The Conservative Management of Hypertension

A Literature Review

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ABSTRACT

Hypertension is an affliction that is not new to today’s society as the first references to it are biblical. However, it is a disease that is becoming more prevalent in the United States at an alarming rate. More than 50 million Americans are affected by hypertension. An additional 30 million more are diagnosed as having a high normal blood pressure. Concurrently, cardiovascular disease associated with severe hypertension is one of the leading causes of morbidity and mortality in the United States. Since the symptoms of mild hypertension usually go unnoticed, the condition is unknowingly allowed to progress into a more severe form.

With more research being performed, it is becoming evident that there are many predisposing factors involved in the development of hypertension. Genetics, diet and other nutritional aspects, and lack of exercise play major roles in the development of hypertension. As health care providers, chiropractors are in a unique position to educate their patients on the benefits of various conservative approaches to management as well as the long-term effects of pharmacological treatment.

Chiropractors as primary care physicians must understand the mechanisms and management of this disorder as many times they are the first to diagnose hypertension in new patients. Interestingly, many of the same musculoskeletal findings are found in patients with cardiovascular disorders. These indicators are commonly discovered during a thorough chiropractic exam. The following review of literature addresses the mechanism, diagnosis, and conservative approaches to treatment.

Whether co-managing a hypertensive patient with a medical practitioner, or monitoring a mild case, implementation of the many conservative management
techniques that chiropractors employ is essential to a complete treatment plan\textsuperscript{13,16}.

Chiropractic adjustments, diet analysis and modification, cardiovascular exercise, and lifestyle changes are all conservative treatments within chiropractor’s scope of practice. The role chiropractic manipulation in the treatment of hypertension is still a debatable topic but more research is being done to document its effectiveness\textsuperscript{7,8,13,14,15}. 
BACKGROUND:

Hypertension is a disease that affects the cardiovascular system of those afflicted. Blood pressure is increased due increased tension within the artery. This is attributed to either an increase in the volume of fluid within the vessels, the cardiac output, and/or a decrease in the size of the vessels, which increases the total peripheral resistance and cause the heart to work harder\textsuperscript{22}. There are two types of hypertension\textsuperscript{22}. Primary, or essential hypertension, and secondary hypertension\textsuperscript{22}. Secondary hypertension is usually the result of another disorder, such as renal, cardiac, pulmonary disease, hypothyroidism, Cushing's disease, and adrenal disease. Secondary causes of hypertension accounts for only 5-10\% of overall cases\textsuperscript{1,3,22}. The renin-angiotension-aldosterone system is an integral component of hypertension due to renal problems\textsuperscript{22}. When the kidney senses a decrease in arterial pressure it will secrete renin, which is then converted to angiotension I in the plasma\textsuperscript{22}. Angiotension I is then converted into angiotension II in the lungs by angiotension converting enzyme\textsuperscript{22}. Angiotension II then acts on the peripheral vasculature to cause vasoconstriction, which causes arterial pressures to rise\textsuperscript{22}. Angiotension II will also causes the kidney to increase retention of salt and water which will increase the fluid volume, causing an increase in pressure\textsuperscript{22}. Some of the medications that are currently used for the treatment of hypertension are diuretics which cause a loss of fluid from the system. The kidney will then sense this loss and begin the renin-angiotension cascade. As the patient continually tries to reduce their volume via diuretics, the body will try to bring the pressure back up. A vicious cycle of fighting the bodies own physiological mechanisms is thus begun.
Pulmonary and cardiac causes of systemic hypertension are due to fluid backing up in the system, causing the total peripheral resistance to increase. Vasoconstriction in the pulmonary system due to long term inhalation of smoke or other toxic substances causes blood to back up into the heart, which will the cause fluid to back up into the system.

Essential hypertension makes up 90% of cases and is idiopathic in nature yet many of the predisposing characteristics have been identified. A combination of many genetic and environmental factors have been postulated. An extensive family history is essential even before a diagnosis is made. Nutritional factors such as dietary fat and salt intake, as well as electrolyte and mineral deficiencies need to be addressed. Other dietary and lifestyle characteristics have been implicated such as weight, amount of exercise, smoking, alcohol consumption, high caloric intake, and use of caffeine.

Guyton states that "acute hypertension can be caused by strong stimulation of the sympathetic nervous system," and hypothesizes about the neurogenic component in chronic cases. Chiropractors have long speculated that a chronic stimulation of the sympathetic nervous system, or sympathicotonia, due to segmental dysfunction and pathomechanical origins, as well as by long term use of stimulants, can be an underlying cause of hypertension.

A diagnosis of hypertension is made when manometric readings of a patient's blood pressure are elevated on at least three separate occasions on two separate visits. This method is employed so as not to misdiagnose a case of white-coat hypertension, caused by the anxiety associated with being at the doctor's office. The sphygmomanometer should be of proper size and must be correctly positioned and operated.
so as not to indicate falsely elevated levels\textsuperscript{16,18}. Patients are considered to be high normal or mildly hypertensive when these consecutive readings indicate either a systolic pressure over 130-140 mm Hg or a diastolic pressure over 90-95 mm Hg\textsuperscript{16,18}. These are the patients that will benefit most from non-drug interventions\textsuperscript{16,16,18}. When systolic readings approach 160-180 mm Hg and/or diastolic readings are above 110-115 mm Hg the patient may require pharmacological co-management and referral is warranted\textsuperscript{16}. The term co-management is stressed here as patients who exhibit consistently elevated pressure readings must be educated as to the myriad of conservative measures that will benefit them in their treatment regimen as well as the pitfalls of becoming dependent on a strictly pharmacological approach\textsuperscript{19}.

Medical protocols for management of hypertension include the use of vasodilators, beta blockers or sympathetic inhibitors, and diuretics\textsuperscript{2}. Many times medical practitioners will employ other conservative techniques yet it is doubtful that all aspects are addressed. The ultimate long-term goals should always be to bring down pressures and eliminate the pharmacological agents from the treatment plan. Chiropractors are in an excellent position to educate their patients in this matter.

Conservative approaches to management should include chiropractic manipulation, exercise, and nutritional/lifestyle modifications. Each category is equally important in the management protocol, and all should be employed to obtain the full benefits possible.

**CHIROPRACTIC MANIPULATION:**
Studies of chiropractic manipulation and hypertension indicate that positive results can be achieved with adjustments at consistent intervals to certain areas of the spine. The majority of the studies performed direct the chiropractor to careful assessment of the upper thoracic spine, T1-T5\(^2,6,7,8,12,14,15,16,18\). Beal states that particular attention should be paid to the left thoracic area\(^4\). Other researchers have also noted the muscular components of these joint complex dysfunctions at these same levels.\(^2,4,5,10,11\) T1-T5 represents the origin of the sympathetic innervation to the heart\(^2,12,23\). One study implicates osteophytic lipping of the thoracic spine in patients with hypertension\(^9\). By relieving the somatic stresses acting on the spinal cord at these levels, chiropractors can influence the sympathetic component of this disease\(^2,7,12,23\). Other studies indicate a lower thoracic spinal component at the T11-T12 area\(^2,12\). This is the location of the celiac ganglion and sympathetic innervation of the kidneys and adrenal glands\(^2\). It is postulated that adjustment to this region can help restore normal neurological input to the kidney\(^2\).

These studies also indicate the need to address the upper cervical spine and occiput when evaluating the musculoskeletal system\(^2,12,15,15\). Vagotonia, or inhibition of vagal influence is postulated as a contributor to hypertension\(^23\). A parasympathetic influence from adjustments to the C1-occiput joint dysfunctions is directed at stimulation afferent branches of the Vagus nerve, slowing the heart rate and decreasing cardiac output\(^13,15,23\). This concept is biomechanically and physiologically sound yet more research needs to be done.

Other techniques warrant mention here. Dulgar, et al. describes the anithypertensive effects of a basic single notch adjustment\(^24\). Activator methods research has also been conducted on 21 hypertensive patients with effective results\(^7\).
DIET/LIFESTYLE:

Diet and lifestyle modification is often regarded as the number one step in treating patients with hypertension. Various components are essential to helping control high blood pressure. Reducing caloric intake combined with exercise can help the patient lower blood pressure\(^1\). Weight loss of 15 to 20 lb. has been shown to reduce both systolic and diastolic pressures by 10 mmHg\(^1\).

Reduction of sodium intake is another key ingredient\(^{20,28}\). Excess sodium within the body leads to an increase in fluid retention and increased volume of the blood\(^{20}\). This has an overall effect on the blood pressure\(^{20}\). Sodium intake should be limited to 100 mmol or 2.4 g/day\(^{20}\). Doctors should advise their patients to avoid such sodium containing foods as baking soda, canned vegetables, commercially prepared foods, over-the-counter medications that contain ibuprofen (Advil, Nuprin), diet soft drinks, foods with mold inhibitors, preservatives, sugar substitutes, meat tenderizers, softened water, and soy sauce\(^{20}\). Patients should also restrict all animal fats such as bacon, beef, bouillon, gravies, peanut butter, pork, sausage, and smoked or processed meats\(^{20}\). Aged cheeses, chocolate, sour cream, sherry, wine, and yogurt should also be avoided\(^{20}\). These foods should be eliminated completely if the patient is taking a MAO inhibitor\(^{20}\). Many of these foods contain tyramine and/or its precursor tyrosine\(^{20}\). Combining these foods with a MAO inhibitor increases the patient's chance of experiencing and increase in blood pressure and possibly stroke\(^{20}\). Amino acid supplements and foods containing phenylalanine and phosphorus, such as soda, should be avoided\(^{20}\). Over the counter antihistamines and vitamins should only be used under medical supervision\(^{20}\).
The hypertensive patient should be placed on a high fiber diet that includes plenty of fruits and vegetables, fresh juices, broiled white fish, skinless turkey or chicken, and distilled water\textsuperscript{20,28}. Grains such as brown rice, buckwheat, millet, and oats should be consumed regularly\textsuperscript{20,28}. Supplemental fiber should also be included separate from meals\textsuperscript{20,28}.

Other supplements should include electrolytes and minerals, especially for the patient who is on a diuretic medication\textsuperscript{18,20,6}. Increased excretion of potassium can adversely affect heart function\textsuperscript{6,18,20}. Studies indicate that addition of 48-120 mmol/day of potassium has had significant effects on reduction of blood pressure\textsuperscript{6,28}. It is postulated that potassium has an effect on lowering peripheral vascular resistance, renin concentration and neural mechanisms that effect cardiac musculature\textsuperscript{6}.

Many patients with hypertension experience hypomagnesemia also due to their prescribed diuretics\textsuperscript{6,18,20}. These patients should take supplemental forms to replenish the renal loss\textsuperscript{20,28}. Loss of this mineral can cause bone deterioration and abnormal heart rhythms. Dyckner and Wester studied the addition of 15mmol/day for 6 months in 17 patients and found a reduction of 12 mmHg systolic and 8 mmHg diastolic pressures\textsuperscript{6}. 1000 mg daily supplementation is regarded as adequate\textsuperscript{20}.

Calcium consumption should also be evaluated as hypertensive patients mobilize their calcium differently then normotensive patients do\textsuperscript{6,28}. Research indicates that calcium supplementation with 1500 mg daily can lower systolic and diastolic pressures by 2-4 mmHg\textsuperscript{6,20}. The doctor, however, must screen the patient for high or low levels of renin in the serum as high renin patients actually have an increased level of calcium\textsuperscript{6}. A single gram/day has shown to be beneficial to the low renin groups\textsuperscript{6}.
Fish oils containing omega-3 fatty acids have also been studied in regards to their antihypertensive properties\textsuperscript{6,26,27}. Ingestion of 50 ml of fish oil/day provided the patient with sufficient levels of eicosapentaenoic and docosahexaenoic acid to reduce pressure in tested subjects\textsuperscript{27}. Another study by Bonaa et. al., suggests the consumption of 6 grams of corn oil a day can have the same antihypertensive effects\textsuperscript{26}.

Researchers funded by the National Heart, Lung, and Blood institute (NHLBI), have established dietary guidelines for hypertensive patients known as the “Dietary approaches to Stop Hypertension,” or the DASH diet\textsuperscript{28}. The diet appears in The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure\textsuperscript{28}. This is a combination diet rich in fruits and vegetables, low fat dairy foods, and low in saturated and total fat\textsuperscript{28}. This 2,000 calorie diet is low in cholesterol, high in dietary fiber, potassium, calcium, magnesium, and moderately high in lean proteins such as poultry and fish\textsuperscript{28}.

Along with these diet modifications, the patient then needs to evaluate their lifestyle and social vices. Ingestion of alcohol and tobacco should be prohibited\textsuperscript{17,20,28}. Smoking should gradually be eliminated\textsuperscript{17,20,28}. Caffeine should also be avoided\textsuperscript{20,28}. Any stress in the patients life should be identified and removed at all cost and the patient should receive plenty of rest\textsuperscript{20,28}. A moderate to light exercise programs should be initiated\textsuperscript{17,20}.

**EXERCISE:**

It is still uncertain how much of an effect exercise has on hypertension yet increasing aerobic activity can help the patient achieve an adequate weight and increase
the patients functional health status\textsuperscript{1,6,28,29}. The physical activity need not be particularly strenuous but should be performed at a minimum of 30-45 minutes 3 time per week\textsuperscript{1,6,28}. Walking, cycling or jogging are relatively low impact exercises that the patient can incorporate into their daily activities\textsuperscript{1}. Patients who demonstrate high blood pressures should undergo a complete cardiac evaluation by their cardiologist before undertaking a cardiovascular routine.

CONCLUSION:

Presented in within this review is a conservative approach to managing hypertension along with the patient’s pharmacological treatment and a protocol for the chiropractor to employ when consulting with patients who exhibit pressures in the high normal to mild hypertensive range. Chiropractors need to educate their patients as to the progressive nature of this disease and the factors that precipitate its advance into the more severe stages. Doctors in the field need to command patient compliance when prescribing a treatment plan. Although there are other conservative approaches to managing hypertension such as acupuncture and herbal supplements, these treatments need to be researched more as to their efficacy. Patients who are taking medication for their hypertension need to be counseled as to not become completely reliant on their medication alone and should be encouraged that elimination of pharmacological agents from the treatment plan is the ultimate goal.
Works Cited


