

## **ISOLATION OF CRYPTOCOCCUS LAURENTII IN BAL FLUID IN AN ASTHMATIC PATIENT -A CASE REPORT**

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**ABSTRACT:**

*Isolation of Cryptococcus laurentii in BAL fluid in an asthmatic patient.*

**Background:** *Cryptococcus laurentii* is one of the several non neoformans Cryptococci that has rarely been associated with human infection. However in recent years, there has been an increase in incidence of opportunistic infections with *Cryptococcus laurentii* Cryptococci are a saprophytic fungi present in soil contaminated with bird droppings mainly pigeons, roosting sites and decaying vegetables. *Cryptococcus* species is now recognized as a potential pathogen which can cause superficial as well as systemic disease, the most common presentation being meningitis, but can cause lung disease, pneumonia or respiratory failure. Here we report a case of 55 year old male patient who presented with fever, cough, chest pain and expectoration for 3 days. There was no history of hypertension, Diabetes mellitus or CAD. The patient gave a history of asthma on corticosteroid treatment for last 5 years. BAL fluid received in the lab in sterile container was cultured on Blood and MacConkey agar plates. On the basis of colony morphology, gram staining, Yeast panel was selected for identification and sensitivity of the microorganism on Vitec II, Fully automated microbiology analyser (Biomérieux) The growth of gram positive budding yeast cells was identified as *Cryptococcus laurentii* by Vitec II Susceptible to Amphotericin B.

**Conclusion:** *In the present case report the patient was an asthmatic patient on prolonged corticosteroid therapy but was otherwise immunocompetent as his HIV status was negative. Recent report on the outbreak of Cryptococcus infections should be considered as an alarming signal. Generally, immunocompromised patients are at risk of Cryptococcal infection, but infection in immunocompetent patients cannot be ruled out. The infection is easy to miss, so a high degree of clinical suspicion, improved culture methods and identification techniques like Vitec II can contribute to the diagnosis of unusual fungal infections. Previous reports have suggested that HIV negative patients (30-70%) suffer from pulmonary cryptococcosis more frequently as compared to AIDS (2%) patients who suffer from disseminated Cryptococcal disease.*

**Key Words:** *Cryptococcus laurentii, BAL fluid, Non neoformans Cryptococci,*

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**INTRODUCTION**

*Cryptococcus laurentii* is one of the several non neoformans Cryptococci that has rarely been associated with human infection. However in recent years, there has been an increase in incidence of opportunistic infections with *Cryptococcus laurentii*.<sup>1</sup>

*Cryptococcus* species was first isolated and described in 1894 by Sanfelice F in Italy from peach juice and named it *Saccharomyces*, a yeast like fungus.<sup>2</sup> It was first isolated from a clinical specimen by Busse from Germany.<sup>3</sup>

*Cryptococci* are a saprophytic fungi present in soil contaminated with bird droppings mainly pigeons, roosting sites and decaying vegetables.

*Cryptococcus* sps. is now recognized as a potential pathogen which can cause superficial as well as systemic disease, the most common presentation being meningitis, but can cause lung disease, pneumonia or respiratory failure.<sup>4,5</sup> *Cryptococcus* is an encapsulated yeast so it can evade the defense mechanism of intact immune system and lead to dissemination mostly from lungs and CNS to blood, skin, eyes, skeletal system and urinary tract.<sup>6</sup> A growing population of immunosuppressed patients has led to an increase in incidence of invasive fungal infections by non neoformans Cryptococci. *Cryptococcus laurentii* and *Cryptococcus albidus* together account for 80% of reported cases.<sup>7</sup> Impaired cell mediated immunity, presence of invasive devices are some of the common risk factors, others being steroid exposure, exposure to pigeons, pregnancy SLE,

Cushings syndrome, liver cirrhosis etc.<sup>7</sup>Banerjee et al described a case of *Cryptococcus laurentii* fungaemia and KV Ramana et al described a case of Cryptococcosis secondary to Bronchial asthma presenting as type 1 respiratory failure. The natural habitat of *Cryptococcus laurentii* is unknown. Potential sources for fungus include dissemination from a pulmonary source. Thus inhalation may be possible source of a acquiring infection. *C. laurentii* is psychrophilic and grows poorly above 30°C temperatures. While optimal growth temperatures of 15°C have been reported for this species, it is cryotolerant and can be successfully cultured at near freezing conditions.

Pulmonary Cryptococcosis may present as pleural effusion, solitary or multiple masses, glass ground interstitial opacities, dense consolidation and nodular and reticulo nodular cavities. Differential diagnosis of Cryptococcosis should include pneumonia.<sup>8,9</sup>

Here we report a case of *Cryptococcus laurentii* infection of lungs isolated from BAL fluid in a patient of asthma on long term steroid treatment.

### CASE REPORT

A 55 year old male patient presented with fever, cough, chest pain and expectoration for 3 days. There was no history of hypertension, Diabetes mellitus

or CAD. The patient was asthmatic on corticosteroid treatment for last 5 years. On examination, blood pressure was 130/90 mm Hg, chest - rhonci +, P/A soft, Hb- 13.4gm/ , Total count was 20,500/cumm , polymorphs 92% , lymphocytes 05% monocytes 02% and eosinophils - 01% . Malarial parasite was not detected, Creatinine - 1.14 mg % and SGPT- 25 U/LX-ray Chest showed infiltrative pneumonitis in left mid and upper zone. Bronchoscopy was performed which showed generalized inflammation and thick pus was aspirated. BAL fluid was sent to Sampurna Sodani diagnostic clinic, Microbiology department for routine examination and culture. Meanwhile inj. Tazomac, Inj. Deriphylline and inj. Parasafe was started and nebulization was done with Duoline.

A provisional diagnosis of left lower lobe consolidation was made. The BAL fluid was inoculated on MacConkey and Blood agar plates and a direct Gram smear was made. The growth after 24 hours showed Gram positive spherical budding yeast cells as shown in figure I. Yeast panel was selected for identification and sensitivity in Vitec II fully automated Microbiology system. The system identified the growth as *Cryptococcus laurentii* sensitive to Amphotericin B, Fluconazole and Flu cytosine. HIV test was later done to rule out immunodeficiency on Architect 1000 and the result was negative.

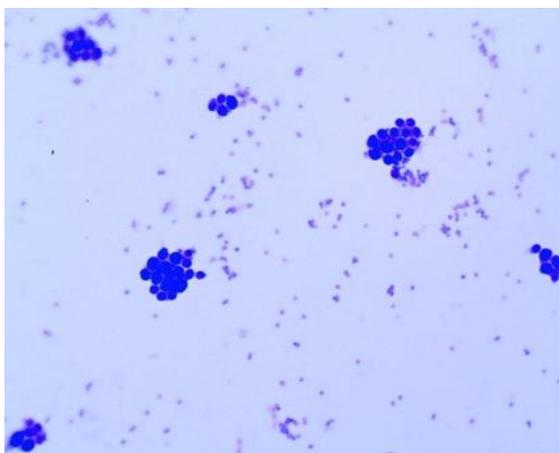
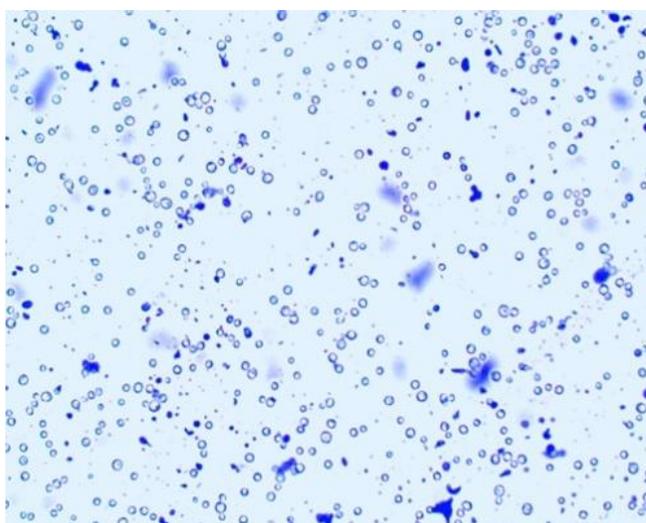


figure I Grams stain showing yeast cells

## MATERIALS AND METHODS

BAL fluid received in the lab in sterile container was cultured on Blood and MacConkey agar plates. A direct Gram's smear was made which showed pus cells and few Gram positive budding yeast cells. On the basis of colony morphology, gram staining, Yeast panel was selected for identification and sensitivity of the microorganism on Vitec II, Fully automated microbiology analyser (Biomerieux) following criteria was used for identification:

1. Colony morphology: cream colored, with a smooth mucoid texture
2. Grams staining: Gram positive budding yeast cells with distinct capsules.
3. India Ink Preparation: Positive - narrow but distinct capsules surrounding the yeast cells are present as shown in figure II
4. Biochemical reaction:- performed on Vitec II, Fully automated microbiology analyser (Biomerieux)
5. Antimicrobial sensitivity tests:- performed on Vitec II, Fully automated microbiology analyser (Biomerieux)



**Figure II – India Ink preparation showing capsules Surrounding the yeast cells**

## RESULTS

The growth of gram positive budding yeast cells was identified as *Cryptococcus laurentii* by Vitec II susceptible to Amphotericin B, Fluconazole and Flucytosine.

## DISCUSSION

*Cryptococcus* disease is also known as Busse Buschke's disease, European Blastomycosis or Torulosis. Previously the disease was latent but it has been steadily increasing in incidence.<sup>10</sup>

*Cryptococcus* is a ubiquitous fungus present as normal flora of man and animals, plants and other habitats where *Cryptococci* can be isolated. In the present case, patient was a long term asthmatic and was treated with corticosteroids for a

long time. He was employed in a building and might have been exposed to *Cryptococcus* by inhalation and was carrying the organism asymptotically. Because of bronchial asthma and chronic airway obstruction and due to prolonged steroid therapy, the immunity might have been compromised causing overt infection although the patient was otherwise immunocompetent as his HIV status was negative. Pulmonary *Cryptococcosis* was suspected because of history of asthma, corticosteroid therapy and contact with pigeon.

Previous studies have shown 29% incidence of pulmonary *Cryptococcosis* in HIV negative patients. Pulmonary *Cryptococcosis* either asymptomatic or with symptoms can resolve even without treatment in immunocompetent patients. However, treatment was given to our patient as studies have indicated a 12.5%

chance of dissemination in untreated pulmonary cases. Fluconazole therapy is recommended as it is less toxic. Confirmation of Cryptococcal infection is traditionally done by isolation of *Cryptococcus laurentii* in sputum or other respiratory secretions like BAL fluid and identification by Gram's stain, India ink staining for capsule and latex agglutination tests. There is no validated standard treatment for *Cryptococcus laurentii*. Studies correlating in vitro antifungal susceptibility test results and treatment do not exist. Amphotericin B and Fluconazole are considered to be good antifungal drugs against non-neoformans Cryptococci. However, in vivo susceptibility has been observed with oral Fluconazole and patients have tolerated it well. However Amphotericin B was given to our patient and he responded well to the treatment.

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#### CONCLUSION

In the present case report the patient was a chronic asthmatic patient on prolonged corticosteroid therapy but was otherwise immunocompetent as evident from his HIV negative status. The rising incidence of *Cryptococcus* infections should be considered as an alarming signal. Generally, immunocompromised patients are at risk of Cryptococcal infection, but infection in immunocompetent patients cannot be ruled out. The infection is easy to miss, so a high degree of clinical suspicion, improved culture methods and identification techniques like Vitec II can contribute to the diagnosis of unusual fungal infections.

**CONFLICT OF INTEREST:** none

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