Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

# Antibiotic De-escalation in Culture-Negative Pneumonia

Anti-MRSA and anti-pseudomonal antibiotics are often started empirically in patients with suspected pneumonia, but cultures frequently do not identify a pathogen. Should antibiotics be de-escalated in these patients?

**What do guidelines recommend?**
The 2016 Infectious Diseases Society of America (IDSA) & American Thoracic Society (ATS) hospital-acquired and ventilator-associated pneumonia (HAP/VAP) guidelines suggest that antibiotic therapy be de-escalated rather than fixed.[1] The 2019 ATS/IDSA community-acquired pneumonia (CAP) guideline recommends de-escalation from empiric anti-MRSA and anti-pseudomonal antibiotics to standard CAP antibiotics if cultures do not identify a drug-resistant pathogen and the patient is clinically improving at 48 hours.[2]

Additionally, the CAP guidelines suggest holding empiric anti-MRSA and anti-pseudomonal antibiotics in some patients with **non-severe** CAP despite risk factors for MRSA and *P. aeruginosa* (formerly known as healthcare-associated pneumonia).

**What is the evidence?**
A large retrospective cohort study studied outcomes in culture-negative pneumonia patients from 164 US hospitals using propensity analyses to control for indication bias. Antibiotic de-escalation in culture-negative pneumonia was **NOT** associated with 14 days mortality but was significantly associated with less frequent late ICU admission, less late invasive mechanical ventilation, less late vasopressor use, shorter length of stay, and lower hospitalization costs.[3]

**What interventions may help facilitate de-escalation in culture-negative pneumonia?**
Addition of a comment indicating the lack of identification of MRSA and *P. aeruginosa* in respiratory cultures results may help facilitate antibiotic de-escalation. In one report, there was a 5.5-fold increase odds of antibiotic de-escalation. The specific comment used was “commensal respiratory flora: No *S. aureus*/MRSA or *P. aeruginosa*”. Hospital-wide education was provided to pharmacists and providers to promote de-escalation.[4]

**Key Takeaway:** De-escalate empiric anti-MRSA and anti-pseudomonal antibiotics in improving patients with pneumonia and negative cultures. Consider adding microbiology comment on negative cultures to promote de-escalation.

**References:**


1. Kalil AC, Metersky ML, Klompas M, et al. Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society [published correction appears in Clin Infect Dis. 2017 May 1;64(9):1298. doi: 10.1093/cid/ciw799] [published correction appears in Clin Infect Dis. 2017 Oct 15;65(8):1435. doi: 10.1093/cid/cix587] [published correction appears in Clin Infect Dis. 2017 Nov 29;65(12):2161. doi: 10.1093/cid/cix759]. *Clin Infect Dis*. 2016;63(5):e61-e111. doi:10.1093/cid/ciw353
2. Metlay JP, Waterer GW, Long AC et al. Diagnosis and treatment of adults with community-acquired pneumonia: an official clinical practice guideline from the American Thoracic Society and Infectious Diseases Society of America. *Am J Respir Crit Care Med*. 2019. 200(7): e45-67
3. Deshpande A, Richter SS, Haessler S, et al. De-escalation of Empiric Antibiotics Following Negative Cultures in Hospitalized Patients With Pneumonia: Rates and Outcomes. *Clin Infect Dis*. 2021;72(8):1314-1322. doi:10.1093/cid/ciaa212
4. Musgrove MA, Kenney RM, Kendall RE, et al. Microbiology Comment Nudge Improves Pneumonia Prescribing. *Open Forum Infect Dis*. 2018;5(7):ofy162. Published 2018 Jul 10. doi:10.1093/ofid/ofy162


Created 7.16.25