A Rare Case of Nasal Septal Perforation Due to *Purpureocillium lilacinum*: Case Report and Review

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Abstract Perforations of nasal septum are fairly frequent with an incidence of about 0.9 % and may lead to morbidity than mortality. Common causes are trauma (iatrogenic occasionally nose picking), malignancy, inflammations and infections such as tuberculosis, syphilis, Wegener's granulomatosis, sarcoidosis and fungal infections. Paranasal fungal sinusitis is frequently encountered in clinical practice in both immunocompromised and immunocompetent individuals. Nasal septal perforations caused by species of *Aspergillus* and *Fusarium* have been documented. We report a case of nasal septal perforation in a 35-years-old immunocompetent male patient due to *Purpureocillium lilacinum*, a soil and environmental fungus and an emerging pathogen, which is known to cause various infections in humans with normal and deficient immune system. Fungal aetiology was diagnosed by histopathology and direct smear examination and confirmed by culture. Patient was treated with voriconazole, following Antifungal susceptibility testing (AFST), to which the patient is responding.

Keywords *Purpureocillium lilacinum* · Nasal septal perforation · Immunocompetent

Introduction

Nasal septal perforations are a challenge to Otorhinolaryngologists. They may be asymptomatic or cause various symptoms, which may be of aesthetic and functional problem. Fungal infections in the sino-nasal cavities may be caused by opportunistic and emerging fungi, both in immunocompromised and immunocompetent individuals [1, 16]. Invasive fungal sinusitis due to *Aspergillus* spp and *Fusarium solani* leading to nasal septal perforation in immunocompromised person has been reported [2, 3].

Purpureocillium lilacinum is an emerging, opportunistic fungal pathogen known to cause various infections in both immunocompromised and immunocompetent humans [1, 6, 9]. Rarely, it can cause infection of sino-nasal cavity. Here, we report a case of nasal septal perforation secondary to *P. lilacinum* infection in a 35-years-old, immunocompetent male patient who responded well to voriconazole treatment.

Case Report

A 35-years-old male was presented to the department of ENT with a history of

- Swelling and excruciating pain over the tip of the nose, of one month duration.
- Mild nasal obstruction of two weeks duration.

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Past History

Patient gave history of swelling in the medial canthus of the right eye two months before, which was treated by an Ophthalmologist and the excised mass was reported as candidal dacryocystitis on histopathological examination. Culture was not done and patient did not receive any antifungal drugs.

On ENT Examination

Tip of the nose showed diffused swelling of 2 cm diameter and was red in colour (Fig. 1). Nasal examination revealed foul smelling scanty discharge was along with crusts. Since the swelling was tender, endoscopy could not be done. Preliminary diagnosis of Nasal Vestibulitis with secondary infection was made and Nasal swab was sent for microbiological examination. Other routine investigations were done. Hb %, TC, DC, ESR and Platelet count were under normal limits; FBS and PPBS were under normal range; LFT, RFT were normal; HIV and HBsAg were negative and VDRL and TPHA were non-reactive; X-ray of Paranasal sinus (PNS) and CT PNS were normal. Patient was started on Cefixime and Metronidazole.

After 3 days, pain had reduced and nasal endoscopy was attempted. Endoscope could be passed only up to the vestibule and revealed crusting in both the nasal cavities and two perforations, one measuring about 2×4 mm and the other, about 6×8 mm in the cartilaginous part of the nasal septum (Fig. 2). Edges of the perforation were granular in appearance and from this site; a bit of tissue biopsy was taken and sent for histopathological examination and also for culture and sensitivity.

Report

Histopathological Examination

Haematoxylin and Eosin stain showed cartilage with granulation tissue consisting of blood vessels with chronic inflammatory cells comprising of lymphocytes, macrophages and few foreign body type giant cells. Periodic Acid Schiff stain showed filamentous fungal hyphae within the giant cells and also extracellularly (Fig. 3). The impression was chronic infection of fungal aetiology.

Microbiological Examination

Direct Grams smear of nasal secretion showed plenty of pus cells with gram positive cocci in cluster and gram negative bacilli along with septate fragmented fungal hyphae (Fig. 4). 10 % KOH mount showed short segments

Fig. 1 Showing diffuse swelling over the nasal tip

Fig. 2 Showing nasal septal perforations

of septate hyphae with occasional branching. Bacterial culture yielded *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Fungal culture on Sabouraud's Dextrose Agar yielded *P. lilacinum* with in 3–4 days. Nasal septal biopsy specimen also yielded *P. lilacinum*. Growth was typical showing powdery, floccose, lilac coloured colony (Fig. 5). Lactophenol cotton blue mount showed septate hyaline hyphae of moderate thickness and infrequent branching with conidiophores swollen at their bases. Phialides arose from these conidiophores and had long chains of purple coloured conidia (Fig. 6). Antifungal susceptibility testing (AFST) was performed and the MIC result was as follows:

Amphotericin B (10.8 lg/ml).
Fluconazole (160 lg/ml).
Itraconazole (7.2 lg/ml).
Voriconazole (0.04 lg/ml).

Patient was started on Ketoconazole 400 mg/day following direct smear report and Voriconazole was replaced for Ketoconazole following culture and AFST report.

Fig. 3 PAS stained tissue section showing fungal elements

Fig. 5 Growth of *P. lilacinum* on SDA

Fig. 4 Gram's stained smear showing hyphal elements

Fig. 6 Microscopic appearance of *P. lilacinum* in LCB mount

Patient was reviewed after 2 and 4 weeks of treatment. Swelling and pain had decreased and patient was asked to continue with Voriconazole and asked to come for regular follow up.

Discussion

Nasal septum perforation is not infrequent and occurs in around 34 % of cases in cartilaginous part. Trauma such as self induced external nose picking or facial accidents may result in lacerations of the mucosa. Interference of blood supply or ischemia of the mucoperichondrium may also result in perforation. Nasal surgeries, nasal intubation,

placement of nasogastric tubes etc., sometimes result in injury leading to perforation. Septal haematoma, if not attended, may get infected and lead to perforation. Rarely tuberculosis, syphilis, Wegener granuloma and sarcoidosis are implicated as a cause perforation. Inhalation of irritants such as chromic or sulphuric acid fumes, glass dust, mercurials, phosphorous may sometime cause perforation. Cocaine and vaso-constrictive nasal spray often cause large perforations. Nasal septum perforation may also be a presenting symptom of AIDS [4].

Once perforation occurs due to various causes, mucosal edges epithelialize preventing closure of the defect. Altered nasal airflow results in symptoms. Posterior perforations are less symptomatic than anterior ones because of humidification from the nasal mucosa and turbinates. Nasal obstruction, crusting, epistaxis, foul smelling nasal discharge, parosmia and neuralgia are the common symptoms.

Small perforations can cause whistling sound with inspiration. Long standing perforation may result in saddle-nose deformity which is an aesthetic and functional problem.

Opportunistic fungi of low virulence, distributed widely in soil and environment, do cause infection in immunocompromised persons including AIDS patients. They are also becoming emerging pathogens, causing infection in humans with normal immune system. Fungal infections of sino-nasal cavities, both in immunocompromised and immunocompetent, are not rare. Nasal septal perforations in very few cases have been caused by fungus like *Aspergillus spp* and *F. solani* [2, 3].

The genus *Purpureocillium* [5], earlier known as *Paecilomyces*, was first described by Bainer in 1907 [6]. They are saprophytic fungi found worldwide in soil and decomposing vegetation. They belong to Hyphomycetes. They usually occur as laboratory contaminants, in sterile solutions and clinical specimens. Recently *Purpureocillium spp* have been reported to cause infections in immunocompromised and immunocompetent individuals, virtually in all the body sites [7]. Five species of this genus have been identified which can cause infection in humans [8]. Among these, *P. variotii* and *P. lilacinum* are more common.

P. lilacinum, an opportunistic and emerging pathogen, has been known to cause infections in persons with both normal and deficient immune system, particularly in patients with indwelling foreign devices or following intraocular lens implants. [9–11] Paecilotoxin is the mycotoxin produced from this fungus, but its significance in causing human infection is not known [12]. Some of the infections caused in humans are cutaneous and subcutaneous lesions, vaginitis, endophthalmitis, fungemia, onychomycosis, keratitis, bursitis and sinusitis, etc. [13–15].

Fungal infections of the sino-nasal cavity are frequently encountered in ENT department. Over the past 30 years only six cases of *Purpureocillium spp* infection in sino-nasal tract have been reported-four cases of *P. lilacinum* and two cases of *P. variotii*. [16–19] Nayak, et al. in 2000, has described a case of unilateral sinusitis and proptosis in an immunocompetent child. Fungal maxillary sinusitis due to *P. lilacinum* in an immunocompetent host presented as subcutaneous swelling has been reported by Permi HS, et al.

Here is a case of nasal septal perforation proposed due to *P. lilacinum* in a 35-years-old immunocompetent male. Identification of hyphae in direct smear is always challenging as it is very difficult to differentiate *Purpureocillium spp* from *Aspergillus*, *Zygomycetes* and *Pseudohyphae* of *Candida*. Culture is confirmative [20]. In our case, direct smear identification was confirmed by typical colony morphology and microscopic features in lactophenol cotton blue mount. *P. lilacinum* is known for its drug resistance. It is resistant to

conventional antifungal drugs and also to sterilization methods [21]. AFST by MIC method was done and it was sensitive to itraconazole and voriconazole.

Conclusion

We would like to conclude that *P. lilacinum*, an emerging fungal pathogen, can cause infection in nasal sinuses and nasal cavity probably resulting in nasal septal perforation in immunocompetent individuals. High degree of suspicion is needed to identify the fungus by histopathological examination. Culture is confirmatory. Treatment with traditional antifungal drugs often fails but voriconazole and itraconazole are effective.

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