

Mucormycosis of the Middle Ear and Neck Post COVID 19

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ABSTRACT

Mucormycosis is an opportunistic infection caused by fungi of order *Mucorales* and affect immunosuppressed patients. The cases of mucormycosis have surged during the COVID pandemic, especially in cases requiring steroids and mechanical ventilation. Here we present a case of a 40-year-old diabetic post COVID female patient. She presented with right earache, right facial paralysis (grade four) of two weeks duration and right sided neck swelling for ten days. Ultrasonography and computed tomography revealed multiple abscesses in the right side of the neck. Histopathological examination of tissue from the neck and middle ear confirmed the diagnosis of mucormycosis. This is a rare case of concurrent neck and middle ear mucormycosis in a post COVID patient.

Keywords: Coronavirus; COVID 19; middle ear; mucormycosis; neck.

INTRODUCTION

Mucormycosis is a rare fungal infection usually affecting an immunocompromised person and posing a high mortality. Mucormycosis is an opportunistic infection caused by fungi of order *Mucorales*, with *Rhizopus* being the commonest pathogen. These fungi have the properties of angioinvasion, tissue infarction and necrosis. They usually attack patients with depleted immunity. Mucormycosis has been classified into different types according to the site of infection, like, rhino-cerebral, cutaneous, gastrointestinal, pulmonary, and disseminated.² The rhino-orbital mucormycosis is the most common site.¹

The COVID pandemic has affected worldwide with numerous deaths. There has been an upsurge in the cases of mucormycosis during COVID pandemic. However, the role of COVID as causal, contributory or co-existing factor for this fungal infection is still debatable.³ Here, we report a case of mucormycosis affecting the middle ear and neck in a post-COVID patient.

CASE REPORT

A 40-year-old female presented to our department with right sided earache and acute onset of right facial weakness for about two weeks. There was no past history of ear discharge. She also complained of gradually progressive, painful swelling in right side of the neck for 10 days. The swelling initiated from right upper lateral neck which progressively increased in size. Then it subsequently extended to the right pre-auricular, submandibular region and lower lateral part of the neck. The patient had fever with chills and rigors nearly one month back which lasted for about a week. There was history of intake of oral Prednisolone for nine days for the facial paralysis from another medical center. She was a known case of type 2 Diabetes mellitus under medication for past two years. There were no any nasal or aural complaints, and no history of trauma.

On initial examination, she was ill-looking but her vitals were stable. On neck examination, there was 8*6 cm diffuse swelling with multiple loculations in the right

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submandibular region, right lateral and posterolateral part of the neck and in the pre-auricular region (Fig. 1). The overlying skin was erythematous with area of self-burst and pus exudation from right upper lateral neck.



Figure 1. A photograph showing swelling with multiple loculations in right side of neck with overlying erythematous skin.

On otoscopic examination, there was a large central perforation in the right tympanic membrane with yellowish pus in the middle ear. Tuning fork test was suggestive of conductive hearing loss in the right ear. She had grade four right facial nerve paralysis. The examination of nose including nasal endoscopy, paranasal sinuses, orbits and oral cavity were normal.

Blood investigations revealed leukocytosis (24,800/mm³) with neutrophilia (83%). There was marked hyperglycaemia with random blood sugar of 329 mg/dL and HbA1c of 14%. She had acetonuria, however, ketoacidosis was absent. Erythrocyte Sedimentation rate (ESR) was 60 mm in first hour and C-reactive protein (CRP) was high (47.7 mg/L). Her COVID Polymerase Chain Reaction (PCR) test was negative. The pure tone audiogram revealed 58dB conductive type of hearing loss in her right ear. In the high-resolution computed tomography of temporal bone, soft tissue density was observed in the anterior epitympanum with erosion of tympanic segment of the facial canal (Fig. 2). However, the mastoid air cell system was normal. In the ultrasonography and computed tomography of the neck, multiple well-defined collections were seen in right level II, III, IV and V suggestive of abscess. Pus culture revealed *Klebsiella pneumoniae* sensitive to Gentamycin.



Figure 2. High resolution computed tomography of right temporal bone showing soft tissue density in the anterior epitympanum with bony erosion of tympanic segment of facial canal.

Incision and drainage was performed under antibiotic coverage and tissue from the neck was sent for biopsy. The histopathological examination revealed broad non-septate hyphae and the diagnosis of mucormycosis of the neck was formulated. On the background of COVID pandemic and rising cases of rhino-orbital mucormycosis in our hospital, IgM COVID antibody test was sent which came out to be positive. Liposomal Amphotericin B was started in the dose of 5 mg per kg per day for 3 weeks. Daily neck wound debridement and dressings were continued. Endocrinology team was constantly involved to optimize the blood sugar level.

On the tenth day of admission, the patient underwent right canal wall down mastoidectomy with facial nerve decompression (from first genu till vertical segment) keeping in mind for the possibility of temporal bone mucormycosis. Per-operatively, there was a large central perforation of the tympanic membrane with necrosed annulus. Whitish necrosed tissues and slough were debrided from the anterior epitympanum. A part of bone over tympanic segment of the facial nerve was eroded (Fig. 3). The mastoid air cell system was normal. All the ossicles were normal. Malleus and incus were removed but stapes suprastructure was preserved and grafting was not performed.

The histopathological examination revealed many broad based aseptate hyphae with 90 degree branching, confirming the diagnosis of middle ear mucormycosis (Fig. 4). The general condition of the patient gradually improved in next few weeks with static condition of the facial nerve.

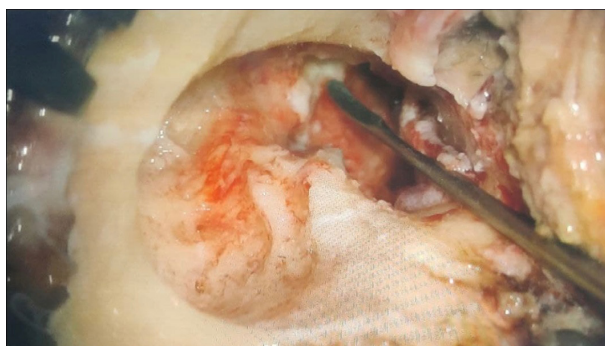


Figure 3. Intra-operative picture of right canal wall down mastoidectomy with the instrument showing whitish necrotic tissues in the anterior epitympanum and part of tympanic segment of facial nerve.

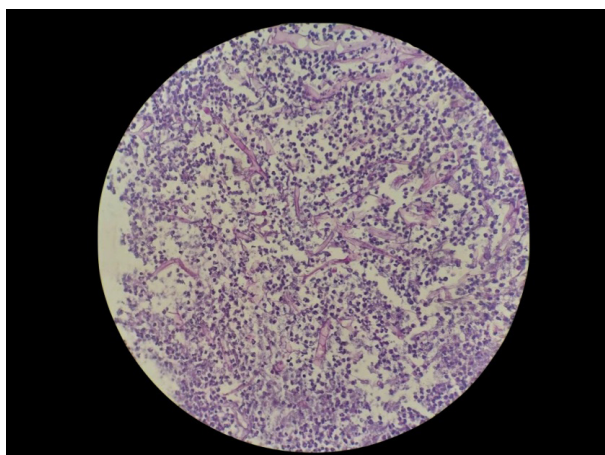


Figure 4. Histopathology of tissue from right middle ear showing inflammatory infiltrates along with many fungal hyphae which are aseptate, broad based and have 90 degree branching, PAS, ×200 primary magnification.

DISCUSSION

Mucormycosis of the ear and neck is a very rare entity.⁴ This is the first reported case of simultaneous involvement of both the sites in a post COVID patient till date to best of our knowledge after searching in the Pubmed and Google scholar. Yun et al. first reported a case of middle ear mucormycosis with facial paralysis.⁵ A case, similar to ours, with involvement of ears, neck and orbit has been reported in a diabetic patient after foreign body in the ear.⁶ The major route of spread of the fungi is inhalation.⁷ The fungi may have harboured in the middle ear in this case from nasopharynx via the Eustachian tube.⁴ The lymph nodes in the neck may have

been involved subsequently as the lymphatic drainage of the middle ear occurs in the deep cervical and preauricular region.

The diagnosis of mucormycosis was not suspected clinically in the initial evaluation. The histopathological report from the neck tissue aided in its diagnosis and guided us to obtain the COVID antibody test which turned out to be positive. The risk factors for mucormycosis in this patient were uncontrolled diabetes, use of corticosteroids and COVID infection. Studies have hypothesized that the combined effects of lymphopenia, reduced CD4+ and CD8+ T cells, endothelialitis, hyperglycaemia, hyper-ferritinemia, hypoxia and acidosis during COVID infection predispose the patient to mucormycosis.⁸

The rarity of mucormycosis in neck and ear makes its suspicion difficult.⁹ However, clinician should be vigilant about this sort of presentation in a diabetic patient especially during COVID era. The rapid initiation of Liposomal Amphotericin B, control of hyperglycaemia and surgical debridement improved the outcome of this patient. Three fold treatment in the form of antifungals, debridement and correction of risk factors are the mainstay of patient management.¹⁰

CONCLUSIONS

Mucormycosis, though rare, could present concurrently at multiple sites in an immunocompromised patient.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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