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Cytology of Cerebrospinal Fluid in Cryptococcal Meningitis: A Case Report

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ABSTRACT

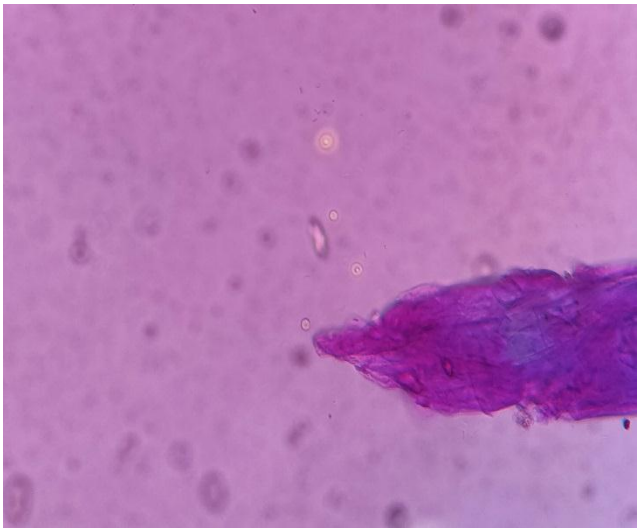
Cryptococcal meningitis is one of the common opportunistic infection in immunocompromised patients. It can also affect immunocompetent individuals. Symptoms include headache, vomiting, fever, neck rigidity, etc. It can cause life threatening complications. Diagnosis of the condition requires cytological examination along with its demonstration on India ink preparation. Microbiological culture for fungal isolation is gold standard diagnostic method. Treatment includes Amphotericin-B and fluconazole or itraconazole.

INTRODUCTION:

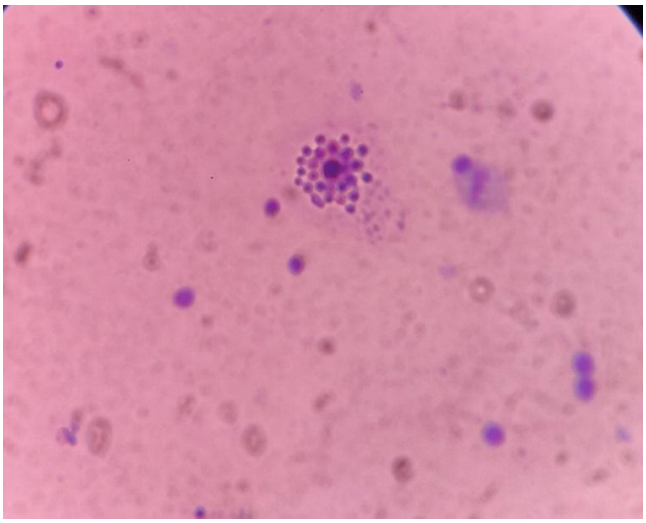
Cryptococcus neoformans is one of the commonest encapsulated yeast found on cytology in immunocompromised patients. The identification of organism is very crucial as it can cause life threatening complications[1]. It is also important to rule out sources of contamination of specimen which could lead to false positive diagnosis[2]. Cryptococcal meningitis is one of the AIDS defining condition in patients with CD4 count less than 100/mL.[3]Though its AIDS defining condition, 10-40% cases of cryptococcal meningitis have been reported in immunocompetent patients in India and other countries in the world[4].In early stages of infection, it is possible that clinical diagnosis can be missed due to non-specific clinical and radiological findings and thus CSF examination followed by CSF antigen testing for Cryptococcus/ India ink preparation/culture confirmation is much needful.

Case report:-

38 Years old male, known case of HIV was admitted to Dr. Hedgewar Rugnalaya Aurangabad with h/o fever, hedache, vomiting, neck rigidity and burning micturition since 3 days. Hemogram revealed following findings :-Hb-12.6g/dl, WBC count- 4.5 10^3/ul, Platelets-450 10^3/ul , ESR-25mm at the end of 1 hour. Urine routine examination did not reveal any significant findings. Lumbar puncture was done on next day and cerebrospinal fluid was sent for routine examination and cytology in two separate sterile containers. Grossly C.S.F. was 2ml in volume and clear in appearance. Coagulum, cobwebs were absent. Biochemical findings of C.S.F. were as follows-Glucose-32mg/dl, protein-112mg/dl, ADA- 3.5 IU/L. Microscopy revealed total count of 04 cells/cumm (counted on modified Naeubaur's chamber) with 100% on differential. Cytocentrifuged PAP stained smear showed few budding yeast cells and also clusters of the same admixed with lymphocytes in a clear background. India ink preparation also revealed capsulated cryptococcus. Based on these findings it was reported as cryptococcal meningitis and culture was advised which subsequently confirmed diagnosis of cryptococcal meningitis.



Microphotograph A (High power (45X)-India ink preparation showing cryptoccus with thick capsule with clear halo surrounding it



Photomicrogaph B (High power-45X) showing occasional budding yeast cells with clusters of numerous yeast cells with surrounding clear halo few lymphocytes.

DISCUSSION:-

Cryptococcus neoformans is capsulated ubiquitous yeast that causes opportunistic infection in HIV patients[1]. It commonly dwells in animal and bird droppings, decaying organic matter, and soil. It is also associated with patients on corticosteroids, immunosuppressive drugs and in organ-transplant and malignancy patient also[4]. Cryptococcus neoformans enters the body by inhalation route through the respiratory tract and can spread to the central nervous system by hematogenous route.[1] Various studies conducted in different parts of world have demonstrated prevalence of cryptococcosis in HIV-reactive patients and it has been found to range from 2.09% to 68.6%[3]. Fever, headache, altered sensorium, neck stiffness associated with raised intracranial pressure are common symptoms of cryptococcal meningitis. Generally, focal neurological deficit is absent in cryptococcal meningitis compared to other mycotic infections[6].In CSF routine examination generally reveals high protein levels. On imaging studies hydrocephalus, infarcts and meningoencephalitis are common findings[5]. These findings may overlap with other causes of meningitis like tuberculous meningitis. hence cytological examination of CSF with India ink preparation plays a crucial role in identification of Cryptococcus neoformans followed by confirmation by culture for fungal isolation and is gold standard method[5].On cytocentrifuged Papanicolaou stained preparations yeast cells can be seen as pale, brownish-pink, slightly refractile spheres surrounded by clear halos. Special stains like mucicarmine, periodic acid-Schiff can aid in the diagnosis of Cryptococcus neoformans as it has thick mucopolysaccharide capsule. Various studies has been done on cryptococcal meningitis however very less is understood regarding its pathogenesis. Current evidence suggests that both direct fungal-cell migration across the endothelium and the fungal cell carriage inside macrophages as “Trojan horse” invaders can occur. The cryptococcal capsule is anti-phagocytic, and the capsular polysaccharide has been associated with numerous deteriorus effects on host immune function.[4,5,6]Amphotericin B and Fluconazole or Itraconazole are the drugs of choice for cryptococcal meningitis according to standard guidelines.

CONCLUSION:

Cryptococcal meningitis can cause life threatening complications. The diagnosis of cryptococcal neoforms on the cytology can be missed due to paucicellular smears with scant yeast cells or hemorrhagic background. Hence careful examination of cytocentrifuged smear can aid in the

diagnosis of cryptococcal meningitis with confirmation by culture for fungal isolation which is gold standard method.

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