

Hypertension in Dental Health Care and their Management in Dentistry

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ABSTRACT

Hypertensive patients deserve special attention because of the possible complications during dental treatment. This article describes safe approaches for hypertensive patients, indications for local anaesthesia, treatment risks, hypertensive crises, drug interactions, and oral manifestations of antihypertensive drugs. It aims to review the literature regarding safe dental approaches for hypertensive patients, such as indications for local anaesthesia, surgical risks, hypertensive crisis, drug interactions, and oral manifestations of antihypertensive drug use. Several preventive measures must be taken to treat hypertensive patients, including taking an anamnesis. This action is very important to evaluate systemic changes. In addition, measuring blood pressure at the beginning and during the intervention is necessary. Minimizing sitting time in the dental unit must also be done to minimize patient anxiety. Stress control and selecting appropriate anaesthetic agents also need to be done. Solutions with low concentrations of vasoconstrictors, paying attention to dosage, and following the principles of the anaesthetic technique must be observed. The use of nonsteroidal anti-inflammatory drugs should be avoided. These precautions will avoid serious iatrogenic events and improve and ensure patient safety and quality of service.

Keywords: Anesthetics, antihypertensive agents, anxiety, hypertension, vasoconstrictor agents.

INTRODUCTION

Hypertension is a multifactorial clinical condition characterized by a sustained increase in blood pressure \geq 140 and 90 mmHg.^{1,2} This condition is a serious medical condition in which pressure in the blood vessels that is too high will significantly increase the risk of heart, kidney, brain, and other diseases. Under normal conditions, blood is pumped by the heart to all parts of the body through the blood vessels, so the force of the blood pushing against the walls of the arteries when pumped by the heart causes blood pressure to rise. If blood pressure is higher, it will cause the heart to have difficulty pumping.³⁻⁵

Arterial hypertension (AH) is a disease with a high prevalence that tends to increase with age and becomes a global health problem. According to the World Health Organization (WHO), AH is one of the main risk factors for cardiovascular disease. According to the American Dental Association (2023), hypertension is one of the most common chronic cardiovascular conditions in the US. Hypertension affects more than one billion people, with a ratio of more than 1 in 4 men and 1 in 5 women, and is the main cause of premature death worldwide. Two-thirds of cases are found in low- and middle-income countries, largely due to increased risk factors in these populations in recent decades.^{1,3,6-9}

Hypertension is a silent killer for adults aged over 20 years and this condition is estimated to reach 1.56 billion hypertension sufferers worldwide by 2025.¹⁰⁻¹⁴ The increase in the prevalence of hypertension in society is very worrying because a person's life expectancy can be reduced by 10-20 years due to untreated hypertension.^{10,15}

Children or adults can experience this condition.¹⁶ Blood pressure with systolic >140 mmHg and diastolic >90 mmHg is called a person with hypertension.⁴ Hypertension is divided into 2 categories, namely primary hypertension and secondary hypertension, with 90%-95% of hypertension cases being primary hypertension with an unidentified cause and only in 10% of cases, hypertension is secondary. Secondary hypertension can be caused by diabetes, kidney disease, pregnancy, or endocrine disorders.^{1,4,10,13,17}

Concerning hypertensive patients, dentists must know how to determine the severity and stability of hypertension.¹¹ Dentists must have extensive knowledge regarding oral health care in the hypertensive patient population, regarding difficulties in treating it, prevention, and management options and treatment until the results of the treatment.^{10,11} In this case, dentists also have an important role in screening for undiagnosed and untreated hypertension because they are often the first medical practitioners to encounter symptoms.^{4,16,18}

Current recommendations require dentists to measure blood pressure in children (over 3 years) and adults at every visit, whatever the purpose. Therefore, there is a need to educate dental staff about how to measure blood pressure properly and correctly. For pediatric patients, dentists must study the child's health history and focus on obtaining information about the medicines the child is taking or their diet. This information can help paediatricians determine potential blood pressure problems in the child. It should be emphasized that in younger patients, particularly those diagnosed with hypertension, especially those who are untreated or poorly treated, local anaesthetics containing vasoconstrictors should not be used.¹⁶

Side effects of hypertension treatment can mainly be seen on the skin, around the mucous membranes in the oral cavity, telangiectasia (around the skin of the cheeks), gingival hyperplasia, tongue enlargement, and edema. This can lead to increased dental caries, ulceration of the oral mucosa, taste disorders, or gingival disease. Because of the possible side effects of the drugs used, it is very important to carry out regular periodontological control in this group of patients.^{11,16}

Assessing a patient's medical history is the first step of any dental treatment. Medical status can change dental treatment plans and, if ignored, can lead to severe and sometimes fatal consequences.¹⁹ Therefore, it is essential to find adequate dental care protocols for patients suffering from hypertension.¹¹

ORAL MANIFESTATION CAUSED BY ANTIHYPERTENSIVE DRUG

Hypertension does not appear to have any recognized orofacial manifestations.^{11,20} Antihypertensive medication, an option for hypertensive treatment, can occasionally result in orofacial side effects.^{20,21} These drugs can have several oral side effects within a few weeks of taking them.^{21,22} Antihypertensive medications may cause oral side effects such as dry mouth, altered taste, taste loss, angioedema, gingival bleeding, gingival enlargement, erythema multiforme, and lichenoid reactions.^{11,13,19,22} The side effects and drugs causing it can be seen in Table 1. Typically, a clinical examination and taking a history allow for the detection of oral mucosal lesions. They may, however, go unnoticed in some instances because of the lesions' clinical similarity.^{21,22} It is easier to manage patients when physicians are aware of these medications' potential side effects.¹⁹

- Lichenoid reaction

The oral lichenoid reaction typically manifests as white striations or papules and frequently appears on the buccal mucosa, tongue, and gingiva. They are frequently accompanied by erythema, erosion, and ulcers.²³ Lichenoid reactions resemble lichen planus lesions clinically and histologically but are unilateral and have a traumatic pattern.²² Acanthosis, basal cell degeneration, hyperparakeratosis, and extensive chronic inflammatory cell infiltration throughout the connective tissue, particularly the plasma cells and histiocytes, are some of their distinguishing features.²⁴ Nonsteroidal anti-inflammatory drugs (NSAIDs) and antihypertensive agents, such as b-blockers, ACE inhibitors, and diuretics (in particular hydrochlorothiazide), are the two classes of drugs historically linked to lichenoid reaction. It is frequently challenging to agree on diagnostic criteria, partly because the once well-established lichenoid reaction may persist after the drug is stopped unless rigorously treated.²³

- Gingival hyperplasia

Clinically, gingival hyperplasia manifests as overgrown gingiva on the buccal, facial, lingual, or palatal aspects of the marginal gingiva that is diffuse, generalized, and frequently nodular.²³⁻²⁵ Inflammation caused by plaque exacerbates the resulting gingival enlargement.^{23,25} Sometimes, they may even cover the entire crown, which makes eating difficult.²⁴ Nifedipine and amlodipine, in particular, are antihypertensive calcium channel blockers that cause gingival tissue hyperplasia.^{2,23}

- Angioedema

Angioedema is a frequent clinical symptom that is characterized by rapid, painless swelling of the lips, tongue, area around the eye, and surrounding tissues.²⁶ This sudden onset of swelling can compromise breathing and be fatal. There have been reports of medication-induced angioedema caused by various drugs, most frequently ACE inhibitors and other antihypertensive medications, such as angiotensin receptor blockers, calcium channel blockers, and hydrochlorothiazide.²³

- Xerostomia

Numerous antihypertensive drugs are linked to xerostomia.²

Additional unwanted effects such as taste loss (ageusia) or taste modification (dysgeusia) are side effects of ACE inhibitors. Dysgeusia also manifests from using beta-blockers and diltiazem.²

Table 1. Antihypertensive drugs and their oral manifestation side effects.^{2,13,20,23,25-27}

Drug class	Examples	Oral manifestation
Alpha-adrenergic blockers	Doxazosin, indoramin, prazosin, terazosin	Xerostomia
Angiotensin-converting Enzyme inhibitors (ACEIs)	Captopril, cilazapril, enalapril, fosinopril, imidapril, lisinopril, moexipril, perindopril, quinapril, ramipril,trandolapril	Lichenoid reaction (Captopril) Angioedema Xerostomia Ageusia Dysgeusia Ulceration Burning mouth Gingival bleeding
Angiotensinogen II receptor blockers (ARBs)	Azilsartan, candesartan, eprosartan, losartan, olmesartan, temisartan, valsartan, irbesartan	Angioedema Xerostomia Ageusia
Beta-adrenergic blockers	Acebutolol, atenolol, bisoprolol, carvedilol, celiprolol, esmolol, labetalol, metoprolol, nadolol, nebivolol, oxprenolol, pindolol, propranolol, timolol	Lichenoid reaction (propranolol, labetalol) Dysgeusia Xerostomia
Calcium-channel blockers (CCBs)	Phenylalkamines: Verapamil Dihydropyridines: Amlodipine, nifedipine, nimodipine Benzothiazepines: Diltiazem	Gingival enlargement (Nifedipine and amlodipine) Angioedema Diltiazem (diltiazem) Xerostomia Dysgeusia Erythema multiform
Diuretics	Thiazide: chlorthalidone, bendroflumethiazide,	Lichenoid reaction (hydrochlorothiazidem,

	hydrochlorothiazide, and indapamide Loop: furosemide, torsemide, bumetanide, and ethacrynic acid Potassium-sparing: spironolactone, amiloride, triamterene, and eplerenone	furosemide, spironolactone) Angioedema (hydrochlorothiazide) Xerostomia (thiazide, loop)
Sympatholytics	Clonidine, methyldopa	Xerostomia (clonidine) Lichenoid reaction (methyldopa)
Vasodilators	Hydralazine, minoxidil	Risk of gingival bleeding

THERAPY OF DISORDERS IN THE ORAL CAVITY CAUSED BY ANTIHYPERTENSIVE DRUGS.

- Xerostomia

Dry mouth is a detrimental effect of more than 500 medications. Antihypertensive drugs such as loop diuretics, thiazide diuretics, ACE inhibitors, and β -blockers are often reported to cause xerostomia.^{2,23} The consequences of xerostomia in the oral cavity include dental caries, gingivitis, difficulty chewing, speaking, and swallowing, candidiasis, dysgeusia, and oral burning syndrome.^{2,26,28} Denture-wearing individuals with xerostomia showed worse signs and symptoms of inflammation than individuals without dentures.²⁸

Older individuals are reported to be three times more likely to suffer from xerostomia, and patients who consume more than one type of medication have twice or more risk than people without consuming medication.²³ Xerostomia therapy can be done directly using parasyntomimetic agents (pilocarpine or cevimeline).² The use of saliva stimulants, saliva substitutes, oral lubricants, and non-irritating toothpaste are symptomatic management of xerostomia.^{26,28} Another way is to drink lots of water, reduce coffee consumption, eat candy without sugar, and avoid using mouthwash that contains alcohol. To reduce the risk of dental caries, topical fluoride can be used.²

- Lichenoids

Antihypertensive drug therapy is one therapy that stimulates Lichenoid Hypersensitivity Reaction (LHR).^{23,29} The way to treat this disorder is by changing the antihypertensive drug, but if the drug cannot be changed, then topical corticosteroid drugs can be used.² Lichenoids can be treated with systemic corticosteroids, but because of the potential for an increase in blood pressure, corticosteroids may be contraindicated in patients with hypertension.²⁰

- Gingival hyperplasia

Antihypertensive drugs such as calcium channel blockers (diltiazem, nifedipine, amlodipine, felodipine, nisoldipine, and verapamil) cause gingiva hyperplasia.^{2,23,26} This situation can be made worse by plaque, which causes inflammation.²³ Gingival hyperplasia due to calcium channel blockers is diffuse, flat, and nodular with a fibrotic consistency.²⁶ Clinically, gingival enlargement often occurs on the buccal or facial and lingual or palatal aspects of the gingiva margin.²⁴ This disorder is common in patients taking nifedipine, with an incidence of 1.7 to 38%.¹¹ Manifestations of gingival hyperplasia are pain, gingiva bleeding, and difficulty chewing. Changing antihypertensive drugs and maintaining good oral hygiene will reduce the incidence of this event.² Periodontal surgical therapy is not definitive therapy; a more effective way is to reduce the dose of the drug used if possible or replace it with another type of drug.¹¹

- Angioedema

ACE inhibitors are drugs that commonly cause angioedema.²³ This type of drug also causes loss of taste sensation (ageusia) or changes in taste sensation (dysgeusia).² This change in taste is caused by a decrease in saliva flow or secretion of these drugs in saliva.²⁹ Other antihypertensive drugs, such as angiotensin receptor blockers, hydrochlorothiazide, isotretinoin, and calcium channel blockers, cause angioedema. Several studies state that lipoic acid can relatively cure taste sensation disorders, but the most effective way is to eliminate the use of drugs that cause these disorders.²⁶ In general, angioedema usually forms edema on the tongue, lips, and

face and can also affect the pharynx, larynx, and internal organs. Patients who use ACE inhibitor drugs must stop and be given alternative antihypertensive drugs. Antihistamines, corticosteroids, and adrenaline are often used in angioedema therapy.³⁰

Knowledge of the adverse effects of hypertension drugs, such as xerostomia, gingival hyperplasia, lichenoid reactions, gum bleeding, and loss of taste sensation, will help dentists treat patients with a history of using these drugs.¹⁹ Oral complications related to antihypertensive drugs can be consulted with the doctor treating the patient, and evaluation of the drugs and their side effects can be considered.¹³ Non-pharmacological interventions can also be carried out, namely a healthy diet (consuming more fruit and vegetables, a high protein, low carbohydrate diet), physical activity (150 minutes/week), reducing salt, and maintaining an ideal body weight (normal BMI).³¹

MANAGEMENT OF HYPERTENSION PATIENTS IN DENTIST PRACTICES

High blood pressure is the body's response to disease status, medications, lifestyle changes, and habits, which have a medical impact and direct and indirect manifestations on oral health.⁴ As a dentist, knowledge Regarding hypertension is very important to know the consequences and possible complications that occur during clinical treatment or as a result of therapy.¹¹ Therefore, there are differences in dental care protocols and how to treat hypertensive patients.¹

Dental care for hypertensive patients is a challenge that must be based on science to determine the best behaviour in patient care. Therefore, in treating hypertensive patients, we need to measure blood pressure, explain the best treatment plan, explain the therapy and its effects, and minimize or prevent side effects that may occur during treatment tooth.^{5,9,11,12}

The most important step in managing hypertensive patients is to carry out an initial evaluation of hypertensive patients through anamnesis, including a complete health examination including family history, history of hypertension, medications consumed, duration and history of antihypertensive treatment, severity of disease, complications of disease, employment status, and socioeconomic status.^{2,4} The doctor's ability to carry out a precise and in-depth history is necessary for deciding the ideal therapeutic procedures.¹¹ Diagnosis and treatment plan are the initial and very important steps in dental care to ensure the success of the treatment.⁴

Stress before and during dental treatment is normal for every patient. The use of pharmacological agents for relaxation and reducing stress can be given.¹⁹ During dental treatment, avoiding anxiety and pain is very important. Therefore, adequate analgesia can be used to ensure that treatment does not cause pain. This condition can cause the release of endogenous epinephrine, which results in dysrhythmias.⁴

As dentists, we need to reduce blood pressure responses to dental treatment, such as physical stress, psychological stress, humoral factors, environment, central stimuli, and nervous reflexes. Patients with White Coat Hypertension (WCH) in the dental clinic are another determining factor. The frequency of WCH was higher in patients who experienced a greater increase in blood pressure under conditions of psychological stress, and most patients showed higher blood pressure during the clinic than outside the clinic.⁷

Patients with hypertension are treated in the morning because the morning is more relaxing. Likewise, if an unexpected event occurs, there is enough time to manage it.¹⁹ In treating hypertensive patients, dentists must be careful not to interfere with antihypertensive treatment, limit the stress caused by treatment, ensure that the analgesia used is optimal, and administer premedication drugs.¹¹

Health services by a dentist need to be accompanied by regular blood pressure checks of the patient.⁷ When undergoing dental treatment, always try to measure blood pressure 2-3 times with an interval of 3-5 minutes to ensure accuracy because there is a condition called white coat hypertension where there can be dramatic changes in blood pressure when measured in a medical or dental environment that occurs due to patient anxiety.^{4,17} Blood pressure measurements are usually reported for complex and stress-inducing dental procedures, such as long-term restorative procedures, surgical procedures, and periodontal disease treatment.^{7,17}

When performing anaesthesia, a syringe with aspiration can be used to avoid entering the anaesthetic drug into the blood vessels.⁴ Local anaesthetic drugs containing adrenaline are not contraindicated in controlled hypertension.¹¹ Epinephrine can be used with local anaesthesia unless the systolic blood pressure exceeds 200 mmHg and/or diastolic more than 110 mmHg. To avoid drug interactions, local anaesthetics containing epinephrine should not be given in high doses to patients taking beta blockers. If necessary, conscious sedation may be recommended.⁴ However, recently, the potential for cardiovascular stimulation (increased heart rate and blood pressure) after intravascular injection may occur, leading dentists to reduce or avoid vasoconstrictors in individuals with cardiovascular disorders, although vasoconstrictors in local anaesthetics are rarely contraindicated.⁶

CONCLUSION

Dental treatment categorized as safe can be life-threatening if performed on patients with medical problems. Dentists must identify and treat patients wisely because of any medical emergencies that may occur while the patient is under treatment. A comprehensive treatment plan must be created through good collaboration with the patient. Although no evidence suggests a direct link between dental care and hypertension complications, oral health care providers must understand the potential risks and complications when these individuals receive care in a dental office.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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