

Isolation of *Rhizopus* from a Case of Nasal Polyp in an Immune-Competent Individual

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Abstract

Nasal polyps are noncancerous inflammatory growths within the nose or sinuses. Symptoms may vary ranging from breathing difficulty through the nose, loss of smell sensation, reduced taste, post-nasal drip, and a runny nose. The growths are movable, fleshy and nontender, though face pain may present occasionally. Complications may include recurrent sinusitis, widening of the nose and destruction of the nasal bones.

The exact cause is still not clear. Polyposis most probably is related to chronic inflammation of the lining of the nasal mucosa and sinuses. They occur more commonly among people who have allergies, cystic fibrosis, aspirin sensitivity, or certain fungal infections. Symptoms of polyps include nasal congestion, loss of smell, facial pressure, nasal speech, thick nasal discharge, and mouth breathing. According to different studies done worldwide, fungal elements are suspected to be one of the causative agents of chronic rhinosinusitis and a fungal etiology has been considered as a cause for severe nasal polyposis. Here we report a case of nasal polyp caused by *Rhizopus* species in an immune-competent adult. A proper diagnosis and treatment is necessary otherwise it may terminate into a fatal case of rhino-cerebral zygomycetes and here lies the importance of our study.

Keywords: Nasal Polyps; Rhinosinusitis; Allergy; Fungi; *Rhizopus*

Introduction

Nasal polyps are soft, painless, noncancerous growths on the lining of nasal passages or sinuses. They result from chronic inflammation and are associated with asthma, recurring infection, allergies, drug sensitivity or certain immune disorders. Clinical manifestations depends on the size of polyps and it varies from asymptomatic to nasal blockage, breathing difficulty, loss of smell sensation and recurrent infections. Because these polyps may block nasal airways and create breathing difficulties or inhibit proper drainage of the sinus cavities, creating stagnant secretion and lead to sinusitis. An increase in size of polyp may exert pressure effects on bones and cause destruction of nasal and other facial bones and leads to other complications [1]. The actual cause of nasal polyps is still unclear but some evidence suggests that chronic inflammatory conditions may leads to formation of polyps [2]. But infection of various etiology and even environmental pollution have all suggested as possible causes of chronic inflammation and developing nasal polyposis [3]. In this study polyp was resected from the patient presented with right sided maxillary polyposis-studied by mycological and histopathological methods and *Rhizopus* species was isolated as the causative agent.

Case Report

A 68 years old male came to ENT OPD of our hospital with complain of headache, right sided nasal blockage and occasional nasal bleeding for last 9 months. Then he was clinically diagnosed with a case of right sided maxillary polyp with hypertension. No history of diabetes or asthma or any other immune-suppression were present. He was a chronic inhaler of powder form of tobacco for last 35 years. CT scan of nose and paranasal sinus was showing right sided unilateral anterior opacities with maxillary bone erosion and widening of maxillary ostium (Figure 1). After that Unilateral endoscopic sinus surgery was done to confirm the diagnosis and also to treat the condition. The maxillary sinus found to be filled with thick, brown secretions and a mass of (2 cm x 6 cm) was removed. Maxillary sinus was irrigated with normal saline following removal of that mass. There was no excessive bleeding per operatively. One part of that mass was send to pathology department for histopathological examination (HPE) and one part was send to microbiology department for further investigation. After the removal of that mass, patient was treated with antibiotic and steroid. He was discharged after 5 days and was asked to attend ENT OPD with reports after 15 days for follow up.



Figure 1: CT Scan of paranasal sinus showing right sided unilateral anterior opacities.

On HPE of multiple section showed multiple broad aseptate fungal hyphae with inflammatory changes (Figure 2).

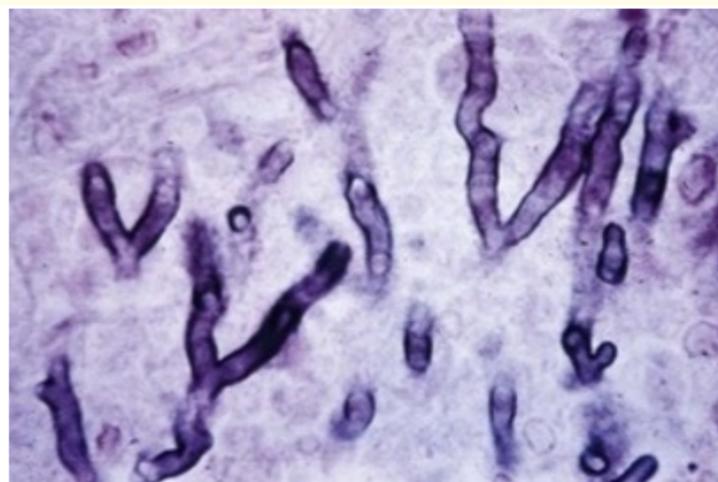


Figure 2: Broad aseptate hyphae in H & E staining of tissue section (400X).

Microbiological investigation

Macroscopic examination: A tissue section measuring around (1.5 x 3) cm, whitish in color, fleshy was received in normal saline. On macroscopic examination there was no granules over its surface. Tissue was grind and material used for gram staining, ZN staining, KOH mount, aerobic bacteriological culture and fungal culture. For bacteriological culture blood agar and MacConkey agar was inoculated and incubated aerobically at 37°C. 2 pair of sabouraud dextrose agar (SDA) tubes (one with antibiotic and other without antibiotic) were inoculated with the material and one pair of those tubes were incubated at 25°C and other pair were at 37°C.

Findings

- **Gram staining:** Pus cell 2-5/HPF, no organisms were seen.
- **ZN staining:** No acid fast structure were found.
- **KOH mount:** Broad aseptate hyphal like structure were seen.
- **Aerobic bacteriological culture:** After 48 hours of incubation no organism grown on culture.
- **Fungal culture:** On 3rd days of 25°C incubated SDA tube (without antibiotic) showed profuse growth characterized by-rapid growth, obverse side- cottony wooly greyish white suspended in air, reverse-non pigmented (Figure 3). After that, LPCB mount was performed from the colony and it showed broad aseptate hyphae with sporangiophore, sporangium containing spores and nodal rhizoids (Figure 4 and 5). But there was no growth at SDA tubes with antibiotic and in the tube that was incubated at 37°C. It was diagnosed as zygomycetes group of fungus. For further speciation, slide culture test was performed and it was diagnosed morphologically as *Rhizopus* species.

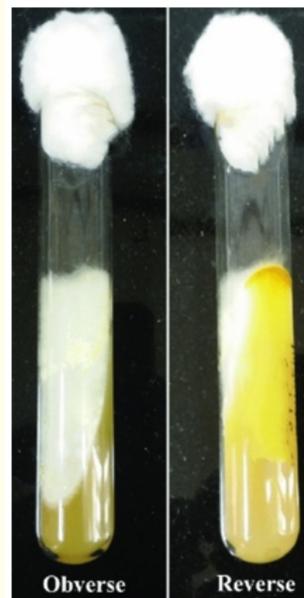


Figure 3: SDA tubes without antibiotics showing profuse cotton-wooly growth on obverse side (on day 3 of incubation at 25oC).

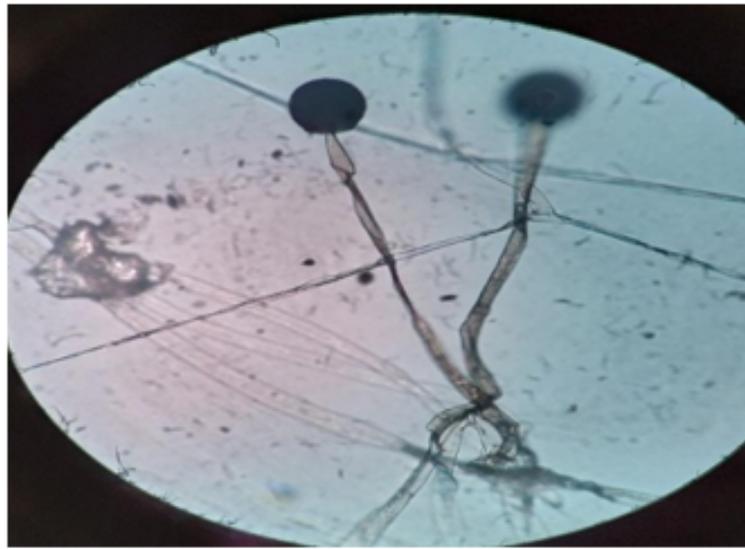


Figure 4: LPCB mount (slide culture) of colony is showing broad aseptate hyphae with branched sporangiophore, sporangium containing spores and nodal rhizoids (400X).



Figure 5: LPCB mount (slide culture) of colony is showing sporangiophore, sporangium and nodal rhizoids (400X).

From the clinical history, clinical findings, radiological investigation, histopathological examination and microbiological investigations diagnosis was made as a case of nasal polyp caused by *Rhizopus* species of fungus in an immune-competent adult.

After the surgical removal of the fungal mass and application of antifungal ointment locally, there was no recurrence and patient became asymptomatic.

Discussion

Nasal polyps are the most common noncancerous growth of the nasal cavity and affecting around 1 - 4 percent of the population. Clinical manifestations directly related to their location and size. People who suffer from the polyps are frequently may encounter intranasal, orbital and even intracranial complications. Causative agents of nasal polyps still remain unknown. Most accepted hypothesis is that chronic inflammation in the nasal cavity can lead to nasal polyps [2,4]. Allergic fungal rhinosinusitis is a well-defined entity of chronic rhinosinusitis (CRS) and is regarded as an IgE-mediated hypersensitivity to fungal colonization of the paranasal sinus mucosa and it could be involved in the development of nasal polyposis. According to recent concept of role of fungus in pathology of CRS, inhaled fungal elements become entrapped in the sinunasal mucus causing eosinophils to shift from respiratory mucosa into the lumen. Eosinophils then cluster around and attack the fungal elements [5-7]. Since the management of nasal polyps includes surgical resection with or without medical management depending on the cause of polyp-fungal eradication should improve the course of disease if fungus is the main cause of the CRS and nasal polyposis [5].

Conclusion

The incidence of fungal etiology in nasal polyps is increasing day by day. Hence it is important to look for the presence of fungus in nasal polyps by detail microbiological and histopathological examination before administering treatment as use of antifungal therapy will benefit patients and prevent recurrence.

Bibliography

1. Archer SM. "Nasal polyps, nonsurgical treatment". University of Kentucky Medical Center, USA (2005).
2. Bateman ND, *et al.* "Nasal polyps: still more questions than answers". *The Journal of Laryngology and Otology* 117.1 (2003): 1-9.
3. Bernstein JM and Kansal R. "Superantigen hypothesis for the early development of chronic hyperplastic sinusitis with massive nasal polyposis". *Current Opinion in Otolaryngology and Head and Neck Surgery* 13.1 (2005): 39-44.
4. McClay JE. "Nasal polyps". University of Texas at Southwestern, USA (2005).
5. Weschta M, *et al.* "Topical antifungal treatment of chronic rhinosinusitis with nasal polyps: a randomized, double-blind clinical trial". *The Journal of Allergy and Clinical Immunology* 113.6 (2004): 1122-1128.
6. McClay J. Allergic fungal sinusitis". University of Texas at southwestern USA (2004).
7. Weschta M, *et al.* "Local production of *Aspergillus fumigatus*" (2003).

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