

News Release

Title

Risk Factors for 30-Day Mortality in Patients with Pneumonia Who Receive Appropriate Initial Antibiotics: An Observational Cohort Study

Key Points

- This prospective multicenter study showed that 10.5% of patients with community-onset pneumonia died within 30 days, even though they received appropriate initial antibiotic treatment.
- The independent risk factors included albumin < 3.0 mg/dL, nonambulatory status, pH < 7.35, respiration rate ≥ 30/min, and blood urea nitrogen ≥ 20 mg/dL.
- The cumulative number of the risk factors could predict 30-day mortality.
- For patients with two or more risk factors, adjunctive therapy other than antibiotic treatment may have an important role in improving the outcomes.

Summary

Prof. Yoshinori Hasegawa, Department of Respiratory Medicine, Nagoya University Graduate School of Medicine (Dean: Masahide Takahashi, M.D., Ph.D.), Assistant Prof. Yuichiro Shindo, and their collaborators in ten medical institutions elucidated the risk factors for 30-day mortality in patients with community-onset pneumonia who received appropriate initial antibiotic treatment. This study was published online in the *Lancet Infectious Diseases* on July 3, 2015.

Appropriate initial antibiotic treatment (AIAT) is essential for the treatment of pneumonia. However, some patients with pneumonia may develop adverse outcomes, even if they receive AIAT. This study aimed to clarify the risk factors for 30-day mortality in patients who received AIAT and elucidate potential candidates for adjunctive therapy.

In this study, the 30-day mortality in 579 patients who received AIAT was 10.5%. The independent risk factors included albumin < 3.0 mg/dL, nonambulatory status, pH < 7.35, respiration rate ≥ 30/min, and blood urea nitrogen ≥ 20 mg/dL. The 30-day mortality for the number of risk factors was 0.8% (0), 1.2% (1), 16.8% (2), 22.5% (3), and 43.8% (4–5).

In conclusion, patients with multiple risk factors were at a higher risk of mortality, although they received AIAT. Therefore, adjunctive therapy other than antibiotic treatment may be important for improving outcomes in these patients, and they could be good targets for future investigation including their immune status and the effect of immunomodulatory agents.

Research Background

Pneumonia remains one of the world's leading causes of death. To improve the outcomes of these patients, appropriate initial antibiotic treatment (AIAT) is essential. Many patients have

reaped the benefit of these newer antibiotics. However, many patients also developed adverse outcomes, even if they receive AIAT. To our knowledge, there have been no studies that clearly demonstrated the risk factors in patients who receive AIAT. If these factors are clarified, we can identify those patients with pneumonia for whom adjunctive therapy other than antibiotic treatment can prove beneficial in terms of improved outcomes. In addition, we may determine the targets for immunomodulatory therapy.

Therefore, we conducted a multicenter, prospective, observational study to clarify the risk factors for 30-day mortality in patients who received AIAT and identify candidates who would benefit from adjunctive therapy in terms of improved outcomes.

Research Results

In total, 747 patients with community-onset pneumonia, including 579 who received AIAT and 168 who received inappropriate initial antibiotic treatment (IIAT) were assessed. The 30-day mortality in the AIAT and IIAT groups was 10.5% and 17.3%, respectively (Figure 1). The independent risk factors for 30-day mortality in the AIAT group included albumin < 3.0 mg/dL [adjusted odds ratio (AOR), 3.39; 95% confidence interval (CI), 1.83–6.28], nonambulatory status (AOR, 3.34; 95% CI, 1.84–6.05), pH < 7.35 (AOR, 3.13; 95% CI, 1.52–6.42), respiration rate \geq 30/min (AOR, 2.33; 95% CI, 1.28–4.24), and blood urea nitrogen \geq 20 mg/dL (AOR, 2.20; 95% CI, 1.13–4.30). The 30-day mortality for the number of risk factors was 0.8% (0), 1.2% (1), 16.8% (2), 22.5% (3), and 43.8% (4–5). In the subanalysis, overuse of broad-spectrum antibiotics significantly increased the 30-day mortality in patients with non-drug resistant pathogens who received AIAT.

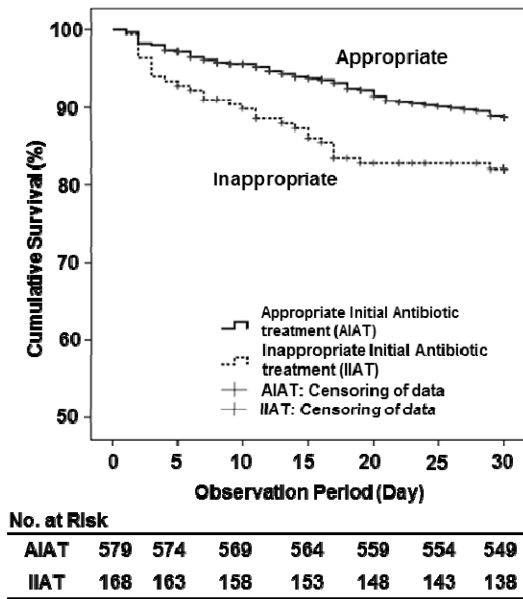
Research Summary and Future Perspective

This study was the first report to clearly reveal five risk factors for 30-day mortality in patients with pneumonia who received AIAT. The cumulative number of the risk factors may be used by physicians to predict 30-day mortality. Patients with two or more risk factors have a higher mortality risk even though they receive AIAT. Physicians need to select appropriate initial antibiotics for these patients and should consider adjunctive therapy other than antibiotic treatment at the same time. These patients could be good targets for future investigation including their immune status and the effect of immunomodulatory agents (Figure 2).

The authors and title of the paper

Shindo Y, Ito R, Kobayashi D, Ando M, Ichikawa M, Goto Y, Fukui Y, Iwaki M, Okumura J, Yamaguchi I, Yagi T, Tanikawa Y, Sugino Y, Shindoh J, Ogasawara T, Nomura F, Saka H, Yamamoto M, Taniguchi H, Suzuki R, Saito H, Kawamura T, and Hasegawa Y, on behalf of the Central Japan Lung Study Group. Risk Factors for 30-Day Mortality in Patients with Pneumonia Who Receive Appropriate Initial Antibiotics: An Observational Cohort Study. *Lancet Infect Dis* , July 3, 2015.

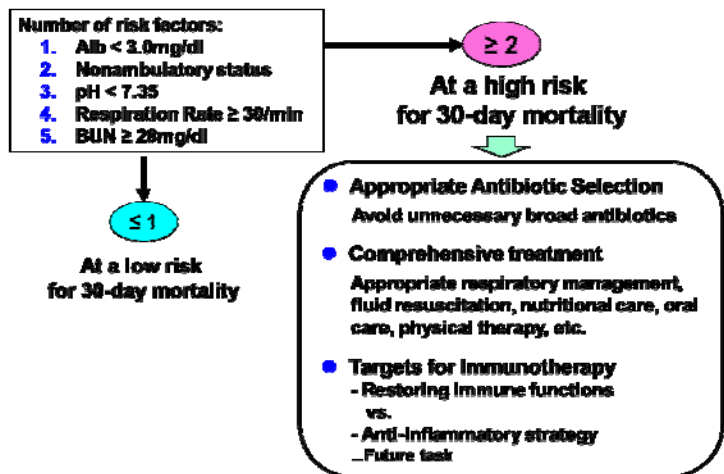
Figure 1. Thirty-day survival in patients who received AIAT and IIAT



The survival curve of the IIAT group (dotted line) rapidly declined in the initial 3 days of treatment following the diagnosis. Then, the curve showed a gradual downward slope until Day 20. The number of surviving patients in the AIAT group (solid line) gradually decreased for 30 days after diagnosis. Of the 579 patients, 61 (10.5%) did not survive for 30 days even after receiving AIAT.

Figure 2. Possible Treatment Strategy for further improvement outcomes

Patients with two or more factors have a mortality risk even though they receive AIAT. Physicians need to select appropriate initial antibiotics for these patients and should consider adjunctive therapy other than antibiotic treatment at the same time. These patients could be good targets for future investigation including their immune status and the effect of immunomodulatory agents.



Japanese ver.

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