Original Article

Oral Manifestations In Mucormycosis Report Of 6 Cases The Starring Disease Of 2020

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Abstract

With the emergence of the pandemic disease covid 19 in the year 2019, disease had a devastating and life-threatening impression in the second wave that has calamitously ascended the number of cases of the disease called Mucormycosis all over the world and including our country, India. Being the most infrequent fungal infection, it was seen as the most rapidly occurring fulminating disease among the patients who were recovering from recent SARS-CoV-2 infection. The most common form of this infection is seen in the rhinomaxillary region and in patients who were immunocompromised such as diabetes.

This article will highlight the various characteristic oral features of Mucormycosis with the CBCT characteristic features that have been observed in 6 different cases of recovered COVID- 19 patients, with few patients having a history of diabetes.

Keywords: SARS-CoV-2, Diabetes, maxillae, palatal eschar, sinus, mucormycosis, CBCT.

INTRODUCTION

Mucormycosis (MCM) is a devastating infection with high mortality rates despite recent advances in its diagnosis and treatment. It is caused by the filamentous fungi of the Mucorales order of the class of Zygomycetes. [1] It was first described by Paultauf in 1885. [2] It represents the third most common angio-invasive fungal infection following candidiasis and aspergillosis. [3] It usually affects immunocompromised individuals and is rarely seen in apparently healthy individuals.[4] Mucormycosis is categorized into rhino cerebral (most common form), pulmonary, cutaneous, gastrointestinal or disseminated. Rhino cerebral form can be further subdivided depending on the tissues being affected as rhino nasal or rhino maxillary, rhino orbital, and rhino orbit cerebral.[5] The rhino nasal mucormycosis begins as the fungal spores are inhaled and invade the nasal mucosa, and spreads to the paranasal sinuses. The infection also spreads from the sinuses into the mouth producing painful, necrotic ulceration of the hard palate. [6,7] This report aims to highlight the characteristic features of mucormycosis in the maxillofacial region with their CBCT characteristics, particularly amongst high-risk individuals such as diabetes in series of cases.

CASE 1

A 62-year-old female reported to the Department with a chief complaint of pain in upper right back tooth region for 2 months. Her history of present illness revealed that she had a history of cough, fever, and sore throat 4 months back. She was shifted to local hospital for drop in oxygen saturation level from where she got discharged after 14 days. Two months after patient started experiencing pain in right upper back teeth region which was sharp, intermittent, radiating in nature, aggravates while chewing food. She started noticing purulent discharge from the left cheek region. She was diabetic, hypertensive and was diagnosed as covid positive patient 4- months back. Her all vital signs were within normal limits. On extra oral examination, the patient face was apparently bilaterally asymmetrical with draining sinus on the middle third region of face on the left side with drooping of right corner of mouth. (Fig 1) Her intra oral examination revealed that the mouth opening was 20mm. The denuded mucosa with a well-defined palatal perforation was present in the right side of hard palate measuring of about 3.5 x 2cm in size extending anteriorly from distal of 14 to 17 regions posteriorly, medially from 1cm away from mid palatal raphe to the cervical margins of 15,16,17 laterally covered with necrotic slough surrounded by erythematous margin. (Fig 2) On palpation, the inspectory findings were confirmed. The affected area was rough in texture and tender. Based on history and clinical examination a provisional diagnosis of post covid mucormycosis was given. Patient underwent radiological investigation CBCT which reveals that osteolytic bone lesion involving both maxillae, zygomatic bone, right infraorbital rim, palatal bone, lateral walls of orbit and nasal bone. Internal structure of bone shows destruction and there is complete loss of normal architectural pattern of trabeculae. (Fig:3) The periphery is

poorly defined and showed areas of breach in buccal and palatal cortical plates. Partial opacification in left and right maxillary sinus was also present. (Fig: 4)

Fig 1: Extraoral Draining Sinus

Fig 2: palatal perforation

Fig 3: 3D CBCT image showing palatal bone perforation

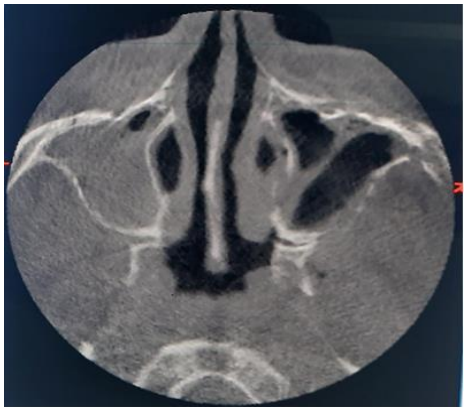

Fig 4: Axial CBCT image showing radiopacification of left and right maxillary sinus, with erosion of anterior, posterior medial wall of maxillary sinus.

CASE 2

A 46-year-old male patient came to our department with a chief complaint of pain and swelling on his left side of the upper jaw for 4 months. The patient had a history of fever 4 months back and subsequently developed pain in the upper front and left posterior tooth region. Pain is sharp, continuous and radiating towards left ear region; Pain aggravates on chewing food with no relief of symptoms on taking medication. The patient also gave a history of mobility in the involved tooth region and history of difficulty in chewing food, following to this he started noticing pus discharge from the front and left quadrant of the upper jaw with a duration of 20 days His medical history revealed that he is a known diabetic for the past 5 years. On extraoral examination, there was a mild diffuse swelling over the left middle third of the face which was extending mediolaterally from the lateral aspect of nose to the tragus of ear and super inferiorly from the infraorbital region to 1 cm above the left corner of the mouth, respectively. The skin over the swelling was normal. On palpation, the swelling was soft in consistency with mild tenderness present. The lymph nodes were not palpable. Intraoral examination revealed mobility in relation to 24,25, 26. The multiple non discharging sinuses were present on the anterior maxillary region with another non discharging sinus on hard palate was present in the centre roughly oval in shape, measuring of about 0.5 cm in size which was tender on palpation. also left side of the palate was tender and soft on palpation. (Fig 5, Fig 6) So, based on the history and clinical findings, a provisional diagnosis of Mucormycosis of the maxilla in relation to the left side was given for which differential diagnosis including chronic osteomyelitis, chronic granulomatous infection, and deep fungal infections.

Fig 4: Non discharging sinus in the anterior maxillary region

Fig: 6 non discharging sinus in the hard palate.

CASE 3

A 70 year old male presented to our department Faridkot with a C/C of pain in upper left back tooth region since 2 month his history of present illness revealed that he had a history of cough, fever which he experienced 8 months back, at the same time he also had an episode of breathlessness and difficulty in breathing for which she was shifted to local hospital where medications were prescribed. Following to which he got relieved of fever within one week. After few days, patient got discharged from the hospital, with relief of symptom but he was advised to continue with the prescribed medication for 1month more. And subsequent to which patient started experiencing pain in left upper back teeth region. The pain was sharp, continuous, radiating in nature, aggravates while chewing food and while speaking. He also gave history of pain in the left side of face, in the palatal region also reported by the patient. History of blurring of vision also reported by the patient. For which he consulted to some local doctors from where he was referred to us. And since 2 weeks he started noticing purulent discharge from the left infra-orbital region. (Fig 7) His past medical history revealed that he was diabetic and on medication for 5 years. He also gave history of covid 19 positive 8 months back. On extra oral examination, facial asymmetry was evident, with swelling evident on left side of face. Purulent discharge was present on the left side of face with the surrounding erythematous skin surface. Parotid, Submandibular Gland not enlarged and not tender to palpation. Lymph Nodes not palpable and not tender to palpation. While doing the intra oral examination mouth opening observed was up to 30mm. Hard palate showed denuded mucosa with a well-defined palatal perforation in the left side covered

with necrotic slough measuring of about 3.5 x 3cm in size extending anteriorly from 24 to 27 region posteriorly, medially from 1cm away from mid palatal raphe to the cervical margins of 24, 25,26,27 laterally. (Fig 8)

The surrounding area was slight erythematous and greyish black is color, on palpation the affected area was rough in texture with evidence of tenderness was present. With these clinical features was a diagnosis of mucormycosis of left maxilla was made.

Fig 7: purulent discharge from left eye

Fig: 8 hard palate showing perforation and denuded mucosa.

CASE 4

A 40-year-old male patient came to our department with a chief complaint of pain in his left upper back tooth region since 4 months. His history of present illness revealed that had a history of fever 3 months back and following to which he started experiencing pain in the upper front and left posterior tooth region. Pain is sharp, intermittent radiating towards left ear region aggravates on chewing food with no relief of symptoms on taking medication. And now since one week he started noticing mobility in the involved tooth region and subsequent to this he started noticing pus discharge from the front and left quadrant of the upper jaw His medical history revealed that he is not known to any immunologically compromised disease. On extraoral examination, his face was apparently bilaterally symmetrical. The lymph nodes were not palpable. Intraoral examination revealed mobility in relation to 22,23,24,25,26,27 with decayed 22 and 23. So, based on the history and clinical findings, a diagnosis of mucormycosis of the maxilla in relation to the left side was given for which differential diagnosis such as chronic osteomyelitis of left maxilla, chronic granulomatous infection, and deep fungal infection was given.

Fig 9: non draining sinus irt 22 23 25 26 region.

CASE 5

A 37 year-old male patient came to our department with a chief complaint of swelling in the right middle 3rd region of face for 15 days. His history of present illness revealed that he had a history of fever 4 months back following to which he started experiencing swelling right middle 3rd region of face, initially which was small in size that has gradually increased to attain the present size that has caused partial closure of his right eye. History of pain was also reported by the patient which was dull, intermittent and experienced only on applying pressure to the swelling area. There is associated history of difficulty in mouth opening which causes difficulty in food intake. No other history of difficulty in breathing was reported by the patient. For these complaints patient visited to some local doctor where he was advised to go for koh staining and ncct scan. After which patient was referred to our department for the same. Nothing significant was revealed by the patient in his medical history.

On extraoral examination a diffuse swelling was present involving the middle 3rd region of face on right side, extending to involve the right angle of mandible and right eye, inspectory findings revealed the overlying skin is non erythematous with no signs of any discharge. On palpation swelling was soft and tender with no local rise of temperature. (Fig 10) On examining his eye movements were normal, and pupils were responsive. Right side infraorbital and circumorbital region showed edema. The facial expressions were normal. On intra oral examination diffuse swelling was present in the right palatal region, extending mediolaterally from 2cm away from mid-palatal raphe to the gingival margins of 13, and 14,15,16,17 teeth. On palpation it was soft and non-tender. (Fig 11) Intraorally, draining sinus was present in the region of 16, 17 palatally and 12,14,15 buccally . Mobility was also evident in relation to 13, 14,15,16,17. (Fig 12, 13) So, based on the history and clinical findings, a diagnosis of mucormycosis of the right maxilla was established. Patients reports was also suggestive of right sided acute invasive permanent rhinosinusitis mucormycosis

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Fig: 10 swelling irt right side of face.

Fig 11: swelling irt hard palate

Fig 12: mobility of teeth

Fig: 13: Non draining sinus irt 12 13

CASE 6

A 40-year-old female presented to our department with a Chief complaint of Pain in upper left back tooth region since 1month. Her history of present illness revealed that she had a history of cough, fever, sore throat which she experienced 1 year back, for which she was shifted to local hospital where medications were prescribed for 2 weeks Following to which she got relieved of symptoms within few days. Subsequent to which patient started experiencing pain and swelling in left middle third region of face and also in the left posterior teeth region. Pain was sharp, intermittent, radiating in nature. Pain aggravates while chewing food. She also gave history of watery discharge and heaviness in the left antrum region. She also gave history of pain in the left palatal region with also mobility in the same quadrant also reported by the patient. For which she consulted to some local doctor where she was advised to go for extraction of the offending teeth. But there was no relief of symptoms and they got worsened. Her medical history revealed that she was diabetic and on medication for 4 years. Her dental history revealed that she had undergone extraction of teeth in upper left back teeth region 3 months back. Her general examination shows moderately built, absence of icterus, absence of clubbing, absence of pallor, normal gait. Her all vital signs were within normal limits. On extra oral examination, facial asymmetry was evident, with presence of diffuse swelling in the left middle third region of face extending anteriorly from ala of nose to the tragus of ear posteriorly and superiorly from infraorbital rim to the 4 cm below the lower border of mandible inferiorly on palpation swelling was soft with raised overlying surface temperature and tender . (Fig 14) Parotid, Submandibular Gland not enlarged and not tender to palpation. Lymph Nodes not palpable and not tender to palpation. On intra oral examination mouth opening was up to 30mm. A diffuse swelling was present in the left palatal region extending anteriorly from palatal rugae of 21 the region to junction of hard and soft palate posteriorly. Medially from mid-palatal raphe to the cervical margins of 21,22,23,24,25,26,27 laterally which was soft and tender on palpation. (Fig 15) Mobility in relation to 21,23,26,27.with evidence of missing 22,24,25. Yellowish white necrosed area was present in relation to the extraction sockets of 22,24,25 with exposed bone in relation to 22 23 24 25 palatally and labially. (Fig 16) So, based on the history and clinical findings, a diagnosis of mucormycosis of the maxilla in relation to the left side was established. The patient was advised to undergo for CBCT Scan, which revealed extensive osteolytic bony lesion involving left maxilla extending up-to tuberosity region with signs of radiopacification in the left maxillary sinus, internal structure of bone shows complete loss of normal bony architecture. (Fig 17)

Fig 14: swelling irt left side of face

Fig: 15 swelling irt hard palate

Fig: 16 Yellowish white necrosed area.

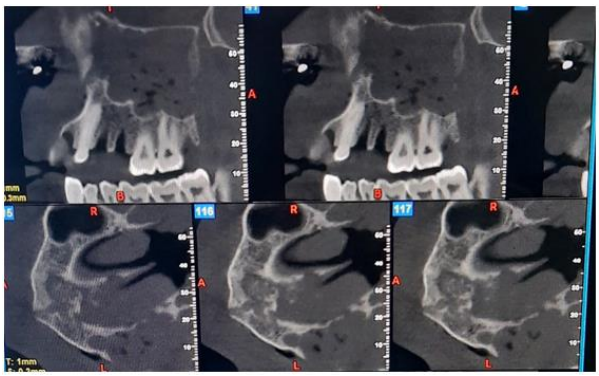

Fig 17: Osteolytic bone lesion involving left maxilla

DISCUSSION

As the COVID-19 disease has imparted different patterns of manifestation in body during its whole course and without much acquaintance of the disease and its variants the impact is so volatile that for its management multifactorial causes were perceived with highly distressing outcomes one of which was much presented in the second wave and majorly affected the individuals who were immunocompromised with diseases like diabetes mellitus was mucormycosis. In this presented case report of 6 patients, we encountered most of the patients were having a history of diabetes mellitus and presented to us with mobile teeth and purulent discharge as their oral manifestation. Although Mucormycosis is a sporadic and invasive fungal infection which is mainly caused by saprophytic aerobic fungi types Rhizopus, Rhizomucor, and Cunningham Ella genera of the or order Mucorales, now called Rhidopodaceae. These fungi mainly gets colonize on the mucosal surfaces of oral and nasal cavity, from where they derive their nutrition for growth with presenting different Oro maxillofacial manifestation.[8] Baker[9] an American pathologist, created the term mucormycosis in 1957 for a severe Rhizopus infection. Eisenberg *et al.* described six clinical variants:

- Rhinocerebral (Rhinomaxillary)
- Pulmonary
- Cutaneous
- Gastrointestinal
- Central nervous system
- Disseminated type

Tissue necrosis is the hallmark of Mucormycosis, resulting from angioinvasion and subsequent vascular thrombosis. [10,11] Oral manifestations of Mucormycosis usually include bone exposure and necrosis, which demands histopathological examination to confirm the diagnosis because of its nonspecific features and possible similarities to bacterial osteomyelitis, trauma, and iatrogenic infection.

Oral mucormycosis usually results in the individuals with systemically compromised organs. In the present article of 6 case reports maximum number of patients were having devastating condition of uncontrolled diabetes associated with acute inflammatory immune response due to COVID-19. There are numerous predisposing factors for the occurrence of the condition and reported by various authors.

But the Recent reports have come up with the upgraded knowledge of correlations of Mucormycosis in covid patients. It has been found that in normal hosts, Rhizopus is a saprophytic organism which is abolished by mononuclear and polymorphonuclear phagocytes by the generation of oxidative metabolites and cationic peptides. [12]

This oxidative capacity is lost in patients with diabetic ketoacidosis patients. Moreover, reduced chemotaxis and phagocytic efficiency in these patients permit the growth of innocuous organisms. The hyperglycaemic state also promotes fungal growth and are thus are highly susceptible to Mucormycosis.[13] The basic pathogenesis behind this disease that leads to its devastating picture is that the fungus commences to grow, it enters the human host through attaching to the endothelial cell lining of blood vessels leading to haematogenous spread, thrombosis, bleeding or infarction. This leads to formation of Mucor thrombus through fibrin reaction, thus causing vascular occlusion, ischemia and infarction, which leads to the formation of a black necrotic eschars on the nasal or palatine mucosa, presenting the characteristic feature of Mucormycosis. An area of ulceration or an extraction socket in the mouth in an immunocompromised patient can also be a port of entry for Mucormycosis involving maxillofacial region.[14,15] In our cases, few patients showed progression of ulceration, mobility and pain after history of extraction in the offending region.

So, to evaluate these cases and to arrive at a proper Diagnosis of Mucormycosis, it requires systematic clinical history and assessment of primary medical ailment. Additionally, presence nasal or palatal necrosis raises strong suspicion of this condition. Hence today with the advancements in the field of radiology, Radiographic appraisal will provide better assessment of bony erosions, degree of sinus involvement, any incidence of orbital or intracranial immersion. In our cases we assessed the patients with the recent 3d tool, CBCT which showed bony destruction, in perforations, sequestrum, sinus opacifications, nasal cavity involvement. Although we can see these features in various other diseases also, but when we are able to appreciate the changes like bony erosion, maxillary sinus opacification in a suspected cases of covid positive with weak immune system, fungal sinusitis becomes one of the differential diagnosis. Therefore, CBCT can provide detailed decription of invasive destruction by fungal growth. Because of the availability of tool in our institute we were able to do so in indicated cases. And final Confirmatory diagnosis is based on demonstration of the organism in the tissue of a biopsy specimen which reveals presence of broad, nonseptate hyphae with branching at 90 degrees.[15] So early diagnosis and prompt treatment can prevent mortality. Management of Mucormycosis, includes thorough debridement, and supportive anti-fungal medication. Medical management comprise of broad spectrum anti-fungal agents and systemic anti-microbials for prevention against superadded bacterial infections. [16,17]

CONCLUSION

We presented case reports of patients with mucormycosis where we emphasizes the various characteristic clinical appearances and features whose systemic health was compromised and how, dental professionals were able to rule out this disease of Mucormycosis by taking careful history and use of advanced diagnostic tool CBCT in identifying the extension in the maxillofacial region for the early intervention and better prognosis of the patient. Hence CBCT provided comprehensive description of changes involving the maxilla, mandible, nasal cavity and alveolus region. Both clinical and radiographic features facilitated us to arrive at early diagnosis where multidisciplinary management approach from the radiology, pharmacology, pathology and surgery were significant in management of Mucormycosis concerning the orodental region.

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