

the Fungitell® Bulletin

volume 9, issue 2

Topic:

APPLICATION OF FUNGITELL IN FUNGAL CHORIORETINITIS AND ENDOPHTHALMITIS

EVALUATION OF THE UTILITY OF SERUM (1→3)- β -GLUCAN IN THE DIAGNOSTIC WORK-UP FOR FUNGAL CHORIORETINITIS AND ENDOPHTHALMITIS: A RECENT CASE SERIES

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Discussion:

Invasive fungal infections (IFI) are often difficult to diagnose due to non-specific symptoms and the lack of sensitivity of conventional diagnostics, including the still gold standard, culture-based methods.^{1,2,3} A particularly challenging subset of IFI is comprised by fungal chorioretinitis and endophthalmitis. In the former, a fungal infectious process is found in the tissues of the uveal tract; the choroid, the ciliary body, and the iris. In the latter it is present in the intraocular fluids; the vitreous and aqueous. *Aspergillus* sp. and *Candida albicans* are common causes of fungal chorioretinitis and endophthalmitis.^{4,5,6} Typically, hematogenous spread of the infectious organisms from another infection site is responsible for the dissemination to the ocular tissues and fluids. Ophthalmological evaluation of candidemic patients is recommended in order to assess possible ocular infection in the setting of candidemia.^{7,8} Sensitivity of blood culture in fungal endophthalmitis has been reported to be low.⁹

In recent years, non-culture-based diagnostic tests have improved the diagnosis of IFI and, importantly, contributed to anti-fungal stewardship through high negative predictive value (NPV).¹⁰ These include (1→3)- β -D-glucan (BDG), a cell wall component of the vast majority of pathogenic fungi. Serum BDG titer analysis has been widely used in both fungemia and in more focal invasive fungal disease and is the subject of an extensive literature. The application of (1→3)- β -D-glucan detection of fungal chorioretinitis and endophthalmitis and to fungal keratitis has been much more limited and case report-based and the field has been in need of larger studies.¹¹

Recently, Ammar *et al.*,¹² have published the results of a retrospective case-controlled study involving 88 patients. Ten were established to have either chorioretinitis (N=6) or endophthalmitis (N=4) and fungal infection by culture (blood, N=9; vitreous, N=1). 78 patients were established as controls based upon negative eye examination, regardless of BDG or culture result. Diagnostic performance was assessed using a positive serum cutoff of 80 pg/mL. The sensitivity results for chorioretinitis and endophthalmitis were 66.7% (95% CI: 22.3%–95.7%) and 100% (95% CI: 39.8%–100%), respectively. Specificity for the presence of either condition was 74.4% (95% CI: 63.2%–83.6%). In chorioretinitis, positive predictive value for prevalence of 1% and 5% were



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calculated as 2.1 and 12.6 %, respectively. Negative predictive value for 1 and 5% prevalence was calculated as 99.5% and 97.7%, respectively. In fungal endophthalmitis, positive predictive value for prevalence of 1% and 5% were calculated as 3.8 and 17.1 %, respectively. Negative predictive value for 1 and 5% prevalence was calculated as 100%, for both.

The authors noted that potential utility of a serum BDG test lay as an adjunctive test, into be considered in the context of clinical suspicion of ocular fungal disease, as well as host and clinical factors. The fact that a test result of high NPV may be obtained relatively rapidly compared to culture results of limited sensitivity was considered as potentially drug-exposure-sparing. The limitations of the study included a relatively small number of positive cases and its retrospective nature. However, the results were indicated to warrant larger evaluations of clinical utility.

The issue of speed of result may be problematic for institutions which utilize external laboratories for BDG analysis. This issue has been resolved with the introduction of the Fungitell STAT™, a new BDG measurement product from Associates of Cape Cod, Inc. which permits BDG analysis of a single patient test in an hour.¹³ Additional information concerning the Fungitell STAT™ may be found at www.fungitell.com.

Discussion References:

1. Qusay Haydour, Chadi A Hage, Eva M Carmona, Oleg Epelbaum, Scott E Evans, Luke M Gabe, Kenneth S Knox, Jay K Kolls, Nancy L Wengenack , Larry J Prokop, Andrew H Limper, M Hassan Murad. Diagnosis of Fungal Infections. A Systematic Review and Meta-Analysis Supporting American Thoracic Society Practice Guideline Ann Am Thorac Soc . 2019 Sep;16(9):1179-1188.
2. Mark P. Breazzano, MD; H. Russell Day Jr, BS; Karen C. Bloch, MD; Sarah Tanaka, MD; Edward F. Cherney, MD; Paul Sternberg Jr, MD; Sean P. Donahue, MD, PhD; John B. Bond III, MD. Utility of Ophthalmologic Screening for Patients With Candida Bloodstream Infections. A Systematic Review JAMA Ophthalmol. 2019;137(6):698-710.
3. Kathleen A. Regan, Nila S. Radhakrishnan, Jon D. Hammer, Benjamin D. Wilson, Lara Beth Gadkowski and Siva S. R. Iyer. Endogenous Endophthalmitis: yield of the diagnostic evaluation. BMC Ophthalmology. 2020;20:138.
4. Leopoldo Spadea, Maria Ilaria Giannico. Diagnostic and Management Strategies of Aspergillus Endophthalmitis: Current Insights. Clinical Ophthalmology 2019;13 2573-2582.
5. Victoria Grace Dimacali and Ruben Lim Bon Siong. Infectious endophthalmitis at a Philippine tertiary hospital: a ten-year retrospective study. Journal of Ophthalmic Inflammation and Infection. 2020; 10:19.
6. Hande Celiker and Haluk Kazokoglu. Ocular culture-proven endogenous endophthalmitis: a 5-year retrospective study of the microorganism spectrum at a tertiary referral center in Turkey. Int Ophthalmol . 2019;39(8):1743-1751.
7. Nagao M, Saito T, Doi S, Hotta G, Yamamoto M, Matsumura Y, Matsushima A, Ito Y, Takakura S, Ichiyama S. 2012. Clinical characteristics and risk factors of ocular candidiasis. Diagn. Microbiol. Infect. Dis. 73:149-152
8. Gennaro De Pascale,a Brunella Posteraro,b Salvatore Lucio Cutuli,a Anselmo Caricato,a Domenico Lepore,c Mario Tumbarello,d Mariano Alberto Pennisi,a Maurizio Sanguinetti,e Massimo Antonellia. Why Should We Monitor (1-3)-D-Glucan Levels during Invasive Candidiasis? Just Ask Your Ophthalmologist! J. Clin. Microbiol. 2013;51:1645-1646.
9. Abdelrahman Gaber Salman¹, Dina Ezzat Mansour, Ahmad Abdelmegid Radwan, Lamia Ezzat Mansour. Polymerase chain reaction in pediatric post-traumatic fungal endophthalmitis among Egyptian children. Ocul Immunol Inflamm. 2010 Apr;18(2):127-32.
10. De Pascale G, Posteraro B, D'Arrigo S, Spinazzola G, Gaspari R, Bello G, Montini LM, Cutuli SL, Grieco DL, Di Gravio V, De Angelis G, Torelli R, De Carolis E, Tumbarello M, Sanguinetti M, Antonelli M. (1,3)- β -D-Glucan-based empirical antifungal interruption in suspected invasive candidiasis: a randomized trial. Crit Care. 2020; 5;24(1):550.
11. Chen Li, Yong Tao, and Xiaofeng Hu. Utility of Intraocular Fluid b-D-glucan Testing in Fungal Endophthalmitis: A Series of 5 Cases. Am J Case Rep, 2020; 21: e921188.
12. Ammar MJ, Carroll R, Kolomeyer A, Ying GS, Whitehead G, Brucker AJ, Kim BJ. Clinical utility of beta-D-glucan testing for endogenous fungal chororetinitis or endophthalmitis. Retina. 2020 Jun 8. doi: 10.1097/IAE.0000000000002861.
13. Robert L D'Ordine, Kevin A Garcia, Josee Roy, Yonglong Zhang, Barbara Markley, and Malcolm A Finkelman. Performance characteristics of Fungitell STAT™, a rapid (1 \rightarrow 3)- β -D-glucan single patient sample in vitro diagnostic assay. Med Mycol . 2020 May 13;myaa028.



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