

## CASE IMAGE OPEN ACCESS

# A Fatal Case of Necrotizing Pneumonia Caused by Hypermucoviscous *Klebsiella pneumoniae*

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**Received:** 23 October 2024 | **Revised:** 7 January 2025 | **Accepted:** 2 February 2025

**Funding:** The authors received no specific funding for this work.

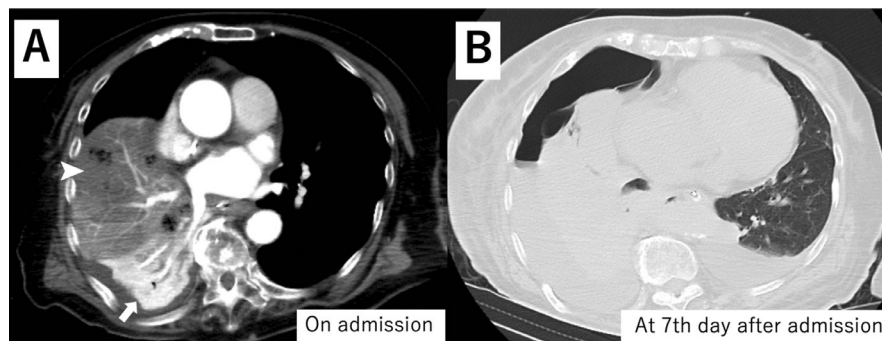
**Keywords:** computed tomography | *Klebsiella pneumoniae* | multiple organ failure | necrotizing pneumonia

## ABSTRACT

Necrotizing pneumonia has a high mortality rate of approximately 50%. Its computed tomography findings lack enhancement in areas of consolidation. These findings should be interpreted as potentially indicative of a severe clinical course. Hypermucoviscous strains of *Klebsiella pneumoniae* are often hypervirulent and may cause fatal necrotizing pneumonia.

An 87-year-old woman presented to our emergency department with hypoxemia and hypotension. Contrast-enhanced chest computed tomography (CT) showed no enhancement in the right lung consolidation, with microcavities, which was considered indicative of necrotizing pneumonia. Another area showed significant enhancement, indicating atelectasis (Figure 1A). The patient was admitted to the intensive care unit for respiratory and circulatory

failure that required mechanical ventilation and vasopressors. Meropenem was administered, followed by ceftriaxone, after blood culture yielded positive results for *Klebsiella pneumoniae* with a positive string test that suggested hypermucoviscosity. Pneumothorax and empyema developed on day 7 of hospitalization, which were treated via chest tube insertion (Figure 1B). The patient ultimately died of multiple organ failure on day 12.



**FIGURE 1** | Computed tomography (CT) image of an 87-year-old female patient with necrotizing pneumonia. (A) Contrast-enhanced chest CT performed upon the patient's admission to the hospital, indicating necrotizing pneumonia (arrowhead) and atelectasis (arrow). (B) Chest CT performed on day 7 of hospitalization, indicating pneumothorax and empyema.

**Abbreviation:** CT, Computed Tomography.

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Necrotizing pneumonia is a severe form of pneumonia with a high mortality rate reaching approximately 50% [1]. It is characterized by CT findings with a lack of enhancement in areas of consolidation [1, 2]. Its most common causative organisms have been reported to be *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *K. pneumoniae* [2]. Although hypermucoviscous strains of *K. pneumoniae* are typically hypervirulent, few reports have linked these strains to necrotizing pneumonia [3]. Surgical intervention is indicated to treat refractory bronchopulmonary fistulae and progressive parenchymal necrosis, neither of which was observed in our patient [2]. However, given the propensity of hypervirulent *Klebsiella* to cause disseminated and necrotic infections, it may have been beneficial for us to have considered surgical intervention more proactively.

Radiological findings of necrotizing pneumonia may indicate a severe clinical course. Hypermucoviscous *K. pneumoniae* may partially explain the fatal outcome we experienced in this case.

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#### Author Contributions

**Kaori Ishiyama:** conceptualization, writing – original draft. **Kyohei Miyamoto:** conceptualization, supervision, writing – original draft, writing – review and editing. **Nozomu Shima:** supervision, writing – review and editing. **Shigeaki Inoue:** writing – review and editing.

#### Acknowledgments

We thank Editage ([www.editage.com](http://www.editage.com)) for the English language editing.

#### Consent

Written informed consent for publication was obtained from the patient's family.

#### Conflicts of Interest

Dr. Miyamoto has received lecturer fees from Asahi Kasei Pharma, the Japan Blood Products Organization, and Chugai Pharmaceutical.

#### Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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