



Review Article

A brief review in dental management of medically compromised patients

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ABSTRACT

With advancement in the technology & medical science there has been also increase in the various diseases & disorders due to lifestyle changes, dietary changes, etc. Due to increase in the aspect of dentistry, there is a need to know about the medical condition of patients because many dental procedures may cause stress to the patient and their proper management is required in case if patient health status is not so good. Also, in invasive dental procedures that involve implants, extractions or jaw surgeries also need a proper dental as well medical management depending upon different conditions likewise there is a risk of bleeding that could be fatal in bleeding disorders, overdose of LA may precipitate the epileptic attack and many more. Here in this article we are going to discuss briefly about dental management in medically compromised patients, and also it's the duty of dentist to have the knowledge of such conditions and he should know how to manage those patients in his or her dental operator.

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1. Introduction

We all know that in past few years the medical science has done great inventions that are very beneficial in better diagnosis and treatment of the diseases and same is in the field of dentistry. But still the disease rate has also been increased in today's population either due to lifestyle changes like dietary changes, sedentary life or there may be environmental changes or the use of much more chemicals, etc. The practice of dentistry today is far different from past one or two decades also, not only in dental techniques and procedures but also in the kinds of patients encountered day to day life. Many chronic disorders or their treatments require alterations in the provision of dental management and failure to make appropriate treatment modifications may have serious clinical consequences. The key to successful dental management of a medically compromised patient is a thorough evaluation of the patient medical condition or his

medical history.

1.1. Definition of medically compromised patient

Person suffering with medical disorder and may get compromised while treating other pathology.¹

2. Discussion

The review focuses on a few medical problems that dentists might encounter in daily practice that need extra knowledge and care to prevent complications causing otherwise unnecessary morbidity and mortality. The diseases & disorders include diabetes mellitus, cardiac abnormalities, bleeding disorders like hemophilia, renal system disorder, neurological disorders like epilepsy, respiratory problems, infectious diseases like HIV or hepatitis and many more disease including multiple drug interactions too.

The important points in managing the patient with medical problems is acquiring a thorough medical history

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and to fully understand the significance of the disease that may be endorsed by the patient & each identified medical condition can affect dental care in a unique manner. Knowing how to manage potential complications is also important and is presented below for few specific medical conditions –

2.1. Diabetes mellitus

DM is caused by an underproduction of insulin, a resistance of insulin receptors in end organs to the effects of insulin, or both. Diabetes is commonly divided into insulin-dependent (type 1) and non-insulin-dependent (type 2) diabetes. Type 1 diabetes usually begins during childhood or adolescence. The main objective in managing the diabetic patient is to maintain the blood glucose at near normal levels and to avoid acute or chronic complications especially hypoglycemic attacks. Drugs like aspirin and steroids should be avoided and Orofacial infections should be treated. Routine non-surgical procedure treatment is best carried out just after breakfast and continuing with the routine antidiabetic medication. For the surgical procedures the desired blood glucose level is 120-180mg/dl and it should be regularly monitored. Hyperglycemia may be harmful because of delayed wound healing or dysfunction. To avoid Hypoglycemia, IV infusion with glucose which should be measured regularly so that soluble insulin can be added as required.² In case of moderate to severe dental infection it is better to administer antibiotic to diabetic patients prior to the dental extraction or surgery and also post op antibiotic medication for 3 to 5 days due to compromised immune system in such patients.

2.2. Pulmonary disease

COPD Chronic obstructive pulmonary disease (COPD) is a general term for pulmonary disorders characterized by chronic airflow limitation from the lungs that is not fully reversible and it encompasses two main diseases that are chronic bronchitis and emphysema. Most cases of COPD occur as a result of long-term exposure to lung irritants that damage the lungs and the airways. The primary cause of COPD is cigarette smoking & Other contributory factors to COPD include recurrent respiratory tract infection, air pollution, cotton textile dust heredity and aging. The signs and symptoms of COPD include –

An ongoing cough or a cough that produces large amounts of mucus often called smokers cough, Shortness of breath, especially with physical activity, Wheezing, Chest tightness.

However, not everyone who has these symptoms has COPD.³ Bronchodilators such as theophylline, inhaled beta agonists, or inhaled anticholinergics are usually prescribed

for patients with significant COPD; in more severe cases, patients are given long acting agents and inhaled corticosteroids or short courses of systemic corticosteroids. In the dental management of patients with COPD who are receiving steroids, the dentist should consider the use of additional supplementation before major surgery. Sedatives, hypnotics, and narcotics that depress respiration should be avoided. Patients may need to be kept in an upright sitting position in the dental chair to enable them to better handle their commonly copious sputum/mucous. Supplemental oxygen greater than their usual rate should not be administered to patients with severe COPD during surgery unless the physician advises it.⁴

2.2.1. Asthma

It is the medical condition characterized by the narrowing & swelling of airways of respiratory system making breathing difficult with cough production or wheezing sounds as clinical symptoms.

The most common causes of asthma exacerbations are pollens, spores, house dust, and insect, viral infections of respiratory tract or smoking. The medical management of asthma depends upon its severity either mild, moderate or severe with pharmacological agents like bronchodilators, anti-mucolytic agents, anticholinergics or corticosteroids. The supportive treatment of acute severe asthma includes supplemental oxygen, fluid and electrolyte maintenance, anxiety relief, and endotracheal intubation and, in extreme situations, mechanical ventilation.⁵ Dental procedures can be done for asymptomatic or well-controlled asthmatic patients. A wheezing or poorly controlled patient should be reappointed later. The sittings should be of short duration with as possible as in upright position with less duration of sittings in supine positions.

The following steps should be taken to manage an acute asthmatic attack in the dental office:

1. Discontinue the dental procedure and allow the patient to sit or lie down in a comfortable position
2. Keep the airway open and administer ~2-agonists with inhaler or nebulizer
3. Administer oxygen via face mask nasal hood, or cannula
4. If no improvement takes place and the patient is worsening, administer epinephrine subcutaneously (1:1000 solution, 0.01 mg/kg of body weight to a maximum dose of 0.3 mg), and summon medical assistance.⁶

2.3. Hemophilia

Bleeding disorders can be classified as coagulation factor deficiencies, platelet disorders, vascular disorders, and fibrinolytic defects. Among these, hemophilia A that occurs

due to deficiency of clotting factor VIII, hemophilia B also known as Christmas disease due to the deficiency of factor IX, hemophilia C or Rosenthal syndrome due to the deficiency of factor XI and von Willebrand's disease are the commonly encountered congenital coagulation defect disorders.⁷ These hemophiliac patients can lead to prolonged clotting time and excessive bleeding tendencies that may be fatal.

Management of hemophilia A among patients undergoing dental surgery consists of increasing factor VIII levels, replacing factor VIII and inhibiting fibrinolysis (table 1).⁸

Table 1: Presurgery treatment for hemophilia A

Condition	Treatment and dose	Potential complications
Mild bleeding	Dose: 15 U/kg factor VIII every 8–12 hours for 1–2 days Target: 30% of normal level	Hemarthrosis, oropharyngeal or dental bleeding, epistaxis, hematuria
Major bleeding	Dose: 50 U/kg factor VIII every 8–12 hours for 7–14 days Target: 80% to 100%	Same potential complications as for mild bleeding, as well as CNS haemorrhage, retroperitoneal haemorrhage, gastrointestinal bleeding of normal level

*Adjunctive therapy Desmopressin, tranexamic acid psilonaminocaproic acid (for mild disease)

Hemophilia B is managed by replacement therapy with highly purified, virally inactivated factor IX concentrates. Prothrombin complex concentrates can also be used for factor IX replacement.⁸

Von Willebrand's disease is not sex linked. For mild conditions in von Willebrand's disease, use of DDAVP may be sufficient, but severe disease needs replacement with factor VIII.⁸

The management of patients with bleeding disorders depends on the severity of the condition and the invasiveness of dental procedure. If the procedure has limited invasiveness and the patient has a mild bleeding disorder, then only slight or no modification will be required but in patients with severe bleeding disorders, main aim is to restore the hemostatic system of the patient to acceptable levels and maintain hemostasis by local and adjunctive methods. The patient's physician should be consulted before invasive treatment. In case of irreversible coagulopathies, replacement of missing factors is the need. In haemophiliac patient nerve block injections are contraindicated as the anesthetic solution is

deposited in a highly vascularized area, which carries a risk of hematoma formation.⁹ Extravasation of blood in the oropharyngeal area by an inferior alveolar block or in the pterygoid plexus can produce gross swelling, pain, dysphasia, respiratory obstruction and risk of death from asphyxia.^{10,11} Anesthetic infiltration and intraligamentary anesthesia are good alternatives to nerve block with a vasoconstrictor (when possible) in such patients. Non-surgical endodontic therapy is preferred over extraction whenever possible in hemophiliac patient.

2.4. Thyroid patients

The thyroid gland is an endocrine gland in the neck consisting of two connected lobes that secretes the thyroid hormones like thyroxine (T4) & triiodothyronine (T3). Thyroid hormones help with brain development and function, regulates the metabolic rate of the body. These hormones also regulate the metabolism of fat, proteins and carbohydrates, Thyroid hormones are integral in the regulation of many functions and aspects of the human body, such as temperature regulation, energy levels, weight and many more. Patients with thyroid dysfunction may be classified as euthyroid, hypothyroid, or hyperthyroid depending on normal, decreased or hyper activity of the thyroid. Characteristics of hypothyroidism include anemia, cardiomegaly, cold intolerance, constipation, cretinism (children), dry hair, elevated creatine, goiter, hyperlipidemia, hypertelorism, hypotension, inverted T waves in electrocardiogram, lethargy, low-amplitude QRS wave in electrocardiogram, myxedema, paresthesia, reduced cardiac output, reduced respiratory rate, seizures, bradycardia, weight gain, whereas the characteristics of hyperthyroidism include abdominal pain, heart murmur, diplopia, dysrhythmias, elevated alkaline phosphatase, fatigue, fine hair, goiter, heat intolerance, hypercalcemia, increased appetite, increased cardiac output, increased pulse, nervousness, palpitations, proptosis, psychosis, tachycardia, tremor, warm skin, weight loss.¹² The dental management in hypothyroid patients in untreated or poorly controlled cases include avoid surgical procedures, treat oral infection, avoid CNS depressants such as narcotics, barbiturates; in well controlled cases avoid oral infections, implementation of normal procedures and management; where in case of medical crisis i.e. rare include recognition and initial management of myxedematous coma, seek medical aid, hydrocortisone 100 mg, CPR.¹³ Dental management in case of hyperthyroidism include avoid the use of adrenaline and control the spread of infection. Treatment should be discontinued if signs or symptoms of a thyrotoxic crisis develop. Management of stress is important in such patients as stress, anxiety or surgery can trigger the thyrotoxic crisis. Anti-thyroid drugs like as propylthiouracil has anti-vitamin K activity and can cause hypoprothrombinemia and bleeding that poses a risk for

hemorrhage and so patients taking PTU must be carefully evaluated before surgery or invasive dental treatment.¹⁴

2.5. Cardiac problems

Hypertension is an important health problem due to its high incidence and prevalence in the general population and it is associated with increase in risk of suffering cardiovascular disease like angina, myocardial infarction and cerebrovascular events example stroke. The blood pressure values considered to be normal were established by consensus as under 90 mmHg in the case of diastolic pressure, and under 140 mmHg in the case of systolic pressure¹⁵ and National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) introduced the term “pre-hypertension” in reference to people with a systolic blood pressure of 120-139 mmHg or with a diastolic blood pressure of 80-89 mmHg.¹⁶ A well control hypertensive patients does not pose a risk in clinical practice, hypertensive patient is to be instructed to take his or her medication as usual on the day of dental treatment. Prior to dental treatment, the patient blood pressure should be recorded, and the treatment should be postponed if the values are higher. Dental visits should be in morning time with shorter durations. Prescription of anxiolytic agents is required in anxious patients like 5-10 mg of diazepam the night before and 1-2 hours before the appointment before dental treatment. A good local anesthetic technique should be performed, avoiding intravascular injection and using a maximum of two anesthetic cartridges (1.8mlx2) with vasoconstrictor. If more anesthesia is needed, it should be provided without vasoconstrictor. Absorbable sutures are to be avoided with adrenaline. When the patient does not present good blood pressure control, it is best to refer him to the physician. In the case of emergency dental visits, treatment should be conservative, with the use of analgesics and antibiotics. Surgery is to be avoided until adequate blood pressure control has been secured.¹⁷ Certain NSAIDs, such as ibuprofen, indomethacin or the naproxen, can interact with antihypertensive drugs (beta-blockers, diuretics, ACEIs),¹⁸ thus lowers antihypertensive action of drugs. Normally more than five days of treatment with both types of drugs are required for interactions to occur;¹⁹ as a result, NSAIDs should not be prescribed for longer than this five-day period. In the case of a hypertensive emergency (>120/210 mmHg), furosemide should be administered (40 mg, via the oral route). If this proves insufficient to restore pressure control, captopril should be administered (25 mg via the oral or sublingual route). If the blood pressure fails to decrease within 30 minutes after these measures, the patient should be referred to the nearest hospital.²⁰

IHD ischemic heart diseases involves the reduction of blood flow to the heart muscle due to build-up of plaque in

the arteries of the heart. IHD include stable angina, unstable angina, myocardial infarction, and sudden cardiac death. Dental management in IHD is given via table 2.²⁰

In case of patients taking anti-platelet or anti-coagulant therapy in case of MI or angina, there is the need to monitor the CT, BT, PT, pTT/INR in case when there is the requirement of surgical procedure or dental extractions. Also, the appointments should be of smaller duration with proper stress management.

2.6. Epilepsy

Dental environment can provoke seizures even in well-controlled epileptics. Prophylactic anticonvulsants: Carbamazepine, Phenobarbitone, Sodium Valproate, Phenytoin, Lamotrigine, Vigabatrin and Gabapentin. The management of epileptic patient in dental operatory includes –

Terminate dental procedure and place patient into a supine position, Protect the patient during attack, Seizures secondary to LA overdose- until cerebral level of LA falls below seizure threshold, maintain adequate airway and oxygen, IV anticonvulsants administration of diazepam 0.2 – 0.5mg / kg per dose IV, repeated at 3 – 5 min. (2)

2.7. Renal problems

Kidney transplant dental treatment of transplant patient requires close consultation between the dentist and the treating nephrologist. After transplant the immunosuppressants are given to the patient to prevent organ rejection that include nowadays is a combination of tacrolimus, mycophenolate and prednisolone. Instead of this, some patients receive cyclosporine, sirolimus or azathioprine.[22] Even after the kidney transplantation, the renal function is not fully restored and this may result in hemorrhage and also in the rare occasion that the transplant patient is administered coumarin anticoagulants as large no. of patients suffers from cardiovascular diseases too, that is why a recent INR should be required before any dental work that may involve bleeding & INR should be less than or equal to 2.5 and if more here should be a consultation with the nephrologist so as to adjust the dose.²¹

Renal failure (on dialysis) dental management in patients with renal failure that are on dialysis need a close cooperation between medical and dental professionals in order to improve the oral and general health of the patient. Prior to any invasive dental treatment, a complete blood count together with coagulation tests is the need. It is essential to eliminate any infection in the oral cavity as soon as possible with the consideration of antibiotic prophylaxis when bleeding and/or a risk of septicemia is expected. B.P. should be monitored. Penicillins, clindamycin and cephalosporins can be administered at the usual doses, and are the antibiotics of choice although the dosing

DENTAL MANAGEMENT IN PATIENTS WITH ISCHEMIC HEART DISEASE	
- Consultation → type of heart disease, severity, time elapsed from the cardiological event, clinical complications, <u>treatment</u> received.	
· Take the prescribed medication as usual	
· If <i>nitrates</i> are used, the patient should bring them	
- Take as a preventive measure before local anesthesia	
- Take in case chest pain develops	
If surgery is needed {	
<i>Anticoagulated patient</i> → determine INR on the day of treatment	
<i>Antiplatelet patient</i> → local hemostatic measures	
- Before 4-6 weeks after infarction → only emergency procedures	
- Very anxious patients → premedication (5-10 mg of diazepam the night before and 1-2 hours before treatment)	
- Brief visits (less than 30 minutes) → avoiding early morning hours and late afternoon hours	
- Anesthesia → not to inject into a blood vessel	
→ a maximum of two carpules with vc	
· If anesthetic reinforcement is needed: anesthesia without vc	
- Patient in semi-supine position	
- Patient should get up carefully → to avoid orthostatic hypotension	
- Monitoring may be required: blood pressure and pulsioxymetric	

vc: vasoconstrictor

Fig. 1:

interval should be prolonged. PCM is the drug of choice in analgesics and aspirin should be avoided due to its antiplatelet activity. It is advisable to provide dental treatment on non-dialysis days, to ensure the absence of circulating heparin, which has a half-life of about four hours. Desmopressin has been proposed for the control of severe bleeding in patients with renal failure, Tranexamic acid in the form of a rinse or administered via the oral route at a dose of 10-15 mg/kg body weight a day distributed in 2-3 doses, may also prove useful.²²

2.8. Infectious diseases

AIDS acquired immunodeficiency syndrome that is caused by retrovirus named as HIV (human immunodeficiency virus). It can be transmitted during sexual intercourse from an infected to an uninfected partner, when sharing equipment used to inject drugs, during pregnancy, labor and delivery, and through breastfeeding. Infection can also occur during exposure to the blood of an infected patient via needlestick or a splash to exposed mucous membranes.

CDC staging of HIV infection in adults (4) –

Stage 1: Laboratory confirmation of HIV infection, no AIDS-defining conditions and CD4+ T lymphocyte count of ≥ 500 cells/ μ L or CD4+ T lymphocyte percentage of total lymphocytes of ≥ 29 .

Stage 2: Laboratory confirmation of HIV infection, no AIDS-defining condition, and laboratory confirmation of HIV infection and CD4+ T lymphocyte count of 200-499 cells/ μ L or CD4+ T lymphocyte percentage of total lymphocytes of 14-28.

Stage 3: (AIDS): Laboratory confirmation of HIV infection and CD4+ T lymphocyte count is < 200 cells/ μ L

or CD4+ T lymphocyte percentage of total lymphocytes is < 14 or documentation of an AIDS-defining condition (see Box 18-1). Documentation of an AIDS-defining condition supersedes a CD4+ T lymphocyte count of ≥ 200 cells/ μ L and a CD4+ T lymphocyte percentage of total lymphocytes of ≥ 14 .

Treatment of AIDS often is organized into three major areas: (1) ART, (2) prophylaxis for opportunistic infections, and (3) treatment of HIV related Complications. Medical history, head and neck examination, intraoral soft tissue examination, and complete periodontal and dental examinations should be performed on all new patients before performing any dental procedures. As with other immunosuppressed patients, such as cancer patients, proper nutrition is important. Treating AIDS patients who have painful oral lesions with appropriate analgesics or medicines for oral lesions is especially important as immunosuppression is major factor for these oral lesions to occur.²³ A proper oral examination is of importance because many physicians do not perform thorough intraoral examinations at routine visits. It is the responsibility of the dental practitioner to screen for oral cancer and intraoral lesions that may be indicative of HIV, oral disease, or oral/perioral signs of other systemic diseases. The oral manifestations of AIDS include Candidiasis, Angular cheilitis, Histoplasmosis, Cryptococcosis linear gingival erythema, necrotizing ulcerative periodontitis, necrotizing stomatitis, actinomycosis, herpes simplex, hairy leukoplakia, oral warts, kaposi's sarcoma, facial palsy, trigeminal neuropathy, recurrent thrombocytopenic purpura, recurrent aphthous ulcers, salivary gland enlargement, xerostomia that may lead to dental caries, melanotic pigmentation.²⁴ Thus, proper oral screening and their

management is the duty of dentist, besides this before doing invasive procedure its better to consult with patient's physician to know about the current viral load and CD4 count of the patient. Also, dentist must follow the universal precautions for the prevention and if got exposed he should take chemo-prophylactic therapy.

Universal precautions are –

Washing your hands often.

Using protective barriers such as gloves, gowns/aprons, masks for direct contact with blood and other body fluids.

Safe collection and disposal of needles and sharps (sharps boxes required for this).

Following the correct procedures for a needle–stick injury (the area should be washed out with soap and water, dispose the needle safely (in case you injure yourself again), go & get assessed for PEP.

Covering all cuts and abrasions with waterproof dressings.

Use of disposable instruments for examining and doing procedures as far as possible.

Cleaning up spills of blood and other body fluids with bleach. Use a separate mop for body fluid spillages and dispose carefully of all equipment (cloths etc.) used to clean up the spillage.

These universal precautions are not limited to HIV infections, instead helpful in every contagious or communicable infections like hepatitis B, C, and nowadays also in case of covid-19 pandemic which is too contagious that the whole world is suffering since more than a year.

PEP for HIV is – You must start PEP within 72 hours after you were exposed to HIV.²⁵ The sooner you start it, the better it will be.

PEP by GOI (NACO) is given below²⁶

PEP regimen	
a.	Wherever PEP is indicated and source is ART naive or unknown: recommended regimen is Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg once daily for 28 days. Wherever available, single pill containing these formulations should be used. Dual drug regimen should not be used any longer in any situation for PEP.
b.	The first dose of PEP regular should be administered as soon as possible, preferably within 2 hours of exposure and the subsequently dose should be given at bed time with clear instruction to take it 2-3 hours after dinner & to avoid fatty food in dinner.
c.	In case of intolerance to Efavirenz, regimen containing Tenofovir + Lamivudine + PI (ATV/r or LPV/r) can be used after expert consultation by an experienced physician.
d.	In case of exposure where source is on ART, Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg should be started immediately. And an expert opinion should be sought urgently by phone/e-mail from CoE/ART Plus centre.
e.	Appropriate and adequate counselling must be provided regarding possible side effects, adherence and follow up protocol.

Fig. 2:

Antibiotic prophylaxis Routine management, where invasive dental treatment is provided without antibiotic prophylaxis, will be appropriate for the vast majority of patients at increased risk of infective endocarditis.

Antibiotic prophylaxis has been used in dentistry for patients at risk of infective endocarditis or prosthetic joint infections. The most common antibiotics used before surgeries are cephalosporins, such as cefazolin and cefuroxime. Your doctor may prescribe vancomycin if you are allergic to cephalosporins. For dental procedures, amoxicillin or ampicillin, clindamycin or azithromycin or cephalosporins can be given prior to the surgical procedure.

ASA physical status classification American Society of Anaesthesiologists (ASA) Physical Status classification system was initially created in 1941 by the American Society of Anaesthetists. The purpose of the grading system is to assess the degree of patient's sickness prior providing any treatment and this asa classification also implies for the dental treatment. The classification for the above is given below in the table 4²⁷

Classification	Description
ASA 1	Healthy patients
ASA 2	Mild to moderate systemic disease caused by the surgical condition or by other pathological processes, and medically well controlled
ASA 3	Severe disease process which limits activity but is not incapacitating
ASA 4	Severe incapacitating disease process that is a constant threat to life
ASA 5	Moribund patient not expected to survive 24 hours with or without an operation
ASA 6	Declared brain-dead patient whose organs are being removed for donor purposes

Fig. 3:

3. Conclusion

From the above overall discussion we can conclude that how important it is to keep the knowledge of different medical conditions and their medical management as well as dental management in dental OPD. A minor stress can precipitate an anginal attack or lack of taking proper medical history may result in heavy bleeding that could be fatal for patient's life. Thus, every dentist must take proper medical history and do general examination so that he could manage such patients in a well-mannered way and thus can prevent medical emergencies to a great extent.

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5. Conflict of Interest

The authors declare they have no conflict of interest.

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