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Review Article

Post Covid Dental Complications:Mucormycosis or Black Fungus

Dr Gaurav Gupta[1]* and Dr. Neelja Gupta[2]

[1]Sr. Consultant at Wisdom Dental Clinics

[2]Consultant at Wisdom Dental Clinics

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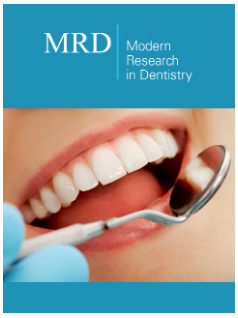

Abstract

A complex interplay of corona virus infection, immunosuppressive treatments and uncontrolled blood sugar levels have evolved in current surge of Mucormycosis / fungal infections in recovered covid patients. We describe a rare case of probable mucormycosis in a 32-year-old man with diabetes, and COVID-19 antibodies with no history of hospitalisation or fever and negative RT-PCR test for covid 2 months back. We also performed a systematic review of our cases encountered in last 1 year and identified five peculiar cases of COVID-19 associated oromaxillofacial complications/mucormycosis. Of the six cases included in our review, diabetes mellitus and use of immunocompromised drugs were the most common risk factors. This article provides potential information about post COVID-19 dental complications, and highlights on the suggested treatment policies for oral health practitioners.

Keywords: Covid-19; Dental complications; Mucormycosis; Diabetes

***Corresponding author:** Dr Gaurav Gupta, Sr. Consultant at Wisdom Dental, Address - Sector - 10, Plot number - 15, Vidhyadhar nagar Jaipur, Rajasthan, India

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Introduction

In this devastating 2nd wave of COVID-19, a new challenge in the form of Mucormycosis colloquially called as' Black Fungus' maiming people with COVID-19. A lot of rumours have also been doing rounds around this fungal infection. Here, we aim to bring scientific facts ONLY to help you understand pathophysiology in post covid dental complications to some extent.

COVID-19 is comparatively a new disease, with foreground being known on an impulsive basis about the natural history of the disease, particularly in terms of post-recovery events. After acute COVID-19 illness, recovered patients may continue to report broad categories of signs and symptoms including fatigue, cough, sore throat, difficulty in breathing, loss of taste etc. because of multiple organ involvement. For follow up care and well-being of all post-COVID recovering patients, comprehensive approaches are the need of time [1].

There are numerous plausible mechanisms for the development of MRONJ like impaired bone repair, osteoclast activity suppression, tissue inflammation and infections, and impaired angiogenesis or vascular repair. This case series describes the role of interplay between diabetes mellitus, covid-19 and pharmacotherapy which may have increased the risk of osteonecrosis and manifested jaw necrosis in various forms in patients suffered from COVID-19 and diabetes received aggressive immunosuppressive drugs for its management.

Here we are presenting 6 cases of dental complications suspected to be linked with Covid 19. A case of osteomyelitis in covid 19 recovered patient suspected to be Mucormycosis, diagnosis of thromboembolic event with Pilot study in covid -19 /suspected cases in our 3 cases, Covid-19 affected individual suspected with MRONJ in one case followed by 6th case, presenting with osteomyelitis of maxilla with fungal infection i.e., mucormycosis along with extensive tissue necrosis in an uncontrolled diabetic individual, thus analysing the consequences of covid-19 in musculoskeletal system.

Discussion

Mucormycosis is an infection caused by fungi belonging to the order Mucorales [2]. *Rhizopus oryzae* is the most common organism isolated from patients with mucormycosis and is responsible for about 70% of all cases of mucormycosis [3-5]. The major risk factors for mucormycosis include uncontrolled diabetes mellitus in ketoacidosis, other forms of metabolic acidosis, treatment with corticosteroids, neutropenia, malignant hematologic disorders, and deferoxamine therapy in patients receiving hemodialysis [4,6,7]. Because of the increasing prevalence of diabetes mellitus, increased hospitalisation and use of immunosuppressive drugs due to high number of covid cases the number of patients at risk for this deadly infection is dramatically increasing [8]. Unfortunately, despite mutilated surgical debridement and adjunct antifungal therapy, the overall mortality rate for mucormycosis remains >50%, and it approaches 100% among patients with disseminated disease or those with persistent neutropenia [4,9]. Clearly new strategies to prevent and treat mucormycosis are urgently needed, and such strategies can be facilitated by clear understanding of the pathogenesis of the disease. Disease transmitted mainly via inhalation of spores from environmental sources [10].

Tissue necrosis is the hallmark of mucormycosis, occurs due to angioinvasion & subsequent vascular thrombosis. [10,11] Oromaxillofacial 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, iatrogenic infections and trauma [11].

In our clinic we reported a case of 35 year old male diabetic patient as a regular dental infection which later on was co-related with covid -19 complication based upon systemic and radiographic findings presenting extra pulmonary manifestations of covid -19 depicting necrosis of maxilla due to some underlining systemic condition which may be a covid-19 post infection complication.

As many post covid complications are reported with involvement of arteries leading to thromboembolic events so here we planned for a pilot study based on 3 similar cases in our clinic to detect presence of thrombus formation in maxillary artery. We decided to go with CT study of face angiography and D-dimer test values to look for presence of any thromboembolic movement.

In 60yr old male patient and 52yr old male patient cases before it was thought to be a case of thrombolytic event but looking upon laboratotay and radiological findings with no such co relating pathologic results were found, later it was considered to be a cases of avascular necrosis of maxilla. But on the other hand our other case a 38yr old male diabetic patient who was previously infected with covid-19 and presented with atypical facial pain along with multiple discharging sinuses in maxillary arch so to clear up the dilemma we went further to go for d-dimer values and angiography of face which gave clear picture that it is not the case of thromboembolic event because there were no such laboratory or radiological findings proving it to be a thromboembolic event after covid-19 infection.

This is the first pilot study till now to our knowledge to go for CT study of face angiography to confirm any thromboembolic event involving maxillary artery and its branches. As limited data is present on thromboembolic events associated with oral conditions, still dental surgeons should consider thromboembolic events and be aware of its signs and symptoms while treating patients. This is unfortunate that no such cases are reported in medical literature till yet. Several studies reported for thromboembolic events especially in ICU patients who were previously affected by covid-19 severely [12,13].

Few of the studies reported,showed cases of mild covid-19 affected individuals to complicate with thromboembolic events during the active phase of the disease [14,15].

In one case ,to diagnose a patient of MRONJ two criteria needs to be fulfilled i.e history of ongoing medication with antiangiogenic or antiresorptive such as Bisphosphonates and denosumab other is non healing bone that can be easily probed through fistula in maxillofacial region with no history of radiation of head and neck region or underlying malignancy [16-20] our case is found to be previously infected with covid-19,for supportive care must have undergone medications. Biopsy report also did not reveal any kind of malignancy and patient was presenting with draining pus from multiple sinuses.

The symptoms clinically manifested as toothache from non-odontogenic cause, radiating pain, unexplained pain along with altered sensation. Radiographically, it may be an unexplained bone loss attributed to periodontal inflammation thus making changes in trabecular bone pattern [18] Our patient in present case also presented with pain in affected area.

For providing detailed examination, digital imaging such as CT or CBCT provide much higher quality of tomographic images in order to reveal MRONJ lesions [21,22]. In our case to make the diagnosis we preferred for digital imaging CECT which showed mucosal hypertrophy with multiple lymph nodes. Treatment management of MRONJ is very challenging and also controversial [22]. [23,24] though treatment protocol is case specific and based on staging and symptoms in ONJ [18].

In subject case, we discussed a dental complication after covid-19 infection, mucormycosis in an uncontrolled diabetic patient whole maxilla is being affected but covid antibody reports was positive but patient had no history of fever, cough or hospitalisation. In this case, Biopsy report was suggestive of mucormycosis and we planned for the treatment through surgical approach by doing extraction of teeth in affected area along with debridement and curettage of tissue with as much conservation possible.

In our pursuit to further acknowledge the etiopathogenesis of such disease which is linked with post covid-19 complication, after

going through our previous cases we eliminated the probability of osteomyelitis, thromboembolic event and MRONJ/CRONJ through our various findings such as D-dimer ,CT angiography of face and other relative haematological, histopathological and radiological tests. As suggestive by our biopsy and haematological findings which is suggestive of mucormycosis in this case we stated that comorbid condition can be one of the accountable element familiar to this fungal condition as uncontrolled diabetes may cause immune suppression thus inviting such fungal invasions.

Conclusion

In summary, dental surgeons caring for recovered COVID-19 patients must be aware of serious infections that can complicate the course of COVID-19. A high degree of clinical suspicion is required to diagnose mucormycosis. Early diagnosis and timely management are necessary to improve outcomes in mucormycosis and post covid oral maxillofacial complications. The clinical presentation of Mucormycosis may vary depending on the pathogen. Oral Mucormycosis must be suspected when the above-mentioned clinical presentations are found in immunocompromised patients/ uncontrolled diabetic or post covid cases or patients with immunosuppressive drugs.

References

1. BrandaoTB, Gueiros LA, Melo TS, Ribeiro AC, Nesrallah ACF, et al. (2020) Oral lesions in patients with SARS-CoV-2 infection: could the oral cavity be a target organ? Oral Surg Oral Med Oral Pathol Oral Radiol 131(2): e45-e51.
2. Hibbett DS, Binder M, Bischoff JF, Blackwell M, Cannon PF, et al. (2007) A higher-level phylogenetic classification of the Fungi. Mycol Res 111(Pt 5): 509-547.
3. Ribes JA, Vanover Sams CL, Baker DJ (2000) Zygomycetes in human disease. Clin Microbiol Rev 13(2): 236-301.
4. Spellberg B, Edwards J, Jr, Ibrahim A (2005) Novel perspectives on mucormycosis: pathophysiology, presentation, and management. Clin Microbiol Rev 18(3): 556-569.
5. Roden MM, Zaoutis TE, Buchanan WL, et al. (2005) Epidemiology and outcome of zygomycosis: a review of 929 reported cases. Clin Infect Dis 41(5): 634-653.
6. Sugar AM (2005) Agents of mucormycosis and related species. In: Mandell GL, Bennett JE, Dolin R, (Eds.), Principles and practice of infectious diseases. (6th edn), PA: Elsevier, Philadelphia, USA, p. 2979.
7. Ibrahim AS, Edwards JE, Filler SG (2003) Zygomycosis. In: Dismukes WE, Pappas PG, Sobel JD, (Eds.), Clinical mycology. NY: Oxford University Press, New York, USA, pp: 241-51.
8. Marr KA, Carter RA, Crippa F, Wald A, Corey L (2002) Epidemiology and outcome of mould infections in hematopoietic stem cell transplant recipients. Clin Infect Dis 34(7): 909-917.
9. Gleissner B, Schilling A, Anagnostopolous I, Siehl I, Thiel E (2004) Improved outcome of zygomycosis in patients with hematological diseases? Leuk Lymphoma 45(7): 1351-1360.
10. Skiada A, Lass Floerl C, Klimko N, Ibrahim A, Roilides E, et al. (2018) Challenges in the diagnosis and treatment of mucor-mycosis. Med Mycol 56(Suppl_1): S93-S101.
11. Rajashri R, Muthusekhar MR, Kumar SP (2020) Mucormycosis following tooth extraction in a diabetic patient: a case report. Cureus 12(8): e9757.
12. Poissy J, Goutay J, Caplan M, Parmentier E, Duburcq T, et al. (2020) Pulmonary embolism in patients with COVID-19: awareness of an increased prevalence. Circulation 142(2): 184-186.
13. Nahum J, Morichau Beauchant T, Daviaud F, Echegut P, Fichet J, et al. (2020) Venous thrombosis among critically ill patients with coronavirus disease 2019 (COVID-19). JAMA Netw Open 3(5): e2010478.
14. Jasinowodolinski D, Filisbino MM, Baldi BG (2020) COVID-19 pneumonia: a risk factor for pulmonary thromboembolism? J Bras Pneumol 46(4): e20200168.
15. Nauka PC, Oran E, Chekuri S (2020) Deep venous thrombosis in a non-critically ill patient with novel COVID-19 infection. Thromb Res 192: 27-28.
16. Peer A, Khamaisi M (2015) Diabetes as a risk factor for medication-related osteonecrosis of the jaw. J Dent Res 94(2): 252-260.
17. Di Fede O, Panzarella V, Mauceri R, Fusco V, Bedogni Aet al. (2018) The dental management of patients at risk of medication-related osteonecrosis of the jaw: new paradigm of primary prevention. Biomed Res Int 2018: 2684924.
18. Ruggiero SL, Dodson TB, Fantasia J, Goodday R, Aghaloo T, et al. (2014) American Association of Oral and Maxillofacial Surgeons position paper on medication-related osteonecrosis of the jaw-2014 update. J Oral Maxillofac Surg 72: 1938-1956.
19. Ruggiero SL (2009) Bisphosphonate-related osteonecrosis of the jaw (BRONJ): initial discovery and subsequent development. J Oral Maxillofac Surg 67(5 Suppl): 13-18.
20. McGowan K, McGowan T, Ivanovski S (2018) Risk factors for medication-related osteonecrosis of the jaws: a systematic review. Oral Dis 24(4): 527-536.
21. Stockmann P, Hinkmann FM, Lell MM, Fenner M, Vairaktaris E, et al. (2010) Panoramic Radiograph, computed tomography or magnetic resonance imaging. Which imaging technique should be preferred in bisphosphonate-associated osteonecrosis of the jaw? A prospective clinical study. Clin Oral Investig 14(3): 311-317.
22. Shimamoto H, Grogan TR, Tsujimoto T, Kakimoto N, Murakami S, et al. (2018) Does CBCT alter the diagnostic thinking efficacy, management and prognosis of patients with suspected Stage 0 medication-related osteonecrosis of the jaws? Dentomaxillofac Radiol 47(3): 20170290.
23. Lombard T, Neirinckx V, Rogister B, Gilon Y, Wislet S (2016) Medication-related osteonecrosis of the jaw: new insights into molecular mechanisms and cellular therapeutic approaches. Stem Cells Int 2016: 8768162.
24. Kuroshima S, Sasaki M, Murata H, Sawase T (2019) Medication-related osteonecrosis of the jaw-like lesions in rodents: a comprehensive systematic review and meta-analysis. Gerodontology 36(4): 313-324.