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Serum galactomannan testing after bronchoalveolar lavage in the ICU. Is it complementary and necessary or redundant?

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Over the past decade, scientific societies have emphasized the importance of early diagnosis of invasive pulmonary aspergillosis (IPA), a condition that, although not frequent, has gained relevance in intensive care units (ICUs).[1] This has become especially evident in recent years for 2 main reasons: the coronavirus disease 2019 (COVID-19) pandemic and the growing recognition of *Aspergillus* infection across a broader clinical spectrum, including nonneutropenic patients.

Simultaneously, the increased training of intensivists in performing bronchoscopy safely and the wider availability of flexible bronchoscopes have contributed to a marked increase in this procedure within ICUs. The galactomannan (GM) test, measured via the Platelia *Aspergillus* enzyme immunoassay (Bio-Rad), has become a cornerstone in the diagnosis of IPA, both in serum and in bronchoalveolar lavage (BAL) fluid.[2] Nevertheless, a recurring practical question remains: Is it worthwhile to request a serum Platelia test if GM has already been determined in BAL?

Biological and temporal differences between serum and BAL GM

From a pathophysiological standpoint, GM is a polysaccharide released by the fungus during invasive growth. In patients with IPA, the presence of GM in BAL reflects local fungal activity in the lungs, whereas detection in serum suggests hematogenous dissemination or a significant fungal burden, both associated with greater severity and poorer prognosis. Consequently, GM positivity in BAL often precedes or even outperforms serum in sensitivity, especially in cases of localized pulmonary infection.[3]

This discrepancy is even more pronounced in nonneutropenic ICU patients, where antigen translocation into the bloodstream may be less efficient due to preserved endothelial barriers and lower angioinvasion. Multiple studies have shown that GM sensitivity in BAL (70%–90%) exceeds that in serum (30%–60%) in this patient group.[4]

International clinical guidelines from the Infectious Diseases Society of America (IDSA) recommend sequential GM testing in both serum and BAL for diagnosing IPA in patients with hematologic malignancies and hematopoietic stem cell transplantation, because both fluids offer complementary data and improve diagnostic sensitivity. According to the IDSA, BAL GM testing has a sensitivity above 70% and adds diagnostic value even in patients on antifungal prophylaxis, whereas serum positivity may indicate systemic spread and serve a prognostic and monitoring role.[5]

The added value of serum testing, even when BAL results are already available, lies in the fact that positivity in both fluids strengthens the IPA diagnosis and supports treatment monitoring. Discordance between the 2 may point to differences in infection site or stage. The IDSA does not recommend routine serum GM testing in patients under antifungal prophylaxis but does endorse its use in BAL in such cases. GM screening is discouraged in solid organ transplant recipients or in those with chronic granulomatous disease.[5] This suggests that both compartments provide relevant diagnostic information, but not entirely redundant. Simultaneous positivity in both compartments enhances diagnostic certainty and has been associated with more severe disease.[3] Therefore, performing the test in serum—even when a BAL result is already available—adds prognostic value and enables monitoring of the antifungal treatment response, in addition to helping differentiate between colonization and invasive disease.[6]

Clinical scenarios where serum GM adds value

Despite these differences, there are specific scenarios where serum Platelia testing offers added value, even after BAL has been performed:

1. Confirmation of systemic dissemination: A positive serum GM following a positive BAL result may suggest vascular invasion, influencing prognosis and therapeutic decisions.
2. Dynamic monitoring: In patients with initially positive serum GM, a progressive decline may indicate therapeutic response. BAL GM is not suitable for follow-up due to its invasiveness and variability.
3. When BAL is not immediately accessible: Although outside the scope of the main question, it is worth noting that serum GM remains valuable in settings where bronchoscopy is unavailable or contraindicated.
4. Cross-validation of borderline results: When BAL GM results are borderline (eg, ODI 0.5–1.0), serum GM can support diagnostic certainty, although a negative result does not rule out disease.
5. Diagnostic quality control: A marked discordance between BAL and serum GM may prompt reevaluation for sample contamination, prior antimicrobials, or simple colonization.[5]

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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Limitations of serum GM in ICU patients: performance may be overestimated

In critically ill patients, serum GM testing has several limitations, especially considering the increasing incidence of IPA in nonhematologic, non-immunocompromised hosts. False negatives are common in nonneutropenic patients, in those on empirical antifungals, or in early stages of infection. Conversely, false positives may occur with certain antibiotics, transfusions, or infections with other fungal species. Therefore, serum GM should not be used as a standalone test, and isolated interpretation may lead to inappropriate treatment decisions.[7,8]

These limitations reinforce the need to consider GM testing as part of a comprehensive diagnostic strategy, alongside radiologic findings, cultures, PCR, and clinical judgment.

In critically ill patients: efficiency or redundancy?

From a clinical and cost-effectiveness perspective, routine serum GM testing when BAL GM has already been requested is not always justified.[9,10] If BAL was collected under optimal conditions (recent bronchoscopy, minimal contamination, good cellular yield) and yields a clearly positive GM (index >1.0), the additional benefit of serum GM is minimal and unlikely to influence treatment decisions.

In ICU settings, where efficient resource use is critical, avoiding unnecessary duplication can optimize diagnostic workflows without compromising patient safety.

Nevertheless, the diagnostic accuracy of Platelia varies significantly by hospital setting, patient type, and sample source. Recent literature underscores the moderate correlation between serum and BAL GM values, and shows that combining both improves diagnostic sensitivity, particularly in high-suspicion scenarios.[11,12]

Conclusion

In conclusion, serum Platelia testing has both diagnostic and prognostic value—even when BAL results are already available—because the 2 fluids reflect different pathophysiological compartments. Their combination improves diagnostic sensitivity and specificity for IPA. The decision to request both should be individualized based on the clinical context, immunological status of the patient, and available resources particularly in high-risk groups such as neutropenic or COVID-19 ICU patients.

Although the 2 tests are not equivalent or redundant, their relative value varies depending on the clinical setting. If BAL GM is already clearly positive and was collected appropriately, serum GM adds limited value. However, in uncertain cases, for treatment monitoring, or in suspected dissemination, serum GM remains relevant.

Ultimately, the key is to interpret both tests within their biological and clinical context, not to request them automatically or redundantly. Serum GM should be used judiciously, with interpretation guided by host factors and clinical context. As with many tools in intensive care, clinical judgment remains irreplaceable.

Conflict of interest statement

The authors declare no conflict of interest.

Author contributions

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References

[1] Gaffney S, Kelly DM, Rameli PM, Kelleher E, Martin-Loeches I. Invasive pulmonary aspergillosis in the intensive care unit: current challenges and best practices. *APMIS*. 2023;131(11):654–667. doi:10.1111/apm.13316

[2] Maertens J, Maertens V, Theunissen K, et al. Bronchoalveolar lavage fluid galactomannan for the diagnosis of invasive pulmonary aspergillosis in patients with hematologic diseases. *Clin Infect Dis*. 2009;49(11):1688–1693. doi:10.1086/647935

[3] Wehbe S, Chaftari AM, Hachem R, et al. Prognostic value of serum and bronchoalveolar lavage fluid galactomannan levels in invasive aspergillosis: an 8-year experience at a tertiary cancer center. *J Fungi (Basel)*. 2025;11(5):355. doi:10.3390/jof11050355

[4] Zhou W, Li H, Zhang Y, et al. Diagnostic value of galactomannan antigen test in serum and bronchoalveolar lavage fluid samples from patients with nonneutropenic invasive pulmonary aspergillosis. *J Clin Microbiol*. 2017;55(7):2153–2161. doi:10.1128/JCM.00345-17

[5] Miller JM, Binnicker MJ, Campbell S, et al. Guide to utilization of the microbiology laboratory for diagnosis of infectious diseases: 2024 update by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM). *Clin Infect Dis*. 2024. doi:10.1093/cid/ciae104

[6] Meersseman W, Lagrou K, Maertens J, et al. Galactomannan in bronchoalveolar lavage fluid: a tool for diagnosing aspergillosis in intensive care unit patients. *Am J Respir Crit Care Med*. 2008;177(1):27–34. doi:10.1164/rccm.200704-606OC

[7] Heng SC, Morrissey O, Chen SC, et al. Utility of bronchoalveolar lavage fluid galactomannan alone or in combination with PCR for the diagnosis of invasive aspergillosis in adult hematology patients: a systematic review and meta-analysis. *Crit Rev Microbiol*. 2015;41(1):124–134. doi:10.3109/1040841X.2013.804033

[8] Dai Z, Cai M, Yao Y, et al. Comparing the diagnostic value of bronchoalveolar lavage fluid galactomannan, serum galactomannanan, and serum 1,3-β-D-glucan in non-neutropenic respiratory disease patients with invasive pulmonary aspergillosis. *Medicine (Baltimore)*. 2021;100(14):e25233. doi:10.1097/MD.0000000000025233

[9] Patterson TF, Thompson GR 3rd, Denning DW, et al. Practice guidelines for the diagnosis and management of aspergillosis: 2016 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2016;63(4):e1–e60. doi:10.1093/cid/ciw326

[10] Hage CA, Carmona EM, Epelbaum O, et al. Microbiological laboratory testing in the diagnosis of fungal infections in pulmonary and critical care practice. An official American Thoracic Society clinical practice guideline. *Am J Respir Crit Care Med*. 2019;200(5):535–550. doi:10.1164/rccm.201906-1185ST

[11] Huang L, Zhang Y, Hua L, Zhan Q. Diagnostic value of galactomannan test in non-immunocompromised critically ill patients with influenza-associated aspergillosis: data from three consecutive influenza seasons. *Eur J Clin Microbiol Infect Dis*. 2021;40(9):1899–1907. doi:10.1007/s10096-021-04228-z

[12] Liu L, Li J, Dong H, et al. Diagnostic value of the combinations of bronchoalveolar lavage fluid galactomannan test and serum galactomannan test in invasive pulmonary aspergillosis. *Zhonghua Wei Zhong Bing Ji Jiu Yi Xue*. 2019;31(3):331–335. doi:10.3760/cma.j.issn.2095-4352.2019.03.014

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