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Comparative analysis of clinical and environmental isolates of *Cryptococcus neoformans* and *Cryptococcus gattii* species complexes from India

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In last two decades Cryptococcal meningitis (CM) has emerged as a major opportunistic infection in immunocompromised population of India. We aimed to analyse the epidemiology, susceptibility and invasive characteristics of clinical and environmental isolates in Southern states. In 2.5 year, total 160 isolates of *Cryptococcus neoformans* complex were recovered from CSF of CM patients and 18 isolates from 305 environmental samples. *C. neoformans* and *C. gattii* were identified and differentiated by biotyping and PCR methods. Molecular typing was performed by fingerprinting using (GTG)₅ and (GACA)₄ and phylogenetic analysis was done. Antifungal susceptibility was tested in VITEK2C using Amphotericin B, Fluconazole, Voriconazole and 5 Flucytosine for 18 environmental and 58 corresponding clinical isolates. Human Brain Microvascular Endothelial Cells (hBMEC) were infected with the strains and lysed to recover internalized yeasts to investigate the invasion and survival rates. Among 160 CM cases, 128 (80%) were HIV seropositive, and 32 (20%) were HIV negative including 17 (53.1%) with immunosuppressed condition. All the isolates were mating type 'Alpha'. We identified 128 *C. neoformans sensu lato (s.l)* VNI, 14 VNII and two *C. gattii sensu stricto* (VGI), 15 *C. tetragattii* (VGIV), one *C. bacillisporus* (VGIII) among clinical strains and 13 *C. neoformans s.l* VNI, one VNII, and four *C. tetragattii*. Invasion rate of control VN strains in hBMEC were higher than VG strains ($P < 0.05$), whereas no difference in invasion rate was obtained for clinical and environmental strains of VNI, VNII and VGIV ($P = 1.0$). We observed better intracellular survival of clinical and control *C. neoformans* strains over environmental isolates. *C. gattii* strains showed negligible survival rate. The study contributes towards epidemiology and prevalence of CM. We documented higher antifungal resistance in environmental isolates and which are significantly invasive which appears as matter of concern. We reveal that probably due to lower survival capability, VN genotypes predominate over VG in causing infection.

Biography

Shayanki Lahiri Mukhopadhyay is doing her research on *cryptococcal* meningitis for four years. *Cryptococcal* disease has turned out as the most common and fatal secondary infection in immune-compromised patients in South India. That is why she has designed her research to investigate the clinical and environmental isolates of *Cryptococcus neoformans* species complex to identify the major environmental sources of the infection, the antifungal susceptibility, pathogenesis of the clinical and environmental isolates to analyze the risks of the infection. Her studies will contribute to the global epidemiology and understanding of virulence of *C. neoformans* sp complex, which in turn will help to ease the treatment of cryptococcal meningitis patients.

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