Page 371 to 373

Volume 2 • Issue 3 • 2018

Scientia Ricerca

Editorial

Clinical Biotechnology and Microbiology

ISSN: 2575-4750

Cryptococcal Meningitis: A Lethal Fungal Infection

Neelabh* and Karuna Singh

Department of Zoology, Banaras Hindu University, Varanasi-221005

***Corresponding Author:** Neelabh, Department of Zoology, Banaras Hindu University, Varanasi-221005.

Received: May 22, 2018; **Published:** May 31, 2018

Volume 2 Issue 3 May 2018

Introduction

Cryptococcosis is an important fungal disease having a global impact and being caused by the species *Cryptococcous. Cryptococcus* spp. are attributed to be the only prominent human fungal pathogens from the large group of basidiomycete fungi that are a growing threat not only to human health, but also to animal and plant health. These fungi have many properties to their advantage such as high virulence, generalism, long-lived environmental stages, and the potential for wide dispersal and rapid evolutionary change (Fisher., *et al*. 2012).

There are two species associated with *Cryptococcus* that can cause disease 1) *Cryptococcus neoformans* 2) *Cryptococcus gattii* (Byrnes III., *et al*. 2011). In general *C. neoformans* is associated with causing disease in the immune compromised patients whereas *C. gattii* can cause infections in healthy individuals as well (University of Maryland Medical Center, 2010). Cryptococcal infections can broadly be categorized into 3 types based on the location of their incidence:

1. Cutaneous cryptococcosis
2. Pulmonary cryptococcosis
3. Cryptococcal meningitis

Amongst all the three types of cryptococcal infections mentioned here cryptococcal meningitis is the most serious and life threatening. It is a subacute meningoencephalitis in which the meninges of the brain get infected which is probably an outcome of the dissemination of a previous pulmonary infection (Park., *et al*. 2009). It targets mainly the people having compromised immune system due to HIV infection, immunosuppressive drugs, undergoing chemo or radiotherapy, organ transplant, etc (Durski., *et al*. 2013; Zhu., *et al*. 2010). Amongst these, the people infected with HIV are most susceptible to cryptococcal meningitis accounting for 95% of cases in middle- and low-income countries (MLICs) and 80% of cases in high-income countries (HICs) (Pyrgos., *et al*. 2013). Additionally, the data at hand related to the fatality rate portrays 9% in high-income regions, 55% in low/middle-income regions, and a whopping 70% in sub-Saharan Africa showing the seriousness of this infection. Furthermore, in 2009, 958,000 cases of the said infection 625,000 deaths associated with this infection were registered (Park., *et al*. 2009).

Symptoms, Diagnosis and Therapy

SSymptoms of this infectious disease are diverse, involving fever, blurred vision, fatigue, dry cough, headache and confusion (Barron and Medinger, 2008). These symptoms are progressive and gradually increase as the time elapses.

The confirmation of the presence of cryptococcal antigen in the body can be made by testing the cerebrospinal fluid, urine and sputum. The most definitive method to identify the meningitis infection is the culture of CSF and checking on the parameters such as elevated white cell counts, with a high proportion of lymphocytes, elevated CSF proteins and low CSF glucose. Traditional method utilized India ink which was low in sensitivity. It was replaced by new techniques such as latex agglutination test, lateral flow immune chromatographic assay (LFA), enzyme immune assay etc (Williamson., *et al*. 2017).

The treatment of cryptococcal meningitis involves three phases: an initial 2-week induction therapy dependent on fungicidal amphotericin B-based regimen, followed by 8-week consolidation therapy and subsequently maintenance therapy with fluconazole, continued for 6-12 months and/or until restoration of host immunity.

Induction Antifungal Therapy

Induction antifungal therapy comprises of a combinatorial treatment of amphotericin B (0.7-1.0 mg/kg per day) and flucytosine 100mg/kg/day for a period of two weeks. (Abbasi., *et al*. 2015; Perfect., *et al*. 2010). This combination therapy has been seen to result in around 40% reduced mortality rates in the initial 10 weeks. Combination therapy with amphotericin B and flucytosine was associated with a ~40% lower hazard of mortality at 10 weeks. Additionally, this therapy had a sustained effect for around 6 months and also it was responsible for the augmented rate of fungal clearance on comparison with amphotericin B monotherapy. Apart from this, on unavailability of flucytosine a treatment regimen utilizing amphotericin B and fluconazole or voriconazole has also been recommended (Perfect., *et al*. 2008; Loyse., *et al*. 2011).

Consolidation and Maintenance Therapy

The consolidation therapy is generally individualized, in other words, varying from individual to individual and depending upon the effect of the induction therapy on an individual. According to the current guidelines, consolidation phase therapy should commence after 2 weeks of induction therapy and involve the administration of fluconazole (400–800 mg/day) for at least 8 weeks (Perfect., *et al*. 2008). Further, maintenance therapy is initiated after successful completion of the induction and consolidation therapy, in which fluconazole is administered at a dosage of 200 mg/day.

Conclusion

Cryptococcal meningitis is one of the lethal fungal infections especially in case of immunosuppressed patients. Therefore, new techniques for the diagnosis and novel therapeutic approaches are required for the better management of this disease.

References

1. Sloan DJ and Parris V. "Cryptococcal meningitis: epidemiology and therapeutic options". *Clinical epidemiology* 6 (2014): 169.
2. Fisher MC., *et al*. "Emerging fungal threats to animal, plant and ecosystem health". *Nature* 484.7393 (2012): 186-194.
3. Meningitis: cryptococcal: Overview". Medical Reference: Encyclopedia. University of Maryland Medical Center. September 2010.
4. Byrnes III EJ., *et al*. "Cryptococcus gattii: an emerging fungal pathogen infecting humans and animals". *Microbes and infection* 13.11 (2011): 895-907.
5. Park BJ., *et al*. "Estimation of the current global burden of cryptococcal meningitis among persons living with HIV/AIDS". *Aids* 23.4 (2009): 525-530.
6. Durski KN., *et al*. "Cost-effective diagnostic checklists for meningitis in resource limited settings". *Journal of acquired immune deficiency syndromes* 63.3 (2013): e101.
7. Zhu LP., *et al*. "Cryptococcal meningitis in non-HIV-infected patients in a Chinese tertiary care hospital". *Medical mycology* 48.4 (2010): 570-579.

8. Pyrgos V., *et al*. "Epidemiology of cryptococcal meningitis in the US". *PloS one* 15.8 (2013): e56269.
9. Barron MA and Madinger NE. "Opportunistic Fungal Infections, Part 3: Cryptococcosis, Histoplasmosis, Coccidioidomycosis, and Emerging Mould Infections". *Infections in Medicine* (2008).
10. Williamson PR., *et al*. "Cryptococcal meningitis: epidemiology, immunology, diagnosis and therapy". *Nature Reviews Neurology* 13.1 (2017): 13.-24.
11. Abassi M., *et al*. "Cryptococcal meningitis: diagnosis and management update". *Current tropical medicine report* 2.2 (2015): 90-99.
12. Perfect JR., *et al*. "Clinical practice guidelines for the management of cryptococcal disease: 2010 update by the Infectious Diseases Society of America". Clinical infectious diseases 50.3 (2010): 291-322.
13. Loyse A., *et al*. "Comparison of the early fungicidal activity of high-dose fluconazole, voriconazole, and flucytosine as second-line drugs given in combination with amphotericin B for the treatment of HIV-associated cryptococcal meningitis". *Clinical infectious diseases* 54.1(2011): 121-128.