

# Divergent Clinical Courses of Community-Acquired Pneumonia: A Comparative Case Report of Uncomplicated Recovery and Pleural Empyema Requiring Thoracotomy

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**Abstract—Background:** Community-acquired pneumonia (CAP) is a common infectious disease with variable clinical outcomes. While many patients recover with antibiotic therapy alone, others may develop severe complications such as pleural empyema requiring surgical intervention. **Case Presentation:** We report two male patients admitted to Ivane Bokeria University Hospital in Tbilisi, Georgia, with similar clinical symptoms of community-acquired pneumonia. The first patient, a 39-year-old male without comorbidities, responded well to empiric antibiotic therapy with ceftriaxone and levofloxacin and recovered without complications. The second patient, a 41-year-old male with type 2 diabetes mellitus and chronic bronchitis, developed complicated parapneumonic effusion progressing to empyema with compressive atelectasis of the right lower lobe. Despite broad-spectrum antibiotic therapy and thoracentesis, clinical deterioration required thoracotomy with decortication and pleural drainage. **Conclusion:** These cases highlight the influence of comorbidities and pleural complications on the clinical course of CAP and emphasize the importance of early imaging, multidisciplinary management, and timely surgical intervention in complicated cases.

**Keywords—** Community-acquired pneumonia, pleural empyema, thoracotomy, decortication, diabetes mellitus.

## I. INTRODUCTION

Community-acquired pneumonia remains one of the leading causes of hospitalization and infectious disease-related morbidity worldwide. Clinical manifestations may vary from mild respiratory symptoms to severe infection complicated by respiratory failure or pleural involvement.

Parapneumonic effusion and empyema represent important complications of bacterial pneumonia and are associated with increased morbidity and prolonged hospitalization. The development of pleural infection typically progresses through exudative, fibrinopurulent, and organizing phases, during which fibrin deposition and septation formation may lead to loculated empyema requiring surgical management.

Host factors such as diabetes mellitus, chronic pulmonary disease, and prior antibiotic exposure may significantly influence disease progression and response to therapy. Early recognition of complications through appropriate imaging and clinical monitoring is essential for optimal management.

This report presents two patients with similar initial presentations but markedly different clinical courses, highlighting the impact of comorbid conditions and pleural complications on disease progression.

## II. CASE 1

A 39-year-old male was admitted on 8 February 2026 to Ivane Bokeria University Hospital in Tbilisi via emergency medical services. He reported a one-week history of fever up to 39°C, generalized weakness, productive cough with difficulty expectorating sputum, and excessive sweating.

During the preceding three days, the fever had not responded to antipyretic therapy.

The patient had a history of alcohol and tobacco use but no known chronic diseases or drug allergies.

Initial vital signs were as follows: temperature 38°C, respiratory rate 27/min, oxygen saturation 87% on room air (95% with supplemental oxygen), pulse 109/min, and blood pressure 110/65 mmHg. Pulmonary auscultation revealed crepitations over the left lung fields.

Laboratory findings during hospitalization are summarized in Table 1.

TABLE 1. Laboratory Findings in Case 1 During Hospitalization

Parameter	Reference Range	08.02.2026	10.02.2026	13.02.2026 / 16.02.2026
WBC (×10 <sup>9</sup> /L)	4–10	1.53	10.82	7.66
Neutrophils (%)	40–75	83.5	-	-
Neutrophil abs.	2–7	1.28	8.9	5.23
Platelets (×10 <sup>9</sup> /L)	150–400	72	-	-
CRP (mg/L)	<5	405	257.5	192.1
PCT (ng/mL)	0–0.5	10		

Chest imaging on admission demonstrated infiltrative consolidation in the middle and lower zones of the left lung (Figure 1).

The patient was treated with ceftriaxone and levofloxacin, along with inhaled bronchodilators, inhaled corticosteroids, anticoagulation, gastroprotection, and careful monitoring and correction of fluid–electrolyte balance.

Follow-up chest imaging demonstrated regression of pulmonary consolidation (Figure 2).



Figure 1. Chest X-ray on admission demonstrating left-sided middle and lower zone consolidation (Case 1).



Figure 2. Follow-up chest X-ray demonstrating partial resolution of consolidation in the left lung fields (Case 1).

The patient’s clinical condition improved, and he was discharged on 16 February 2026 with recommendations for continuation of therapy and outpatient follow-up.

### III. CASE 2

A 41-year-old male was admitted on 8 February 2026 with similar symptoms, including fever, cough, and generalized weakness. Unlike the first patient, his medical history was significant for chronic bronchitis and type 2 diabetes mellitus, for which he was receiving sitagliptin/metformin and glimeglizide.

Initial vital signs were as follows: temperature 37.5°C, respiratory rate 30/min, oxygen saturation 85% on room air (94% with supplemental oxygen), pulse 109/min, and blood pressure 148/86 mmHg.

Laboratory findings demonstrated leukocytosis with neutrophilia and markedly elevated inflammatory markers (Table 2).

TABLE 2. Laboratory Findings in Case 2 During Hospitalization

Parameter	Reference Range	08.02.2026	12.02.2026	18.02.2026
WBC (×10 <sup>9</sup> /L)	4–10	17.14	14.9	9.63
Neutrophil abs.	2–7	14.44	11.22	6.33
Platelets (×10 <sup>9</sup> /L)	150–400	589	589	453
CRP (mg/L)	<5	286.4	353	59.3
ESR (mm/h)	<20	-	132	-
PCT (ng/mL)	0–0.5	10		

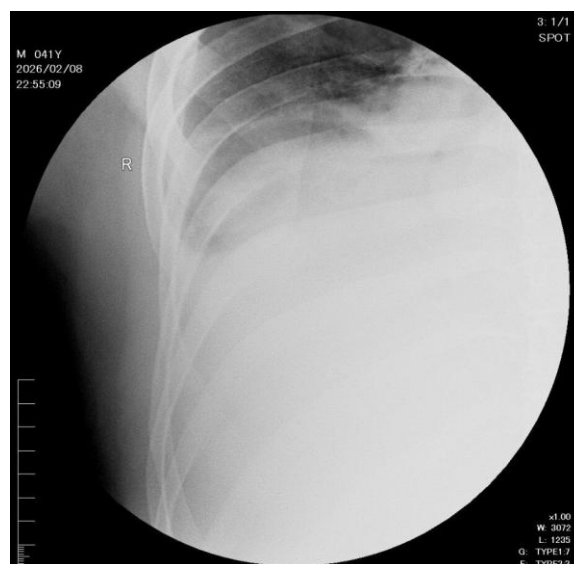


Figure 3. Chest X-ray demonstrating right-sided pleural effusion with associated decreased lung aeration (Case 2).



Figure 4. Contrast-enhanced chest CT demonstrating loculated pleural collections in the right hemithorax (Case 2).



Figures 5. Chest CT demonstrating compressive atelectasis of the right lower lobe secondary to pleural effusion (Case 2).



Figure 6. Postoperative chest X-ray demonstrating re-expansion of the right lung following surgical intervention (Case 2).

Initial chest imaging revealed right-sided pleural pathology (Figure 3). Further evaluation with contrast-enhanced computed tomography demonstrated loculated pleural collections associated with compressive atelectasis of the right lower lobe (Figure 4).

Thoracentesis yielded approximately 400 mL of pleural fluid with exudative characteristics.

Given the severity of presentation, presence of pleural involvement, and risk factors for complicated infection, broad-spectrum antibiotic therapy with piperacillin/tazobactam was initiated along with supportive treatment.

Despite therapy, the patient’s clinical condition deteriorated, and follow-up imaging demonstrated progression of pleural pathology (Figure 5).

On 13 February 2026, the patient underwent right anterolateral thoracotomy with decortication and pleural drainage. Intraoperatively, multiple loculated purulent cavities and thick fibrin deposits were identified, consistent with advanced pleural infection.

Postoperative chest imaging demonstrated satisfactory lung re-expansion (Figure 6).

The patient showed significant clinical improvement following surgical intervention and was discharged in stable condition with recommendations for follow-up.

#### IV. DISCUSSION

Community-acquired pneumonia may present with similar initial clinical features but can follow markedly different clinical courses depending on host factors, comorbidities, and the development of complications.

In this report, both patients presented with comparable symptoms; however, their outcomes diverged significantly. The first patient responded well to standard antimicrobial therapy, whereas the second developed complicated parapneumonic effusion progressing to empyema, ultimately requiring surgical intervention.

Comorbid conditions such as type 2 diabetes mellitus and chronic bronchitis are well-recognized risk factors for severe pneumonia and pleural complications, largely due to impaired immune response and altered host defense mechanisms.

Loculated pleural infection represents a critical stage in disease progression, as septation and fibrin deposition can hinder adequate drainage, promote persistent infection, and reduce antibiotic penetration. In such cases, conservative management may be insufficient, and surgical approaches such as thoracotomy and decortication become necessary.

Radiological evaluation played a crucial role in this case, clearly demonstrating disease progression and guiding timely escalation of management. The divergence in radiological findings between the two patients further emphasizes the importance of early imaging and close monitoring.

Overall, this case highlights the need for early recognition of complicated pneumonia, risk stratification based on comorbidities, and a multidisciplinary approach to management in order to improve clinical outcomes.

#### V. CONCLUSION

Community-acquired pneumonia may follow markedly different clinical courses depending on patient-related factors and the development of complications. This case report highlights the importance of early recognition of pleural involvement, timely radiological assessment, and appropriate escalation of management. In complicated cases, prompt surgical intervention may be essential to achieve favorable clinical outcomes.

#### Ethical Statement

Written informed consent for publication of clinical information and radiological images was obtained from the patients.



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