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Prosthetic rehabilitation after surgical removal of infrastructure subtotal maxillectomy in patient of mucormycosis: A Case Report

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Abstract

Mucormycosis (also called zygomycosis) is a rare infection caused by organisms that belong to a group of fungi called Mucoromycotina. After first phase of Covid-19, the second wave affects a lot to the Indians with mysterious fungal infection known as Mucormycosis. Generally, black fungus affects the body surface and internal organs such as the sinus, brain, lungs, eyes, bones, nerves, body tissues and becomes fatal if left untreated. This case report presents the oral rehabilitative treatment that was done for a 60-year-old male patient who survived covid 19 followed by mucormycosis that cause him loss of his entire maxilla.

Keywords: COVID-19, SARS-CoV-2, CNS.

Introduction

Indian population suffered a major blow with the worldwide pandemic Covid-19 caused by "Severe acute respiratory syndrome Corona virus-2 (SARS-CoV-2)".[1] First case of COVID-19 was reported in Kerala, India on 30th January 2020, afterwards highest cases i.e. 1 lakhs per day were reported for the year by May 2020.[2] After mid-June recovery of patient's increases successively with decrease in infection rate, further active case dropped to less than 15000 in January 2021. Afterwards second wave was begun in March 2021 with a larger blow of active cases then first wave with deficiency of hospital beds, vaccines, medicines, oxygen cylinders and oxygen. The daily reported cases were reached to around 4.5 lakhs in starting of May 2021.[3] The effect of Covid-19 ranges from mild to moderate to life threatening with some associated disorders such as diabetes mellitus, cardiac diseases and immune compromised conditions.[4, 5] Research articles also reported about the development of severe opportunistic infectious diseases like pneumonia, candidiasis, pulmonary aspergillosis etc in Covid-19 affected patients.[6, 7] There are also reports of development of mysterious fungal infection known as Mucormycosis or Black fungus in Covid-19 patients.[8] Covid-19 patients in India also suffer with this epidemic disease (mucormycosis) with a reported case of 8848 till May 22, 2021.[9]

Common predisposing factors include diabetes mellitus and immunosuppression.[10,11,12] The most common route of infection is by inhalation usually through the nose or from direct wound contamination with dissemination to other viscera as a common complication.[12,13] The clinical presentation of mucormycosis depends on the patient's underlying medical condition. There are at least six clinical entities of mucormycosis: rhinocerebral, pulmonary, cutaneous, gastrointestinal, central nervous system (CNS), disseminated and miscellaneous like bone or kidney. The term rhinocerebral mucormycosis (RCM) should only be used if the facial, palatal, orbital, paranasal sinus or cerebral regions are involved and the patients generally present with signs and symptoms that may be primarily located in these regions. [13]

This clinical report presents the rehabilitation of extensive hard and soft tissue defects caused by rhino-cerebral mucormycosis post covid. The patient underwent subtotal maxillectomy and was rehabilitated with an implant-supported maxillofacial prosthesis with zygomatic and pterygoid implants by following an immediate loading protocol.

Case report

A 60-year-old male patient reported to dental OPD with a chief complaint of pain and mobile teeth in upper front region in the last 3 months with c/o discharge from upper front tooth region along with foul taste and smell.

Figure 1: Arrows showing intraoral sinuses.

The patient was alright 4 months back and do not have any above mentioned complain ago when he was hospitalised for treatment of covid 19 (delta wave – second wave of covid in India). Having no past medical h/o any disease or metabolic syndrome he was hospitalised for 28 days and was treated with steroids

and oxygen administration. After discharge from hospital, he was generally alright but develop the symptoms gradually. A biopsy was performed and it suggested 'Angio invasive Mucormycosis'. C T Scan was suggested and performed. Patient was referred to AIIMS Bhopal for further investigations and treatment.

5 months later patient reported back to clinic and presented with subtotal resection of maxilla and teeth present in upper jaw were 17,18,25,26,27,28.

The maxilla is a fundamental structure in the face that plays a

critical role in esthetics, speech, swallowing, and mastication

[1]. It separates the oral, antral, and orbital cavities and pro-vides support to many vital structures such as the lower eyelids, cheeks, lips, and nose [1]. Any maxillary defect regardless of its size affects speech, swallowing, and mastication; may result in cosmetic disfigurement; and compromised the patient's quality of life [1, 2]. Reconstruction of maxillary defects is one of the most challenging works the maxillofacial surgeons and prosthodontists are facing [1, 2].

The maxilla is a fundamental structure in the face that plays acritical role in aesthetics', speech, swallowing, and mastication [14]. It separates the oral, antral, and orbital cavities and provides support to many vital structures such as the lower eyelids, cheeks, lips, and nose [14]. Any maxillary defect regardless of its size affects speech, swallowing, and mastication; may result in cosmetic disfigurement; and compromised the patient's quality of life [14, 15]. Reconstruction of maxillary defects is one of the most challenging works the maxillofacial surgeons and prosthodontists are facing [14,15].

Figure 2 (A): Intraoral picture showing oroantral communication.

Figure 2 (B): Orthopentogram depicting subtotal maxillectomy.

Figure 2 (C): Front profile showing loss of face volume and lip support, sinking of nose.

Figure 2 (D): Side profile showing loss of lip support and prognathic mandible.

For such cases different types of treatment modality are available, one is surgical reconstruction using soft tissue flaps (local or regional flap), second is implant supported prosthesis or obturator for oronasal communication along with teeth, or either combination of all of above or either of them. In this case the aim of treatment was to provide following:

1. Function.
2. Aesthetic value.
3. Complete sealing of oroantral communication.
4. Restriction of regurgitation of food and liquids into nasal cavity
5. Speech.
6. Mastication.
7. Swallowing.
8. And improving patients' quality of life.

an obturator are shorter treatment time, reduced cost, and easy visualization of the maxillectomy cavity [2, 3]. However, obturator therapy has man although an obturator shortens treatment time, reduced cost, and easy visualization of the maxillectomy cavity [15]. However, obturator therapy has many disadvantages, including lack of retention in cases of large defects, reduction in supportive dentition, discomfort associated with prosthesis wear, the potential of hyper nasal speech, and regurgitation of foods and liquids into the nasal cavity in cases of an inadequate seal [15,16]. In addition, other drawbacks include the inconvenience of pros-thesis removal and cleaning to maintain defect hygiene and the periodic need for prosthesis adjustments following healing and bone remodelling [15].

A very large defect and/or when primary closure of soft tissue defects is achieved immediately after resection, the gingivobuccal sulcus is reduced, and the undercuts required for prosthesis retention are deficient or even eliminated [16]

So, with remaining structures an implant supported fix prosthesis along with palatal obturator was planned. A cb ct scan was performed and it suggests two zygomatic implants on right side, extraction of 18 and pterygoid implant at site of 18., one zygomatic implant on left side. Additional two intraosseous implants were also planned so as to provide support & undercut to retain palatal obturator and also to stop the further bone loss. A surgical guide was constructed using 3 d printing technique by 3M 3-d printer and it was inserted in mouth for guidance. And surgery was done as such.

For pterygoid implant 3.5 *16 mm implant was used.

For zygoma BCS implants of size 3.5*40 mm and 3*33 mm implants were inserted.

Intracortical implant of size 4.2*13mm (right side) and 4.2*11.5 mm (left side) were inserted.

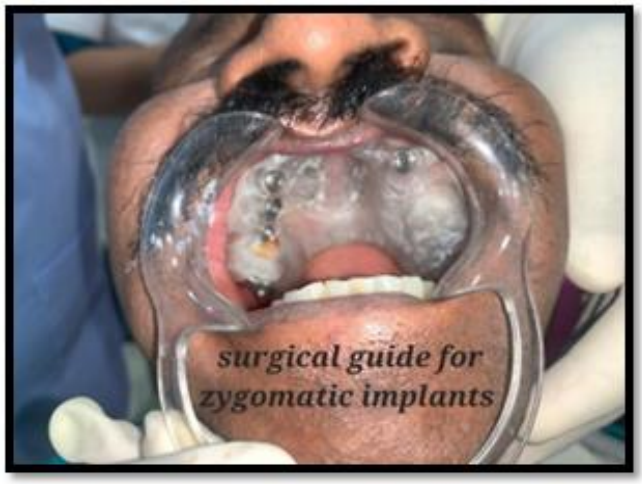

Figure 3: Surgical guide

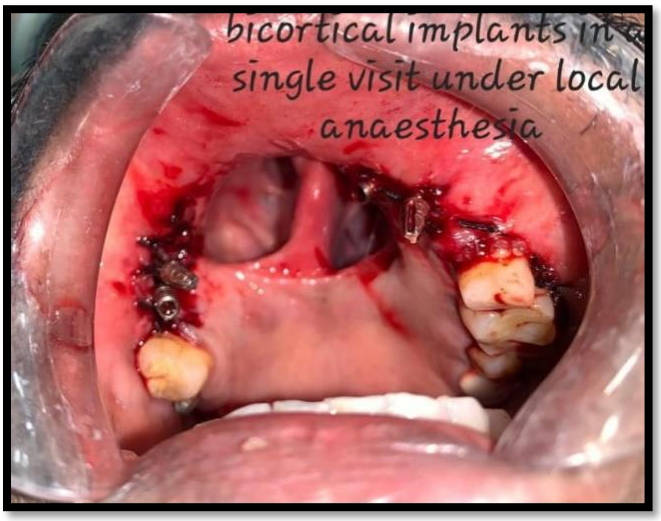

Figure 4: Intraoral view after surgery

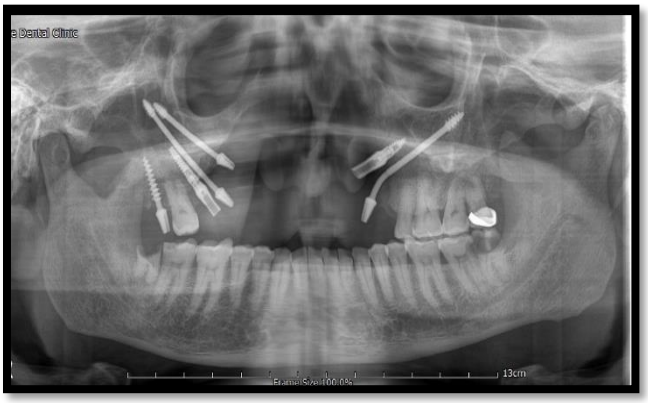

Figure 5: Orthopentogram post-surgery

Figure 6: Immediate post loading with acrylic prosthesis.

After initial healing 1o days post-op sutures were removed and immediate acrylic prosthesis was further improvised for better fit and function.

After one-and-a-half-month crown of 17,25,26,27 and 28 were prepared to receive fixed partial prosthesis i.e a porcelain fused to metal bridge along with abutment of all the implants and fixed prosthesis was cemented.

Figure 6: Fixed prothesis cemented on abutments and tooth preparations.

Figure 7: Palatal obturator intra orally.

Figure 8: Pre and postop intra oral.

Figure 9: Pre and post op comparison of facial form and profile.

Significant difference between lip support and profile.

Discussion

maxillary resection rehabilitation entails the restoration of the patient's previous appearance and function [15,17]. The function of obturator prostheses is directly influenced by the location and size of the maxillectomy defect and the quality and quantity of the remaining teeth, soft, and bone tissues [15,18]. Surgical reconstruction is an option that is affected by size of defect patients general health, past medical history and patient preference. In such situations, prosthetic rehabilitation is considered the treatment of choice [19] the size of defect and soft tissue approximation affects the retention of obturator. Bidra et al. [20] reported that sometimes both the bulky and flaccid nature of the remaining tissue preclude conventional prosthesis support; therefore, other means of support should be used, such as implant therapy. Cortico basal implants specially BCs® are one-piece implants characterized by a thin penetrating tip ensuring quick soft tissue healing, smooth polished surface improving the peri-implant soft tissue health [21,22], isoelastic prosperity offering implant bending without compromising its survival [23,24], and implants splinting with a supporting metal framework for better force distribution and to counter-act the implant length cantilever [17, 19]; the horizontal plates of the implants are deeply anchored inside the basal bone (Osseo fixated) with high stability reducing the possibility of micromovement [21,23]. Such features, in addition to the hygienic extension of the prosthesis, denture base justified the use of these implant-supported prosthesis in this present case with a susceptible high success rate.

Conclusion

This case shows that combination of different modalities can positively bring out an end result that can restore normal function, aesthetics and speech in patients with subtotal maxillectomy that in turn the restores the quality of life of person to normalcy.

Consent

Written informed consent was obtained from the patient for publication of this case report and supplementary images.

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