mm3, Sedimentation: 38/hour. Broad-spectrum antibiotics were started on the patient whose pleural fluid was exudative. Fever persisted for the first 72 hours of IV broad-spectrum antibiotic (Ceftriaxone, Clindamycin) treatment (38.1-38.3). On the 4th day of antibiotic treatment, the fever dropped below 38 C. Thoracic USG (Ultrasonography) indicated septations in the lower zone of the right lung. Consultation was requested from Pediatric Surgery. They stated that they did not consider urgent surgical intervention. Hypoxia developed and respiratory findings worsened during follow-up. The patient's Thorax CT (Computed Tomography) examination revealed pleural fluid of 1.5 cm thickness in the right lung, consolidation in the right lung, and a cystic lesion with a long axis of 8 cm showing cavitation in the right lung parenchyma. Tube thoracostomy was performed. Approximately 50 cc of drainage occurred in 48 hours. Intrapleural tPA (Tissue Plasminogen Activator) treatment was applied and continued for five days. After fibrinolytic treatment, the pleural effusion was seen to regress on the PA chest X-ray. The patient's thoracic tube was removed after no drainage for 48 hours. The patient's IV antibiotic treatments were completed for 21 days, and the patient's respiratory findings regressed clinically and radiologically, and he was discharged after being taken under outpatient clinic follow-up. Oral antibiotic treatment was continued for another 14 days. There was no growth in the patient's peripheric blood and pleura cultures.

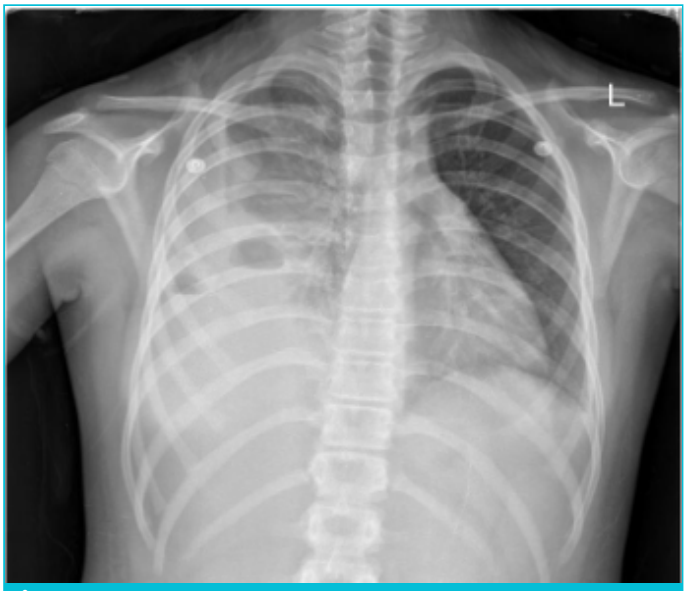

Figure 1. X-Ray Image

DISCUSSION

Initial treatment for necrotizing pneumonia is broad-spectrum antibiotics, administered until an organism is isolated; antibiotic treatment is then tailored accordingly. Steroids are not routinely recommended [4-7]. Early fibrinolytic treatment in cases with empyema secondary to necrotizing pneumonia can reduce the need for pleural complications that can be prevented with interventional treatment approaches such as VATS in these patients [8]. Surgical intervention is indicated for patients who fail to respond to clinical therapy. Delayed surgical intervention is associated with progressive parenchymal infection and higher complication rates. Surgery may lead to better clinical outcomes and

earlier recovery [9]. The number of patients with necrotizing pneumonia requiring resection has increased significantly in the last three years. Aggressive surgical treatment results in significant clinical improvement and favorable lung function outcome in most cases [10]. In the presence of pleural thickening and abscess/necrotizing pneumonia, combined intrapleural tPA/DNase is recommended for the treatment of complicated pleural effusions/empyema. Percutaneous image-guided catheterization and fibrinolytic therapy should be the preferred method in pediatric patients with complicated PPE (Parapneumonic effusion) and empyema who have failed surgical tube thoracostomy. Percutaneous helpful is useful in avoiding more aggressive surgical options [11-12]. Intrapleural Streptokinase Therapy (IST) remains a valuable therapy for managing pediatric parapneumonic effusion. Healthcare providers should be vigilant regarding the risk of pulmonary hemorrhage, particularly in high-risk patients. Ultrasound-guided chest tube insertion, patient assessment before IST, and close monitoring during and after therapy may help minimize this adverse event. Further research is warranted to elucidate the risk factors associated with pulmonary hemorrhage in children with IST. Tuberculous empyema thoracis remains a leading cause of morbidity in low-income countries. Despite antituberculosis therapy (ATT) and thoracostomy, empyema drainage is obstructed by multiple septations, locations, debris, and blood clots leading to complications [13-15]. In a study conducted by interventional radiologists, it was reported that after the application of fibrinolytic application (1-2 mg tissue plasminogen activator [tPA] twice daily, depending on the degree of pleural US) to pediatric parapneumonic effusion patients (sixty-three cases), the pleural treatment period was shortened and none of them required surgical intervention[16]. In a study conducted by Ekingen et al., intrapleural streptokinase was reported to be an effective and safe adjunct in facilitating drainage in early and late-stage II empyema, and a statistically significant difference was found according to the total hospital stay and pleural fluid drainage [17]. It was emphasized that early (<48 hours) chest tube placement was not associated with reduced length of hospital stay in pediatric patients (14 cases) admitted to a rural children's hospital, and further studies are needed to understand whether this association is affected by the timing of chest tube placement or the use of fibrinolysis therapy [18].

In our case, a tube thoracostomy was performed in the early period and fibrinolytic treatment was initiated 48 hours later. There were septations in thoracic ultrasonography. In the case consulted to pediatric surgery, they stated that they did not consider emergency surgery. We also searched the literature. We observed that there were cases in which fibrinolytic treatment was applied in the early period. We applied fibrinolytic treatment for five days in our case. We received a rapid response to the treatment. We observed that fibrinolytic treatment early in the course could be beneficial in our case with widespread septations. As seen in our case, necrotizing pneumonia progresses rapidly and can lead to severe complications (e.g., parapneumonic empyema). It can be resistant to treatment despite broad-spectrum antibiotic treatments. Being careful against complications and intervening in the early period is important for the course of the disease.

Patient Consent Form / Hasta Onam Formu

The parents' of this patient consent was obtained for this study.

Conflict of Interest / Çıkar Çatışması

The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

Financial Disclosure / Finansal Destek

The authors received no financial support for the research and/or publication of this article.

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