ORIGINAL ARTICLE

Prevalence of Fungal Infection in Nasal Polyps

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ABSTRACT

Aim: To observe the prevalence of fungal infections in nasal polyps
Setting: Study was carried out from July 2012 to July 2014 , on fifty patients in ENT . UnitII . Mayo Hospital Lahore
Study design: Cross sectional study
Method: Specimens were taken from the patients operated in the department of ENT Mayo hospital Lahore for nasal polyps. Specimen processed for the diagnosis of fungal infection by potassium hydroxide mount , culture and microscopy in the department of Pathology King Edward Medical University Lahore
Statistical method: Data collected and analyzed through SPSS version 18
Result: Samples collected from 50 patients who were operated for nasal polyps. In 35 specimens the fungal culture was positive and in 15 specimens no fungal involvement was seen.
Conclusion: There is a high prevalence of fungal infection in nasal polyps.
Keywords: Nasal polyp, fungal infection, Aspergillus infection, fungal culture, Fungal rhinosinusitis

INTRODUCTION

Fungal rhinosinusitis (FRS) describes a spectrum of diseases ranging from benign colonization of the nose and sinuses by fungal organisms to acute invasive and life threatening inflammation extending to the orbit and brain[1]. FRS is further classified into two categories: invasive and noninvasive[2]. Invasive FRS is subcategorized into acute invasive (fulminant) FRS, granulomatous invasive FRS, and chronic invasive FRS; meanwhile noninvasive FRS is subcategorized into localized fungal colonization, sinus fungal ball and eosinophil related FRS which include allergic fungal rhinosinusitis, eosinophilic fungal rhinosinusitis[3]. Acute invasive FRS is most common disease worldwide among the immunocompromised patients and the most common culprits among these patients are the *Rhizopus oryzae*[4], and *Aspergillus*spp. Granulomatous invasive FRS has been observed for the most part in African subcontinent, India, and Pakistan and the prominent features are non-caseating granuloma formation, vascular proliferation, vasculitis, perivascular fibrosis, sparse hyphae in tissue, and isolation of *A. flavus* collected from sinus secretions[5]. Chronic invasive FRS is an emerging entity caused by A.fumigatus occurring commonly in diabetics, patients on corticosteroid therapy and immune compromised and is characterized by high accumulation of hyphae, occasional presence of vascular invasion, sparse inflammation and involvement of sinuses[6]. Most benign of all fungal sinusitis is localized fungal colonization in the superficial nasal crusts, sinus fungal ball is a dense mycetoma like aggregate of fungal hyphae in diseased sinuses[7]. Syndromes in eosinophil related FRS (AFRS, EFRS) are contentious and a matter of intense research among otolaryngologists, pathologists, immunologists and microbiologists.

Nasal polyposis is a chronic inflammatory disease of the mucous membrane in the nose and paranasal sinuses presenting as pedunculated smooth, gelatinous, semitranslucent, round or pear shaped masses of inflamed mucosa prolapsing into the nose[8]. Most researchers believe that frequent local swelling of nasal or sinus mucosa result into the formation of polyps which increase in size by increasing sub-mucosal edema and then expose to the airway and cause symptoms [9] like nasal obstruction, anosmia etc. The aforementioned mechanisms supported little by evidence based research however, the main cause of polyp formation is still to be understood clearly. The major symptoms of nasal polyposis include nasal blockage, nasal congestion,hyposmia or anosmia and purulent nasal discharge in cases of chronic sinusitis[10]. Other symptoms comprise post nasal drip, rhinorrhea, facial pain, headache and sleep disturbance. Most theories hypothesize polyps to be eventual manifestation of chronic inflammation. Therefore, conditions leading to chronic inflammation in the nasal cavity can lead to nasal polyps.

It has been put forward in the recent times, chronic rhinosinusitis is caused by some fungal agents and a fungal etiology was found to underlie severe nasal polyposis. The fungal pathogens isolated from paranasal sinuses include *Aspergillus, Histoplasma, Coccidiodies, Penicillum, Candida*,

Fonsecaea Acremonium, Curvularia, Mucor. Sinuses are most commonly colonized by *Aspergillus spp*[11].

Air, soil, dust, plants, and decaying organic matter contains fungi. They are seen to be adherent to dust particles and are deposited on the nasal and paranasal sinus mucosa after inhalation. In order to proliferate these organisms need a warm and moist environment which is provided by the upper respiratory tract[12]. Although in susceptible patients these agents can become infective but in normal healthy individuals due to their strong host responses it is quite rare that these pathogens become invasive.

Because of the ubiquitous nature of fungal spores it is yet to be determined whether fungal infection is a cause or effect in nasal polyps[13]. Fungal infection of the sinonasal mucosa may be the cause of sinonasal polyps as has been shown by some recent studies[14]. Therefore, nasal polyp formation and growth may be initiated by both fungal infections and non-infectious inflammation. It can therefore be said that a local allergic process resulting into fungal colonization of sinunasal mucosa augmented by fungal infection have their effects in the nasal polyp formation[15,16].

MATERIAL & METHODS

The study includes 50 patients presented with nasal polyp who were admitted for surgery like intranasal polypectomy, trans-antralethmiodectomy and external ethmiodectomy in the Department of Otorhinolaryngology Unit-II Mayo Hospital Lahore from July 2012 to July 2014. Clinical examination performed by ENT surgeon, includes ear, nose, throat and general examination. Face was examined to observe any apparent deformity .Nose and throat were examined to observe the effects of nasal obstruction. Ophthalmologic examination was targeted for any orbital involvement (proptosis, dystopia and decreased vision complemented with orbital B-Scan performed from Eye Department of Mayo Hospital. Laboratory investigations included complete blood picture, clotting profile, urine exam, blood sugar, and immunoglobulin estimation, specially the Ig E. Medical evaluation was sought from a departmental physician and general anesthesia fitness was obtained from anesthesia departments before surgery.

Water's View X-ray of paranasal sinuses was done for each patient as part of the radiological assessment with CT-scan for meticulous evaluation of the sinuses like bony erosion, orbital and intracranial extension. Surgical planning was done accordingly for each of the patient. Per-operatively the lesion was excised and samples were divided into two parts under sterile conditions in operation room. One part was placed in formalin for histopathology and the other in sterile normal saline and was sent to Microbiology department for microbiological studies fungal stain and fungal Culture of specimen.

The study was carried out in the Department of Pathology King Edward Medical University Lahore and were processed for the diagnosis by 10% potassium hydroxide mount and mycological culture. Data was collected and results tabulated. All patients with suspicion of fungal sinonasal polyposis on clinical and radiological grounds were included in the study .There was no exclusion on any other medical ground.

Data collection procedure: A proforma specially designed was used for data collection. All the specimens provided after intranasal polypectomy, trans-antralethmiodectomy and external ethmoidectomy were included. Specimens were sent to Pathology Department of King Edward Medical University Lahore with a prescribed request form complete history including age, sex, address, duration of the disease, socioeconomic condition, any concomitant disease and treatment history etc.

Processing of specimen: 10% Potassium hydroxide mounts and mycological culture was used for the processing of specimen for direct microscopy**.**

KOH mounts: A drop of KOH was added to the specimen placed on a slide. A cover slip applied with gentle pressure to drain away excess KOH. Evaluation of the slides was done under the microscope for the presence of thread-like branching structures (hyphae) or beaded spherical structures (spores). If present, it was considered as a +ve test.

Fungal culture: Sabouraud's dextrose agar at 25ºC and at 37ºC was used for culture. Growth of any organism was observed periodically for 4 weeks. Culture characteristics and microscopy parameters were used for identification of organism if any.

Microscopic examination: Lactophenol cotton blue stain (LPCB) was used for observing the microscopic features of the isolates, A piece of colony (fungal growth) was taken with the help of sterilized needle and put on a clean (flamed) slide containing one drop of lactophenol cotton blue stain. Then observation of the slides was done under microscope using low X10 and high X40 power objectives.

RESULT

Fifty patients who were clinically diagnosed as a case of nasal polyp were included in the study. Among these patients 25 (50%) were female while 25 (50%) were male and their age ranged between 11-50 years. Age range was from 16 to 50 years. Maximum patients were between the age ranges of 31-40 (30%) with mean age of 31. Out of 50 patients

included in this study 15 were males and 15 were females. Age of the patient ranged from 11 years to 50 years. Mean age is 31 years.

Table I: Sex ratio

Sex	=n	%age
Male	25	50
Female	25	50
Total:	50	100%

Table II: Age group Distribution

Age (in years)	=n	%age
11 -20	11	22
21-30	13	26
31-40	15	30
41-50	11	22
Total	50	100%

Table IV: Socioeconomic condition of patients

Status	=n	%age
Good	Nil	0
Fair	3	6
Average	5	10
Poor	42	84
Total	50	100%

Table V: Presentation at the time of admission

Presentation	=n
Nasal Obstruction(Nasal Polyp)	50
Impaired sense of smell	30
Headache	28
Sneezing	42
Proptosis	12

Table VI: Duration of illness

Duration	=n
1-6 months	5
6 months-1year	9
1-2 years	13
2-3 years	17
3-5 years	4
> 5 years	2
Total:	50

Table VII: Fungal culture

Culture	=n
Aspergillus species	19
Aspergillusflavus	08
Aspergillus fumigates	05
Fungal culture negative (Microscopy +)	03
Fungal culture negative	15

DISCUSSION

This study revealed the prevalence of fungal infection in the age group of 31-40 years (range 11-50 years) with a mean age of 31 years which resembles to the results of other similar studies[17,18]. Most of the patients belonged to the low socioeconomic group. The common factor irrespective of socio-economic status was unhealthy living environment and lack of awareness and most importantly delayed presentation. Most of the sufferers were living in overcrowded and slums of the cities. The features which were common among the patients were nasal allergy and sinusitis as also mentioned in a study[19].Seeking delayed medical care either due to lack of awareness or poor socioeconomic status was another feature observed among these patients which was revealed in another study too[20]. Before referral to a specialist or tertiary care center these patients tried home remedies or traditional medical care from hakims, quacks and homeopaths. Various antibiotics, topical nasal drops were used by these patients during this period. Poor personal hygiene as obvious from their appearance aggravated the problem.

No gender preponderance was observed as prevalence in either sex was equal in our study which is consistent with other studies[21]. This study also showed that prolonged exposure to dust either as part of their occupation or part of their living environment was an important risk factor for the fungal infection of their nasal polyps and this observation was also concluded in another study[22]. Prevalence of the disease was shown to be unaffected by different ethnic groups which was somehow revealed otherwise in another study[23].

The main complaint of the patients included in our study was nasal obstruction. Other features included impaired sense of smell, deformed nose, headache, sneezing, sore throat, impaired hearing, asymmetry of face, intracranial extension, proptosis, impaired vision which were consistent with a study[24]. Other complaints reported by the patients were nasal bleeding, swelling of cheek, swelling in frontal sinus region, decreased vision, epiphora, pain in temporal region and difficulty in speaking. The above mentioned clearly demonstrate that more than one symptom was present in majority of the patients. Nasal obstruction secondary to nasal polyposis was featured by all the patients and this observation from our study was identical to other studies as well[25,1,7]. Studies have shown that Aspergillus is the most common infection of paranasal sinuses and it is usually present as chronic sinusitis in otherwise healthy persons. In our study, Aspergillus species was isolated in thirty five patients in a total of fifty patients which is in accordance to a study[26].

Fungal culture report revealed Aspergillus species in 19 patients among the total of 50 patients and Aspergillus flavus in 08 patients while fumigatus

was reported in 5 patients. Only 3 patients were positive for fungus on microscopy. 15 patients were negative on microscopy as well as by culture method.

CONCLUSION

Fungal agents are shown to be the most common causative agents involved in the etiopathogenesis of nasal polyps. People living in poor communities like overcrowded families and slums are at high risk for developing nasal polyps secondary to fungal infections. No sex preponderance was observed as males and females were equally affected and the most frequently involved age range was between 31-40 years. Aggressive nasal polyposis and pansinusitis is a hallmark of fungal infection in nasal polyposis.

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