



Dental management of the hypertensive patient Lieutenant Istvan Hargitai, Jr, DC, USN and Captain Robert Sherman, DC, USN

Purpose

An estimated 58 million Americans have hypertension (HTN) of which almost 27% are unaware of their disease (1, 2). The purpose of this clinical update is to update information on the dental/medical management concerns, oral complications, and drug interactions of concern in patients with HTN.

Introduction

HTN is defined as a systolic blood pressure (SBP) \geq 140 mm Hg, a diastolic blood pressure (DBP) \geq 90 mm Hg or taking antihypertensive medication (2). Undiagnosed or poorly controlled HTN can produce irreversible damage to end organs such as the heart, brain, and kidney and can also predispose toward myocardial infarction, atherosclerosis, stroke, and retinopathy (2,3, 4). The cause of HTN in 95% of cases is idiopathic and is termed essential HTN. Conversely, in secondary hypertension, there is an identifiable cause that can be corrected, such as renal artery stenosis or pheochromocytoma. See Table 1 for classification of BP in adults.

Table 1: Classification of BP in Adults over age 18 (2)

Category	SBP (mm HG)		DBP (mm HG)
Optimal	<120	and	<80
Normal	<130	and	<85
High-normal	130-139	or	85-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	160-179	or	100-109
Stage 3	\geq 180	or	\geq 110

Diagnosis

When obtaining the blood pressure (BP), the patient should be upright in the dental chair, with the arm bare and level with the heart (2). A calibrated aneroid or mercury sphygmomanometer or a validated electronic device should be used that encircles at least 80% of the upper arm. (2) Ideally, the BP should be taken after 5 minutes of rest and after the patient has refrained from caffeine and nicotine for at least 30 minutes (2). If the BP is elevated, waiting at least 2 minutes before retaking is suggested. Diagnosis of HTN is made after three consecutive elevated BP recordings (including the screening exam). Signs and symptoms of HTN may include dizziness, headache, tinnitus and tingling of the hands and feet, and bloody nose. Most hypertensive patients are usually asymptomatic.

Risk factors

There are well-known major risk factors associated with HTN such as age ($>$ 60), smoking, hypercholesterolemia, diabetes mellitus, family history of cardiovascular (CV) disease, and sex (increased prevalence in men and postmenopausal women)

(2, 5). Other factors that may predispose to HTN include race (blacks $>$ white), high salt diet, obesity, and excessive alcohol intake. Risk groups have been stratified and categorized in Table 2 based on presence or absence of major risk factors, clinical cardiovascular (left ventricular hypertrophy, angina, prior MI, prior coronary revascularization, heart failure) and target organ diseases such as stroke, transient ischemic attack, nephropathy, peripheral arterial disease, and retinopathy (2,5).

Risk Group A: No risk factors, no target organ or clinical CV disease.

Risk Group B: At least 1 risk factor (not including diabetes), no target organ or clinical CV disease.

Risk Group C: Presence of target organ or clinical CV disease and/or diabetes mellitus, presence or absence of other risk factors.

Table 2 : Management of Hypertension (5)

BP Stage	Cardiovascular Risk Group		
	Risk Group A	Risk Group B	Risk Group C
High Normal 130-139/85-89	Lifestyle modification	Lifestyle modification	Drug Therapy* Lifestyle modification
Stage 1 140-159/90-99	Lifestyle modification (up to 12 mos)	Lifestyle modification (up to 6 mos)#	Drug Therapy Lifestyle modification
Stages 2 and 3 >160/>100	Drug Therapy Lifestyle modification	Drug Therapy Lifestyle modification	Drug Therapy Lifestyle modification

* For those with heart failure, renal insufficiency or diabetes.
For patients at this stage who have multiple risk factors, clinicians should consider drugs as initial therapy, as well as lifestyle modifications.

Lifestyle modification should include exercise, balanced diet, weight reduction, moderation of alcohol consumption, and abstinence from tobacco. Antihypertensive drug therapy is initiated based on Table 2 above. Diuretics (furosemide, hydrochlorothiazide, spironolactone, triamterene, chlorthalidone) are commonly chosen to treat HTN and congestive heart failure. They reduce BP by inhibiting sodium and chloride reuptake in the kidney, which causes increased excretion of water and decreased intravascular fluid volume. *Beta*-blockers (metoprolol, propranolol, atenolol, timolol, pindolol, nadolol, bisoprolol) decrease BP by inhibiting *B*-1 receptors in the heart and kidney producing a decreased heart rate, vasodilation, and thus a fall in blood pressure. *Alpha*-1 blockers such as prazosin and terazosin decreased BP by inhibiting *alpha*-receptors in the periphery, which relaxes arterial smooth muscle and produces vasodilation. Centrally acting agents (clonidine, methyl-dopa, guanabenz) reduce sympathetic outflow from the CNS reducing BP. Direct-acting vasodilators (minoxidil, hydralazine) reduce blood pressure by relaxing arteriolar smooth muscle, thus reducing peripheral vascular. Angiotensin converting enzyme (ACE) inhibitors (lisinopril, enalapril, captopril, quinapril, benazepril) block the synthesis of angiotensin II, a potent vasoconstrictor and reduce the secretion of aldosterone. This reduces vascular resistance, decreases

es the retention of sodium and thus decreases BP. Angiotensin receptor antagonists (losartan, candesartan, valsartan) block the angiotensin II receptor and inhibit the effects of angiotensin II. Calcium channel blockers (diltiazem, amlodipine, verapamil, nifedipine) decrease BP by reducing calcium entry into vascular smooth muscle cells which reduces vascular tone and contractility and thus reduces peripheral resistance and BP.

Dental considerations

SECNAINST 5100 series mandates a blood pressure recording in three situations:

1. At every annual examination
2. Prior to and after invasive surgical procedures
3. At every appointment with a known hypertensive patient

Any patient with suspected or poorly controlled hypertension should be referred for medical evaluation utilizing the referral schedule in Table 3.

Table 3: Referral Schedule for Suspected HTN (2)

Initial BP (mm Hg)			
Stage	Systolic	Diastolic	Follow-up
	< 130	< 85	Recheck in 2 years
	130-139	85-89	Recheck in 1 year
1	140-159	90-99	Confirm w/in 2 mos.
2	160-179	100-109	Refer w/in 1 mo.
3	≥ 180	≥ 110	Refer immediately or w/in 1 week.

The dentist must first identify the hypertensive patient. A complete medical history should include personal and family history of hypertension, risk factors, current and previous medications, duration and levels of hypertension, history of any end organ or cardiovascular disease. If the BP is under good control, there is no contraindication to treatment.

Dental Management Guidelines (5)

- Take the BP before and after injection of local anesthetics with vasoconstrictors.
- Defer elective care and provide only urgent care for patients with Stage 3 HTN or those experiencing hypertensive signs and symptoms. Minimize or avoid the use of vasoconstrictors in these patients. Refer immediately or within one week to the appropriate medical provider depending on the clinical situation.
- Avoid long, stressful appointments.
- Nitrous oxide may be beneficial in controlling anxiety, however rebound hypertension may result if inadequate oxygenation (hypoxia) occurs (3).
- Minimize the use of local anesthesia with vasoconstrictor to 0.036 - 0.054 mg of epinephrine (2-3 cartridges of 2% lidocaine with 1:100,000 epinephrine) per visit in Stage 2, 3, and Risk Group C patients.
- Avoid epinephrine impregnated retraction cords in Stages 1-3.

Common oral related side effects are listed in Table 4.

Table 4: Side Effects (4,6)

Drug Class	Side Effects
Diuretics	Xerostomia, postural hypotension, lichenoid reactions
ACE inhibitors	Xerostomia, cough angioedema, dysgeusia
Calcium channel blockers	Gingival enlargement, postural hypotension
Vasodilators	Postural hypotension
Alpha-blockers	Xerostomia, postural hypotension

Drug Interactions

Prolonged use of NSAIDs and aspirin (2-3 weeks) may decrease the efficacy of beta-blockers, ACE inhibitors, and diuretics. Additive CNS depression may result when central agents such as clonidine are coupled with medication that depress the CNS such as benzodiazepines and opioid analgesics. Caution should be exercised when using local anesthesia with epinephrine and non cardio-selective beta-blockers (propranolol, nadolol, pindolol, timolol) as hypertension with reflex bradycardia may result. (5,6)

Conclusion

Dental officers are in an ideal position to identify patients with HTN. Early detection and referral can lead to prompt treatment and ultimately to decreased long term complications.

References

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