



Pyomyositis with rhino-orbital mucormycosis in type II diabetes mellitus

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Abstract

Mucormycosis is a devastating infection caused by fungi from the order Mucorales. Rhino-orbital (RO) and Rhino-cerebral (RC) are two forms of the disease which are uncommon, acute, and aggressive infections caused by these fungi occurring in several immune - compromised states including diabetes which is the most common (60-80%) predisposing factor. Because of its rapid progression and high mortality, early recognition and aggressive treatment offer the only chance to increase the survival rate. We reported a case of Rhino-Orbital Mucormycosis (ROM) caused by *Rhizopus oryzae* (*R. arrhizus*) that developed in a 39 years old male patient with type II diabetes mellitus (DM) and pyomyositis. He was successfully managed with liposomal amphotericin B, nasal endoscopic surgery and correction of underlying predisposing factors.

Key words

Pyomyositis, Mucormycosis, *Rhizopus oryzae*, Amphotericin B, Diabetes mellitus.

Introduction

Mucormycosis (Zygomycosis or Phycomycosis) are a group of aggressive angio - invasive

infections caused by filamentous fungi of the family Mucoraceae. Infections with these organisms complicate any underlying chronic disease especially patient's with diabetic

ketoacidosis (60-81%), hematological malignancies and solid organ transplant recipients [1]. Rhino-Orbital Mucormycosis (ROM) is a rare disease with an overall prevalence in 0.15% of the diabetics and a high mortality rate of 30 -70% [2, 3]. Early and aggressive diagnostic procedures combined with medical and surgical treatment are necessary to improve the outcome.

Case report

A 39 years old male was admitted in the hospital with complaints of swelling and pain in the left lower limb for two weeks, nasal block, facial pain and pain in both the eyes for three days. He was diagnosed as diabetic with raised renal parameters at a local hospital two weeks ago. On examination, patient was afebrile, conscious, oriented and appeared slightly toxæmic with bilateral orbital edema and proptosis, small blackish eschar type of lesion on the right alar area of nose (**Photo - 1A**) with left lower leg cellulitis. His blood pressure was 170/90 mmHg, pulse - 110/min, temperature 102°F with no other abnormalities.

Serum biochemistry revealed urea 63.0 mmol/l, creatinine 1.7 mmol/l, bilirubin 1.1 mg/dl, AST 117 U/L, ALT 77 U/L, Alkaline phosphatase 158 U/L, serum proteins 8.7 g/dl, albumin 1.3 g/dl, globulin 7.4 g/dl, sodium 130.0 mmol/L, potassium 5.3 mmol/L and GRBS 304 mg/dl. Hematology picture showed hemoglobin 8.1 gm%, total count 13,300/cu.mm, differential count: neutrophils 80%, lymphocytes 17%, eosinophils 2%, monocytes 1%, platelet count 3-7 lakhs/cumm and ESR 115 mm. Viral markers showed positive for HBS antigen. Ultrasound abdomen revealed bilateral bulky kidneys with grade-I parenchymal changes. Ultrasonography of left lower leg showed sub cutaneous edema and venous doppler was negative for deep and superficial venous thrombosis. 2D

echocardiography and color doppler report was normal. MRI showed no significant pathology in PNS. Diabetologist, Ophthalmologist and Otolaryngologist referrals were asked for. Preliminary diagnosis of a case of orbital cellulitis with proptosis and type II diabetes mellitus was made. Under local anesthesia nasal endoscopy was performed, black eschar like lesion on the anterior end of nasal septum and vestibule area was excised and sent for fungal culture and histopathological study suspecting of mucormycosis. Both the studies confirmed the diagnosis of mucormycosis. The patient was put on intravenous amphotericin B 1 mg/kg/day, Inj. Magnex, Inj. Dalacin for three weeks which was later changed to Inj. Amphomul and Tab. Augmentin 625 mg and was given for another four weeks along with neosporin ointment, Moxicil ointment, Lacryl gel, Inj. Mixtard. Nasal endoscopy was performed at regular intervals with monitoring of serum electrolytes, renal and hepatic functions.

His eye manifestations showed improvement but his left lower leg cellulitis was worsening. Suspecting pyomyositis, MRI was repeated. Under local anesthesia incision was done, 200 ml of pus was drained and sent for culture which was sterile. Because of various uncontrolled parameters, wound healing was delayed and hospital stay was prolonged for one more month. He received two units of packed cell and one unit of whole blood transfusion, rich protein supplements, Inj. Insumac combo along with other drugs. Continuous monitoring of blood sugar levels, serum electrolytes, renal and hepatic parameters was done.

By the end of two months, his general condition improved profoundly with healthy granulation tissue and nasal vestibule. At the time of discharge, his eye manifestations resolved and all other parameters were within normal limits. (Blood sugar 11.3%, urea 26 mmol/l, creatinine

1.1mmol/l and hemoglobin 11.3 gm%). He was advised to come for follow up.

Fungal culture

The specimen was examined in 10% KOH preparation which showed broad, aseptate hyphae (15-25 μm) ribbon like with wide-angle branching at irregular intervals. (**Photo - 1B**) The material was inoculated into two tubes of SDA with antibiotics but without actidoine at 25° and 37°C. Greyish-white, wooly growth filling the entire tube was seen in 48 hrs. (**Photo - 2A**)

Photo - 1A: Orbital cellulitis with proptosis. Black eschar like lesion on the anterior end of nasal septum and vestibule area (excised).

Photo - 1B: KOH mount.

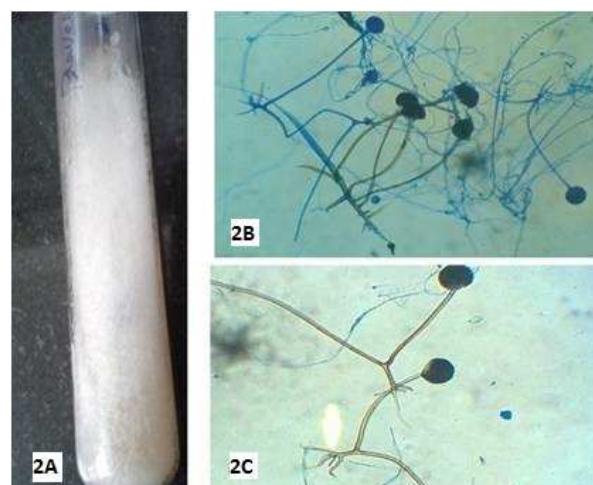


LCB mount of culture showed similar hyphae with single or tuft of unbranched sporangiophores arising from them spherical sporangia filled with sporangiospores which were born at the tips of sporangiophores which terminated in ellipsoidal columella. Sparingly

branched rhizoids arising from the hyphae opposite and few immediately adjacent to the nodal derivation of sporangiophores was observed confirming the fungus as *Rhizopus* (Genus). (**Photo - 2B, Photo - 2C**)

Photo - 2A: SDA showing greyish-white wooly growth.

Photo - 2B and Photo - 2C: LCB mount showing broad aseptate hyphae with single or tuft of sporangiophores arising from them and terminating in sporangia along with branched rhizoids arising opposite to the nodal derivation of sporangiospores.



Slide culture showed longitudinal striae on brown sporangiospores, columella comprising of 50-70% of sporangium and at few places ruptured sporangium along with columella has shown drooping umbrella shape thus confirming the species as *oryzae*. (**Photo - 3A**) Histopathology of tissue-sections stained with hematoxylin and eosin (H & E) demonstrated wide spread tissue necrosis that was infiltrated by similar hyphae. (**Photo - 3B**)

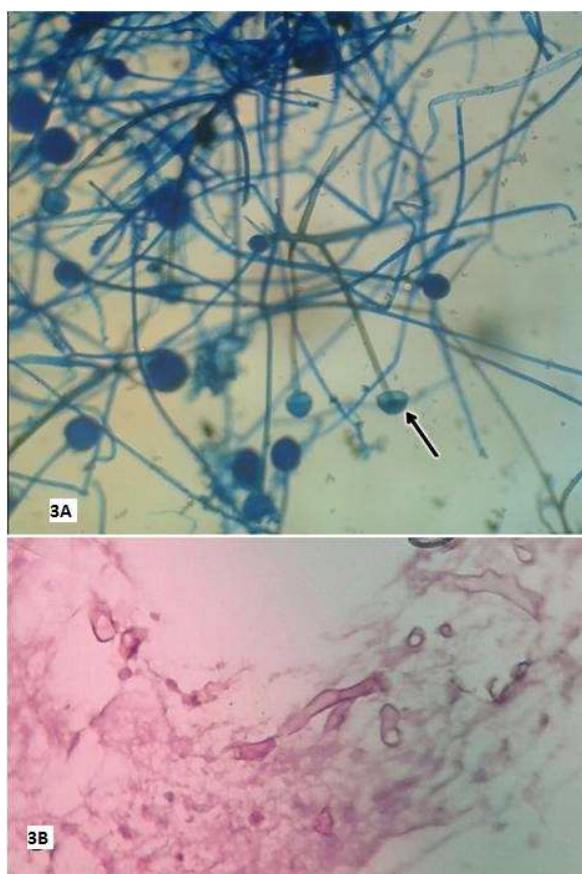
Discussion

Mucorales cause primarily opportunistic infections and represent the third leading cause of invasive fungal infections. These are

saprophytes, and infection occurs following inhalation of fungal spores. The members frequently involved belong to the genera Rhizopus, Mucor, Cunninghamella, Apophysomyces and Absidia with Rhizopus oryzae being the predominant pathogen which accounts for 60% of all forms of zygomycosis and 90% of the Rhino-cerebral cases [4]. In our case too, we have isolated Rhizopus oryzae.

Photo - 3A: KOH mount: Ruptured sporangium showing drooping umbrella shape along with sporangiospores.

Photo - 3B: Histopathology: Shows inflammatory cell collections with aseptate, broad, ribbon like fungal hyphae [H&E stain].



The disease can manifest as one of six different clinical syndromes: Rhino-cerebral, Pulmonary, Gastrointestinal, CNS, Sub-cutaneous and Disseminated form of which Rhino-cerebral is

the most common, which is divided into three subtypes

- Rhino-maxillary
- Rhino-orbital
- Rhino-orbito- cerebral [5].

Infection can disseminate through hematogenous, neuronal, naso-lacrimal duct and bony erosion [3, 6]. In our case, the dissemination may be hematological, neuronal or naso-lacrimal duct as he presented with nasal and orbital manifestations with no signs of sinus or cerebral involvement which was evident from MRI.

In diabetic patients, the reduced ability of the serum to bind iron to transferrin at a low PH is decreased thereby more free iron is available. This is more so in case of diabetic-ketoacidosis. So, the high iron concentration, hyperglycemia, acidosis and lack of dialyzable inhibitory factors offer favorable conditions for fungal multiplication. Uraemia on the other hand causes granulocyte dysfunction and CMI depression. In our case, several predisposing factors, especially uncontrolled diabetes and uraemia might have favoured invasive ROM and pyomyositis.

Histo-microbiological studies and imaging techniques play a vital role in diagnosing this disease which was quiet evident in our case too [7]. The principles of therapy for this disease include combination of medical and surgical modalities along with correction of underlying immune compromised state. The survival rate in patients treated with combination therapy is 70% and those with surgery alone are 57% [8]. The standard medical therapy is Amphotericin B at a dose of 1-1.5 mg/kg/day for weeks to months depending on the severity of the disease with monitoring of renal parameters [9]. The same was given to our patient too with correction of underlying predisposing factors.

Now a days, Posaconazole, a new triazole antifungal and iron chelating agents - deferasirox, deferiprone have been supported as alternative to amphotericin-B [10, 11].

Numerous case reports of pyomyositis have involved patients with diabetes and almost 90% of them are due to *Staphylococcus aureus* [12]. In our case too, patient was diabetic and immunocompromised. The drained pus from left leg was sterile which could probably be because of long term antibiotic coverage. Chakrabarti, et al. analyzed 178 cases of zygomycosis and found co-existing, uncontrolled diabetes in 73.6% of the patient's [13].

Conclusion

Even though our patient presented with several predisposing conditions, early diagnosis and timely management has brought the disease under control.

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