



## Procalcitonin in AECOPD

Antibiotics are recommended in acute exacerbations in chronic obstructive pulmonary disease (AECOPD) when patients present with the three cardinal symptoms of increased dyspnea, sputum volume, and sputum purulence **OR** two cardinal symptoms when one is increased purulent sputum **OR** in those who require invasive or non-invasive mechanical ventilation.<sup>1</sup> Procalcitonin assays are FDA-approved to guide antibiotic prescribing in lower respiratory tract infections.<sup>2</sup> Can procalcitonin help guide antibiotic therapy in AECOPD?

### What do the guidelines say?

The 2024 Global Initiative for Chronic Obstructive Lung Disease (GOLD) Guidelines **do NOT recommend** using procalcitonin to guide antibiotic use in patients with AECOPD.<sup>1</sup> Evidence supporting this recommendation is mixed and may be related to severity of illness.

### What is the evidence FOR using procalcitonin in AECOPD?

In a randomized controlled trial of mostly hospitalized patients (92.5%) with acute respiratory illness, procalcitonin guided therapy was associated with a median 2.5 day reduction in antibiotic exposure and similar clinical outcomes in patients with AECOPD.<sup>3</sup> In another randomized controlled trial that compared antibiotic therapy with no antibiotic therapy, clinical outcomes did not differ in those with AECOPD and a procalcitonin level of < 0.1 ng/mL. However, 17.7% of patients received antibiotics in the no antibiotic arm and only about 25% of patients had purulent sputum at baseline.<sup>4</sup>

### What is the evidence AGAINST using procalcitonin in AECOPD?

In a randomized controlled trial comparing procalcitonin guided therapy in ICU patients with AECOPD, procalcitonin guided therapy was found to be not non-inferior to standard therapy. The most concerning outcome was that procalcitonin guided therapy appeared to increase mortality in patients who were not on antibiotics at baseline (31% vs. 12%, P < 0.05). Conversely, mortality was similar between procalcitonin guided therapy and standard therapy in patients who were on antibiotics at baseline (11% vs 15%). Of note, approximately 40% of patients in this study had concomitant pneumonia.<sup>5</sup>

**Key Takeaway:** Using procalcitonin to withhold starting antibiotics in patients with severe AECOPD may be harmful. Procalcitonin should not be routinely used to guide initiation or discontinuation of therapy in patients with AECOPD, though more data is needed.

### References:

1. Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease: 2023 Report. Global Initiative for Chronic Obstructive Lung Disease; 2024. <https://goldcopd.org/2024-gold-report/>
2. U.S. Food & Drug Administration. FDA clears test to help manage antibiotic treatment for lower respiratory tract infections and sepsis. Published February 23, 2017. Accessed September 12, 2023. Available at: [https://www.fda.gov/news-events/press-announcements/fda-clears-test-help-manage-antibiotic-treatment-lower-respiratory-tract-infections-and-sepsis?source=govdelivery&utm\\_medium=email&utm\\_source=govdelivery](https://www.fda.gov/news-events/press-announcements/fda-clears-test-help-manage-antibiotic-treatment-lower-respiratory-tract-infections-and-sepsis?source=govdelivery&utm_medium=email&utm_source=govdelivery)
3. Schuetz P, Christ-Crain M, Thomann R, et al. Effect of procalcitonin-based guidelines vs standard guidelines on antibiotic use in lower respiratory tract infections: the ProHOSP randomized controlled trial. *JAMA*. 2009;302(10):1059-1066. doi:10.1001/jama.2009.1297
4. Wang JX, Zhang SM, Li XH, Zhang Y, Xu ZY, Cao B. Acute exacerbations of chronic obstructive pulmonary disease with low serum procalcitonin values do not benefit from antibiotic treatment: a prospective randomized controlled trial. *Int J Infect Dis*. 2016;48:40-45. doi:10.1016/j.ijid.2016.04.024
5. Daubin C, Valette X, Thiollière F, et al. Procalcitonin algorithm to guide initial antibiotic therapy in acute exacerbations of COPD admitted to the ICU: a randomized multicenter study. *Intensive Care Med*. 2018;44(4):428-437. doi:10.1007/s00134-018-5141-9