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Extraction – Diabetes Mellitus - Mucormycosis – A Travel Of Journey How To Prevent Legal Issues –A Review of Literature In Current Scenario.

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Abstract

Extraction is a oral surgical procedure performed for the therapeutic removal of teeth from the oral cavity. Diabetes mellitus is a group of metabolic diseases characterized by chronic hyperglycaemia due to defect in insulin secretion or action or both. Mucormycosisis nothing but an opportunistic fungal infection which mainly infects the immunocompromised patients. Consent is the legal issue that protects every patient's right not to be touched or in any way treated without the patient's authorization.Aim of this article is to review and overcome the increased chances of fungal infection in uncontrolled diabetes patients after dental extractions and how to manage such scenario and to avoid further legal issues. Since mucormycosis may occur secondary to tooth extraction, dentist must be familiar with the signs and symptoms of mucormycosis and about its serious complications to overcome any unfavorable outcome. Valid consent plays an important role in our dental practice and this is the only evidence that protects the dental surgeons from illegal issues.

Keywords

Extraction, Diabetes mellitus, Mucormycosis, Informed consent

Introduction

Minor oral surgical procedure performed for the therapeutic removal of teeth from the oral cavity, using proven techniques and specialized instruments causing minimal trauma to the attaching apparatus, least injury to the surrounding tissues in a pattern conducive to uneventful healing inorder to achieve best possible prosthetic rehabilitation. Diabetes Mellitus is a group of

metabolic diseases characterized by chronic hyperglycaemia due to defect in Insulin secretion or action or both. It produces symptoms of polyurea, polyphagia, polydipsia. If left untreated, cause Acute complications such as diabetic ketoacidosis, nonketotic hyperosmolar coma etc., and Chronic complications such as heart disease, stroke, kidney failure, foot ulcers etc. (1)

Criteria for the diagnosis of diabetes according to American Diabetic Association 2010 was

Measurement	**Diagnostic Values for Diabetes**
Glycosylated Hemoglobin (HbA1c)	≥6.5%
Fasting plasma glucose level	≥126mg / dl (7.0 mmol/l)
Post prandial glucose level (2 hours after calorie intake)	≥200 mg/dl (11.1 mmol/l)
Random plasma glucose	≥200 mg/dl (11.1 mmol/l)

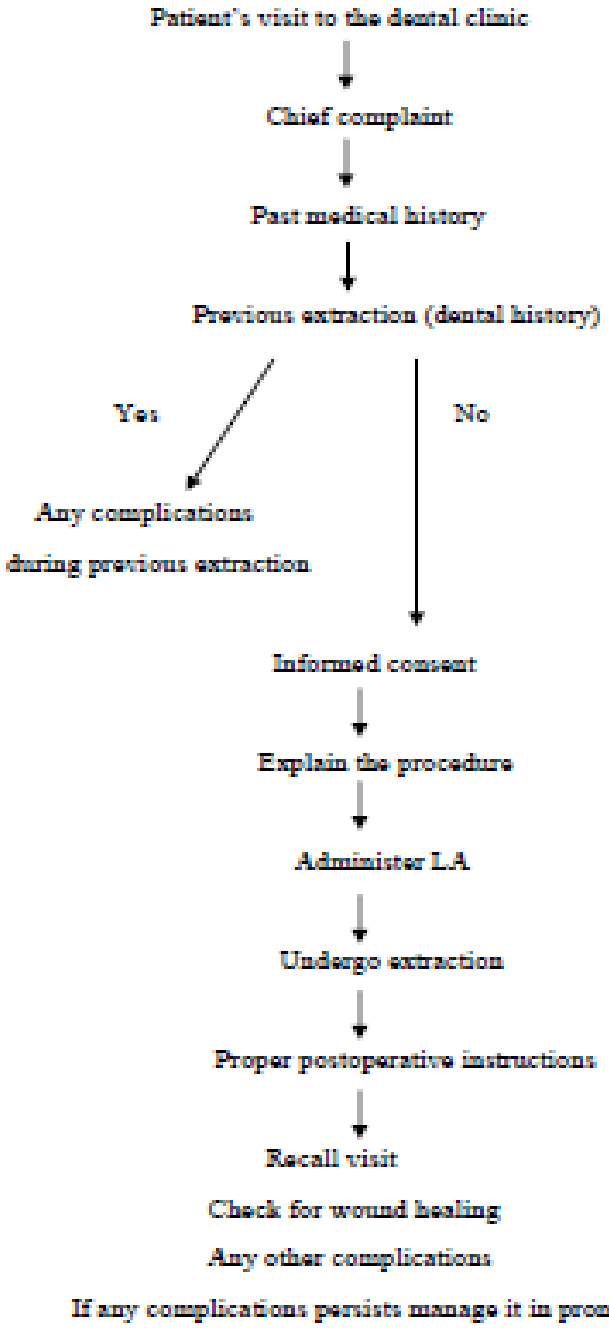
Mucormycosis is an opportunistic fulminant fungal infection, which mainly infects the immunocompromised patients. Organism that causes mucormycosisis a saprophytic fungus, rhyzopus/ mucor (2). The most common site of entry of organism is through the nose and paranasal air sinuses due to inhalation of fungal spores (3). Steps to be followed to prevent illegal issues as we analysed This fungus enters the artery and form thrombi and cause necrosis of hard and soft tissues (4).

This study was to review and overcome the increased chances of fungal infection in uncontrolled diabetes patients after dental extractions and how to manage such scenario and to avoid further legal issues

Interrelation of Diabetes Mellitus And Mucormycosis

Predisposing factors for fungal infection are uncontrolled diabetes, lymphoma,leukemia, renal failure, organ transplant transplant,long term immunosuppressive therapy, AIDS, protein energy malnutrition, burns, cirrhosis. Uncontrolled diabetes mellitus alters the normal immunologic response of patients to infections. Those patients have decreased granulocyte phagocytic ability. And there will be altered PMN response. Ability of serum of immunocompromised patients to inhibit rhizopusinvitro is reduced ,which makes them suitable hosts to opportunistic fungal infection(5). Disseminated involvement of mucormycosis is observed in diabetics with ketoacidosis which favours rapid proliferation of fungus and it's invasion into orbit and cerebrum (6). Mucormycosisis aggressive and potentially fatal in diabetic patients due to impaired host defence mechanism and increased presence of iron (7).

Steps to be followed to prevent illegal issues as we analyzed



Need For Proper Consent Form

Consent means voluntary agreement, compliance and permission. This concept comes from the ethical issue of respect for autonomy, individual integrity, self determination (8). Section 13 of the Indian Contract Act lays that two or more persons are said to consent when they agree upon the same thing in the same sense (meeting of the minds)(9).

Consent is the legal issue that protects every patient's right not to be touched or in any way treated without the patient's authorization. Surgeon who performs operation with outpatient's consent commits assault for which the surgeon is liable in damages (10). It is important for the dental surgeon to be well informed of fundamental process of consent which exist under the law so that dental care can be provided within the legal framework (11). In

current scenario,medicaland dental professions are facing high rate of malpractice suits.

Twin purposes of consent: (12)

Clinical purpose

Legal purpose

Consent form should consists of

Nature of the diagnosis

Nature of the treatment plan

Risks associated with the treatment

Risks when if no treatment undertaken

Alternative therapies. (7,13)

Pitfalls of consent: (14)

Failure to maintain an adequate record of consent process and as a result, incomplete details of what were discussed with the patient.

Poor communication skills.

Failure to involve the patient

Failure to inform about alternative therapies

Informed refusal: (15)

It is the patient's right to refuse all or part of the proposed treatment, other alternate therapies, and likely consequences of declining treatment have been explained in the patient's own language.

Two areas of the law are relevant (16)

Trespass to person and negligence and any procedures that is invasive or irreversible require informed consent.

Dental considerations in diabetic patients: (17)

Patients should be asked about recent blood glucose levels, antidiabetic medications, dosages, frequency of administration. Dentists should get physician's opinion if necessary.

Following is the review of previously reported cases of Mucormycosis after tooth extraction in diabetes patients:

Author & Year	Country	Age/ Sex	Under Lying Disease	History Of Extraction	Clinical Presentation	Management	Outcome
Kim J 2001	USA	57/M	DM	Maxillary right firstmolar& left second &third molars	Cellulitis, Periorbital edema(left eye), Chemosis,Ptosis, Proptosis,ecchymosis, Ophthalmoplegia,loss of vision (left eye)	Surgical debridement, bilateral endoscopic ethmoidectomy, bilateral maxillary and left frontal sinusotomy,IVAB	Fa
Bakathir A 2006	Oman	49/M	DM	Mandibular right second molar	Pain and necrosis at the extraction site and lower lip paresthesia	Surgical debridement,IVAB	Sh
AjitAnilock 2007	India	58/M	DM	Maxillary right molars	Painfull non healing extraction site,nasal congestion, headache	Excision of necrotic bone, IVAB	Sh
Papado Georgaki 2010	Greece	22/F	DM	Maxillary right third molar	Facial edema,pain , double vision	Subtotal maxillectomy followed by obturator,IVAB and posaconazole	Sh
Kumar JA 2013	India	65/M	DM	Multiple maxillary teeth	Pain and difficulty on taking food, necrosis of alveolar bone and palate	NA	NA
Motaleb H 2015	Egypt	57/F	DM	Maxillary right posterior teeth	Diffuse painful swelling of right face, Chemosis, palatal necrosis.	Surgical debridement, IVAB	Fa
Kumar N 2015	India	63/F	DM	Maxillary anterior teeth	Pain in upper jaw,nasal congestion,headache, necrosis of anterior maxilla	Surgical debridement, IVAB	Sh
Arya A 2015	India	54/M	DM	Maxillary right posterior teeth	In healing extraction socket, fluid discharge through nose, palatal necrosis, epiphora of eyes.	Surgical debridement with maxillary obturator, IVAB, Oral antifungal therapy	NA
Selvamani M 2015	India	52/M	DM	Maxillary right third molar	Painful swelling of right face and watery discharge through nose	Surgical debridement with anterior maxillectomy,IVAB	NA

DM – Diabetes mellitus, M – Male, F- Female, NA – Not Applicable,Sh – Satisfactory healing, IVAB - Amphotericin B.

The most common form of this disease in maxillofacial region is rhinocerebralmucormycosis that spreads to oral cavity , maxilla,palate, nose, paranasal sinuses, orbits and CNS. Early symptoms include facial cellulitis, nasal inflammation, Periorbital edema, tissue necrosis (4). According to literature, nearly 40- 50% of patients with mucormycosis have diabetes mellitus as a predisposing factor. In this review article , only 85% of cases who undergone extraction of maxillary posterior teeth was most commonly associated with this disease. Extraction of maxillary anterior teeth contributed for one case and mandibular molars for one case. Increased association of mucormycosis with maxillary posterior teeth extractioncan be due to their close proximity to maxillary sinus, which often get involved when fungal spores are inhaled.

Management of mucormycosis : (4)

Includes immediate hospitalisation.

Systemic antifungal therapy. Amphotericin B is the drug of choice.

Supportive therapy includes fluid balance , nutritional supplements, correction of underlying immune deficiency , surgical debridement to remove the necrosed tissue.

Conclusion

When mucormycosis occurs secondary to tooth extraction , may cause significant morbidity and mortality. Therefore dentists should be familiar with the signs and symptoms of mucormycosis and be aware of its serious and fatal complications to avoid unfavorable outcome in dental practice. At present valid consent is an important ingredient of our dental practice. A signed,fully explained written informed consent may be the soulful evidence that the mishap that occurred was a risk acknowledged by dentist and accepted by the patient. And this protects the dental practitioners from illegal issues.

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