



Prescription Planning with Procalcitonin for Pneumonia

Procalcitonin is a biomarker that elevates in response to bacterial infections, but is less likely to be elevated in other disease states (e.g. viral infections).¹ Procalcitonin assays are FDA-approved to guide antibiotic prescribing in lower respiratory tract infections.² When and how should procalcitonin be used in pneumonia?

Starting Antibiotics

Procalcitonin has been studied in algorithms for starting and stopping antibiotics, however both the community-acquired pneumonia (CAP) guidelines and hospital-acquired (HAP)/ventilator-associated pneumonia (VAP) guidelines recommend **AGAINST** using procalcitonin in deciding whether or not to **start** antibiotics in pneumonia.^{3,4} Like many biomarkers, there is a lag time in onset of procalcitonin rise. The sensitivity and specificity of procalcitonin in diagnosing bacterial HAP/VAP is 67% and 83%, respectively.⁴ For diagnosing CAP, procalcitonin sensitivity ranges from 37.5% to 90.9%.⁵

Guiding Duration of Therapy

The HAP/VAP guidelines suggest using procalcitonin in addition to clinical criteria to decide when to discontinue antibiotics.⁴ The CAP guidelines make no formal recommendation for or against using procalcitonin to discontinue antibiotics.³ Procalcitonin may have largest impact in settings where durations of therapy routinely exceed standard durations of 5 – 7 days. In the CAP and VAP subgroups of a large meta-analysis on procalcitonin, antibiotic duration was approximately **2.5 – 3 days shorter** in procalcitonin guided groups vs control groups.⁶

Procalcitonin thresholds to stop antibiotics vary among studies with < 0.25 ng/mL being the most commonly used. A higher threshold of < 0.5 ng/mL is also commonly seen in studies with ICU patients. Additionally, 65% - 90% reductions in procalcitonin from baseline have been used to discontinue antibiotics.⁶

Stopping Antibiotics in Viral Pneumonia

Patient with viral pneumonia may have a concomitant bacterial infection. In a recent CAP clinical pathway produced by the Infectious Diseases Society of America, they suggest considering stopping antibiotics if viral diagnostic tests are positive and procalcitonin is < 0.25 ng/mL or has reduced by 80% on repeating testing in 72 hours.⁷ Using low procalcitonin in the setting of confirmed viral infections to discontinue antibiotics early has been reported elsewhere to be associated with reduced antimicrobial exposure without need to restart antibiotics or differences in mortality and length of stay.^{8,9} However, no randomized clinical trials have been conducted.

Key Takeaway: Procalcitonin should not be used to withhold antibiotics in patients with strongly suspected or confirmed pneumonia. Procalcitonin is helpful in reducing duration of antibiotic therapy in patients with pneumonia by providing objective criteria for discontinuation. Procalcitonin may aid in early discontinuation of antibiotics in patients with a confirmed viral respiratory infection.

References:

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