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Review on the Principles and Current Trends in Management of Hypertension and Cardiovascular Diseases

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Abstract
This review focuses on hypertension, other cardiovascular diseases and some new developments in their managements.
Hypertension is a cardiovascular disease of increasing medical and public health importance. It is a risk factor for myocardial infarction, stroke and chronic renal failure. Cardiovascular diseases have been recognized as a major cause of death in man and animals across the globe and it has placed enormous economic burden on patients, families, pet owners and national economy. A great number of pets have hypertension and cardiovascular diseases that are unnoticed until the animals are presented with sudden blindness, kidney failure and other end-organ damages. Many have been lost to cardiovascular diseases because they are under diagnosed. There is therefore, the need for proper diagnosis and management. Current classes of drugs offered in the management of hypertension in dogs include angiotensin converting enzyme inhibitors, angiotensin receptor blocker, calcium channel blockers, vasodilators and diuretics. Current trend in the management of hypertension is the use of natural plant products and phytocompounds to reduce end organ damage.
Therefore, early diagnosis and good management with orthodox anti-hypertensives and novel natural products will save the lives of pets and other animals, with attendant improvements on wellbeing of men and animals.
Keywords*: Hypertension, Myocardial infarction Management, antihypertensive, phytocompounds*

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I. Introduction

As the name suggests, hypertension (HTN or HT), also known as high blood pressure (HBP), is a long-term condition where the blood pressure in the arteries is always elevated. In most cases, hypertension has no adverse consequences. For those with long-term hypertension, it may lead to a wide range of health problems including stroke and coronary artery disease as well as atrial fibrillation and peripheral blood vessel disease. Essential (basic) hypertension and Secondary (optional) hypertension are both types of hypertension.

Essential Hypertension.

Essential hypertension, in most instances, is a result of a person's or animal's lifestyle and genetics(Fu, 2020). Overconsumption of salt in the diet, excessive weight, smoking, and booze usage are all examples of bad habits that increase one's risk of developing hypertension. Systolic blood pressure and diastolic blood pressure, which are the highest and lowest tensions, are used to categorise blood pressure. In himans, most adults' average pulse is between 100 and 130 millimetres mercury (mmHg) systolic and 60 and 80 millimetres mercury (mmHg) diastolic (Krempasky, 2020). If a person's resting pulse is consistently over 130/80 mmHg or 140/90 mmHg, the person is considered to have hypertension. (Sliwa, 2018).

Changing one's lifestyle and taking medication may help lower one's risk of developing circulatory issues. Weight loss, increased physical activity, reduced salt intake, reduced alcohol consumption, and a healthy diet are all part of a healthier lifestyle. For those times when lifestyle adjustments don't work, anti-hypertension medications are used. In 90% of cases, taking up to three medicines at once helps control hypertension. A brighter future is linked to the use of medications to treat moderately elevated blood vessel pulse (defined as >160/100 mmHg). Some studies have shown an advantage to treating blood pressure between 130/80 mmHg and 160/100 mmHg, while others have found a marginal benefit (Oniszczuk, 2021). Approximately 16 to 37 percent of the world's population is affected with hypertension. Hypertension was shown to be a factor in 18% of all deaths in 2010. (9.4 million around the world). There are few negative symptoms of hypertension and the only way to tell whether one has it is via a test or a random visit to the clinic Symptoms of hypertension in some people include headaches (particularly back of the head and early in the day), dizziness, tinnitus (a humming or muttering sound in the ears), blurred vision, and swooning. However, it's possible that these adverse effects

aren't due to hypertension at all, but rather to the associated anxiousness. In general, the severity of retinopathy is correlated with the duration or severity of hypertension.

Secondary Hypertension

Most instances of auxiliary hypertension, which includes cases of high blood pressure due to a known cause, such as chronic renal disease, kidney supply channel restriction, an endocrine disorder or the use of contraceptives, fall into this category (Scott, 2021). Secondary hypertension is the type of hypertension that is associated with a known pre-existing cause. They clinical signs of hypertension, are those of primary problem (causes) and those of complications caused by hypertension. For instance, Cushing's syndrome may manifest symptoms of hypertension, and symptoms related to hyperadrenocorticism such as bison mound, obesity, hyperglycemia, fatique (Phipps, 2016). Hyperthyroidism often results in weight loss with an increased appetite, a rapid pulse, swollen eyes, and a tremor (Bertagnolli, 2016). Aortic coarctation is associated with delayed or skipped femoral blood vessel beats and reduced blood pressure in the lower extremities (Nugent, 2022). Pheochromocytoma may produce sudden spikes in blood pressure, along with headaches, palpitations, a pale complexion, and excessive sweating (Lin and Eacker, 2020).

Treatment and Management Goals in Hypertension

Clinicians and patients must work together to optimize pharmacological and non-pharmacologic therapy options for hypertension patients in order to avoid adverse effects on target organs. Treatment for high blood pressure has long been aimed at reducing blood pressure enough, and it was long assumed that the advantages of lowering were independent of the antihypertensive medicine being used. All of the drugs were equally effective in reducing blood pressure, thus they all seemed to be equally helpful. Antihypertensive medicine has won a series of undeniable triumphs over the last 30 years because of this strategy (Phipps, 2016). The pharmacologic activities and hemodynamic effects of widely available antihypertensive medicines differ substantially. For instance, it is possible that hypertension result from increased vascular resistance but not all antihypertensive drugs reverse the circulatory dysregulation by restoring peripheral vascular resistance to normal. (Parsanathan and Jain, 2020). In this approach, the goal of reducing blood pressure by reducing vascular resistance without affecting cardiac yield is acceptable and should be attempted (Hirsch and Hong, 2019).

In some patients, antihypertensive medication has failed to prevent coronary artery disease, which is the most common complication of hypertension. However, timely detection, proper management and lifestyle adjustment can help to prevent coronary disease and other complications. (Tadic, 2022).

General Approach, Screening, and Follow-up

In order to accurately estimate blood pressure, medical care providers must follow certain rules. To prevent and cure high blood pressure, the BP should be managed in the usual way: increased or arranged into 1 or 2 hypertensions. High blood pressure (BP) is defined as being between 120 and 130 millimeters of mercury (mm Hg) or 80 and 90 millimeters (mm Hg) for stage 1 and 140 or more millimeters of mercury (mm Hg) for stage 2 of hypertension. Prior to diagnosing someone with hypertension, it is necessary to use a standard based on two measurements taken on two separate occasions to determine the individual's BP level. In order to confirm the diagnosis of hypertension and to adjust the dosage of a BP-lowering medicine, out-of-office and self-checking BP measurements are recommended (Napoli, 2016).

African Americans, Hispanics, whites, and Chinese adults without hypertension had a 40-year chance of developing hypertension of 93%, 92%, 92.2%, and 86% respectively. When it comes to mortality and disability, hypertension was a major contributor in 2010 over the globe, and a more significant supporter of events for women and African Americans than for whites. Log-direct design expansions from SBP levels (115 mm Hg up to >180) and from DBP levels (75 to >105) are often overlooked because of the risk of CVD expansions (Kitt, 2019). For every additional 10 millimetres of increase in systolic blood pressure (SBP) or 20 millimetres (SBP), the risk of mortality from cardiovascular disease increases. Higher SBP and DBP are associated with an increased risk of cardiovascular disease (CVD), angina, myocardial necrosis (MI), heart failure, stroke, and peripheral blood vessel disease. SBP has reliably been linked to an increased risk of CVD after change for, or within layers of, SBP; this is not valid for DBP, which is not associated with an increased risk of CVD.

Patients with hypertension should have their other CVD risk factors, such as smoking, diabetes, dyslipidemia, excessive weight, poor well-being, unfavourable eating habits, and sleep apnea, evaluated and monitored. Basic metabolic testing includes fasting blood sugar level and complete platelet count as well as cholesterol and lipids levels. Other important tests for essential hypertension include thyroid stimulating hormones (TSH) function test and uric acid assay, electrocardiogram, optional echocardiogram and serum biochemistry.

In man and animal patients with new-onset or uncontrolled hypertension, screening for secondary causes is essential, also, presence of target organ damage (cerebral vascular sickness, retinopathy, left ventricular hypertrophy, coronary artery disease [CAD], chronic kidney disease [CKD]), peripheral vascular disease, albuminuria), or for adults with new-onset or uncontrolled hypertension (Rouhi-Boroujen, 2017). Non-steroidal anti-inflammatory medicines (NSAIDs), steroids/androgens (androgens), decongestants, caffeine, and monoamine oxidase inhibitors (MAOIs) are some of the substances that may cause high blood pressure. The evaluation of unexpected causes for secondary hypertension is presented (pheochromocytoma, Cushing's condition, intrinsic adrenal hyperplasia, hypothyroidism, hypothyroidism, and aortic coarctation) in the event that more specific clinical features are accessible. Patients that have been diagnosed with these conditions should be referred to a specialist in the field.

For overweight or obese man and animal, non-pharmacologic methods to lower blood pressure include a heart-healthy diet that limits salt and includes potassium supplements, as well as an increased level of physical activity via an organized programme should be adopted. (Serebrovskaya and Xi, 2016).

Management Principles of Hypertension Using Conventional Antihypertensive Medications

Calcium Channel Blocker

Calcium channel blockers are anti-hypertensive medications. They prevent the movement of calcium into the heart and blood vessels through calcium channels. Calcium causes the heart and arteries to contract even more clearly. Calcium channel blockers allow arteries to relax and open by inhibiting calcium. Additionally, certain calcium channel blockers may slow the heartbeat, which can reduce blood pressure. It is also possible to recommend the prescriptions for the relief of chest pain (angina) and the management of an irregular heartbeat. Calcium antagonists is another name for calcium channel blockers. There are both short-acting and long-acting calcium direct blockers. The effects of short-acting medications might last just a few hours. while long-acting medications provide a longer lasting effect(Shaito, 2020). Example of calcium channel blockers are: Diltiazem (Cardizem, Tiazac, etc), Felodipine, Nicardipine, Amlodipine, Nicardipine, Nifedipine (Procardia), Nisoldipine (Sular) (Calan SR, Verelan)

Angiotensin Converting Enzyme Inhibitors

Inhibitors of the angiotensin converting enzyme (ACE) are drugs that help relax veins and arteries to lower the blood pressure. They decrease systemic vascular resistance without increasing the heart rate and promote natriuresis. ACE inhibitors effectively reduce blood pressure in hypertensive patients and reduce mortality in patients with congestive heart failure and left ventricular dysfunction after myocardial ischemia. ACE inhibitors inhibit ACE, the enzyme that catalyses the conversion of angiotensin I to Angiotensin II. Angiotensin II is a potent vasoconstrictor that acts on vascular smooth muscle, it also interact with sympathetic nervous system peripherally and centrally to increase vascular tone (Reckelhoff, 2018)., It also causes volume expansion, renal vasoconstriction, fluid retention and promote cell proliferation and hypertrophy thus promoting hypertension and vascular remodeling (Reckelhoff, 2018). When the heart is forced to work harder, it may lead to hypertension. ACE inhibitors inhibit the production of angiotensin II and thereby indirectly inhibiting the activities of angiotensin II and thus maintaining the blood pressure within normal limit (Reckelhoff, 2018).

Examples of ACE Inhibitors

There are many ACE inhibitors in the market. The ideal choice depends on a variety of factors, including the state of health and current situation. An ACE inhibitor, for example, may be beneficial to those with a long-term renal condition. The following are examples of ACE inhibitors: Benazepril (Lotensin), Captopril (Vasotec), Fosinopril (Prinivil, Zestril), Lisinopril (Prinivil, Zestric), Moexipril (Prinivil, Zestril), Perindopril (Prinivil, Zestric), Quinapril (Accupril), and Ramipril. A variety of disorders may benefit from the use of ACE inhibitors, including, but not limited to hypertension (Reckelhoff, 2018). Some chronic kidney illnesses, coronary artery disease, heart disease, and cardiovascular collapse, scleroderma and headaches.

ACEReceptor Blockers

Angiotensin II receptor blockers help to reduce the high blood pressure and make it easier for the heart to draw in blood. In the body, angiotensin II is potent vasoconstrictor that cause increase vascular resistance and high blood pressure. The effects of this vasoactive chemical makes the heart to work harder because of the increased workload. Drugs that inhibit angiotensin II receptors impede the activities of the angiotensin II, thereby enabling vasodilation and normotension.(Ganguly *et al*., 2019). A few angiotensin II receptor blockers are available for purchase. These angiotensin II receptor blockers include: Azilsartan (Edarbi); Candesartan (Atacand); Eprosartan; Irbesartan (Avapro); Losartan (Cozaar); Olmesartan (Benicar); Telmisartan (Micardis); and Valsartan (Micardis) (Diovan).

Alpha Blocker

Alpha blockers are used to manage hypertension and benign prostatic hyperplasia. In order to reduce the load on the circulatory system, they prevent the release of a chemical known as norepinephrine from contracting the muscles of smaller arteries and veins. The veins remain open and free as a result. This increases blood flow and lowers the heart rate. Because alpha blockers also relax other muscles in the body, they may help older men with prostate hyperplasia to urinate more often, as well. There are two types of alpha blockers: short- and long-term. The effects of short-acting medications last just a few hours, but they operate quickly. While long-acting medications take longer to take effect, the benefits outweigh the drawbacks (Guan, 2019). The optimal alpha blocker for human is determined by the health and the disease that one is trying to treat. Other names for alpha blockers include alpha-adrenergic obstruction specialists, adrenergic blocking agents and alpha-adrenergic antagonists. Alpha blockers may be used solely to treat hypertension or in combination with other drugs. Examples of alpha blockers are Prazosin (Minipress), Doxazosin (Cardura) and Tetrazosin (Milota, 2022).

Beta Blocker

Beta blockers, also known as beta-adrenergic blocking agents, are used and anti-hypertensive medication. They are used to control sinus tachycardia, atrial flutter, atrial fibrillation and certain ventricular arrhythmia. It acts is to block β-adrenoceptors and this protect the heart that has been sensitized to the action of catecholamines in hearth failure or myocardial infarction (Blander *et al*., 1990). Adrenaline-blocking beta blockers function by decreasing the effects of epinephrine (also known as adrenaline). Beta blockers reduce heart rate by slowing it down and reducing its power (Medina-Remón, 2018). In addition, beta blockers help to lengthen veins and blood vessels, which in turn helps to increase the flow of blood. . It is important to note that certain beta blockers just affect the heart, whereas others affect the heart and veins simultaneously (Martelli, 2020). The primary care physician will choose which beta blocker is suitable for the person based on the current health conditions. There are a number of beta blockers that may be taken orally, such as Acebutol, Atenolol, Bisoprolol and Metoprolol, which is also known as Lopressor and Toprol XL (Inderal).

Vasodilators

Vasodilators are drugs that widen the veins by opening them up. Arteries and veins muscle walls are influenced by these factors, which prevent muscle fixation and limit muscular movement. As a result, blood moves more efficiently through the vessels. Blood pressure is reduced since the heart does not have to work as hard (Martelli, 2020). Calcium channel blockers, a common antihypertensive drug, may also cause vein enlargement. Hydralazine and minoxidil, on the other hand, are vasodilators that function directly on vessel walls (Fu, 2018).

Uses of Vasodilators:

There are a variety of illnesses for which doctors recommend vasodilators, such as: hypertension; hypertension during pregnancy or labour; hypertension during pregnancy or childbirth (toxemia or eclampsia) a breakdown of the cardiovascular system; high blood pressure that affects the pulmonary arteries; (pulmonary hypertension) (Kim, 2018).

Diuretics

Diuretic is the second most commonly prescribed drug of antihypertensive medication.
(George and Demeric, 2016). Examples include thiazide, loop diuretics, potassium sparing diuretics.

Sodium and water are flushed from the system using diuretics. Diuretics increase the quantity of urine and electrolyte excreted in a given period. In order to reduce the amount of water in the blood vessels, salt aids in the elimination of water from the blood(Oliveira-Paula *et al*., 2017). Diuretics commonly used include loop diuretic, thiazide and potassium sparing diuretics

A different part of your kidneys is affected by each diuretic. More than one kind of diuretic may be combined with another medication for a hypertension management. The choice of an ideal diuretic depends on the overall health of the patient and the cardiovascular condition being managed. Thiazide diuretics may be administered orally and these include:chlorothiazide, chlorthalidone, hydrochlorothiazide, Indapamide, and Metolazone (Gupta, 2019)

Loop diuretics include: Bumetanide (Bumex), Ethacrynic acid (Edecrin) and Furosemide (Lasix) and some other. Examples of Potassium-sparing diuretics areAmiloride (Midamor), Eplerenone (Inspra), Spironolactone (Aldactone, Carospir), and Triamterene (Dyrenium) (McNally, 2019).

Management of Other Cardiovascular Diseases

Congestive Heart failure (CHF)

CHF is a serious disorder in which blood flow to the heart is impaired. CHF, despite its name, does not suggest that the heart has failed or will stop operating. That's not to say that the heart muscle has weakened over time or has a mechanical problem that prevents it from filling up with blood. In this way, the heart is unable to keep track of the body's interest, and blood returns to the heart at a faster rate than it is typically sucked out of the body (Kishi, 2018). This syphoning problem suggests that the body's various organs might get inadequate oxygen-rich blood. The body makes many efforts to compensate. As soon as the heart contracts, the heart beats faster to make up for the reduced blood flow and greater effort. This might lead to heart palpitations. To accommodate the extra blood, the heart also grows in size. This causes the lungs to fill up with fluid, resulting in exhaustion. A lack of blood flow to the kidneys may lead to water and salt retention, which can lead to renal failure. Most often, cardiovascular deterioration is a constant threat, regardless of the therapy used (Otto, 2021).

Prevention of Congestive Heart Failure

The only strategy to avoid a congestive heart failure is to avoid situations that exacerbate it or to take careful measures to address the problems that these situations inevitably generate (Van De Bruaene, 2018).

One should eat foods that are low in saturated fat, sugar, and salt to help lose weight. It's important to consume plants grown on the ground (like kale), low-fat dairy (like cottage cheese), lean protein (like chicken breast without the skin), and good fats (like olive oil and seafood) (Song, 2017).

Being physically active, in addition to a healthy diet, may help one lose weight and improve the heart health.

Maintaining adherence to prescribed medicines, such as statins to lower cholesterol levels, may have a significant impact" (De Backer, 2019).

The long-term benefits of medications may be attributed to their ability to prevent respiratory failures and coronary events that lead to cardiovascular collapse (Baumgartner, 2021).

Valvular Insufficiency Disease

Infection of at least one of the heart's four valves is considered a valvular heart disease (the aortic and mitral valves on the left half of heart and the pulmonic and tricuspid valves on the right half of heart). As a result of maturation, but also due to intrinsic (inalienable) abnormalities or specific disease or physiologic cycles, such as rheumatic coronary illness and pregnancy, these situations are common (Fu, 2020). Valves are vital to the heart's function, which serves as a guide for blood flow through the heart and its many veins. Due to the severity and kind of valvular infection (stenotic or regurgitant), valvular insufficiency might result in impaired heart function. Medications alone may be used to treat damaged valves, but they are commonly combined with valve repair or replacement over the course of treatment (Nørgaard, 2018). Valvular coronary disease are managed based on the cause (congenital or acquired) but commonly, they are treated with anti-inflammatory medications, antithrombotic drugs such as ibuprofen, anticoagulants, antibiotics and diuretics. Surgical intervention may be necessary at times (Tackling and Borhade, 2021).

Cardiac Glycosides

Heart failure and irregular heartbeats may be treated with cardiovascular glycosides. They are part of a group of drugs that are used to treat heart and cardiovascular diseases. The drugs must be used with caution because of the injury associated with the abuse or misuse. There is possibility of heart glycoside accumulation if the recommended dose is exceeded (Oliveira-Paula *et al.*, 2017). This might happen by accident or on purpose. The digitalis (foxglove) plant's leaves, for example, contain heart glycosides. Animal or people who consume a large amount of these leaves may have negative side effects (Rao, 2019). Patients who take cardiac glycosides on a regular basis run the risk of long-term (continuous) damage. Animal with renal insufficiency or dehydration can also have glycoside accumulation (Kuhlmann, 2019).

Management of Hypertension in Pregnancy

Gestational hypertension, preeclampsia, chronic hypertension are common medical complication of pregnancy and they constitute a major cause offoetal, maternal, and perinatal morbidity and mortality (Andrea *et al.*, 1997). Antihypertensive drugs are used to control high blood pressure in both pregnant and non-pregnant animals. An antihypertensive medication dose reduction or discontinuation is often taken into consideration when measuring the natural decline in blood pressure during in early stage of pregnancy. In order to provide the best care, it is necessary to maintain a blood pressure of 110-140/85 mmHg, do routine checks for the progression of toxaemia, and pay special attention to the health and development of the foetus(Guan, 2019). Signs and side effects of toxaemia include migraine, visual abnormalities, epigastric or right upper quadrant pain, and oedema in the right upper quadrant (Guan, 2019). Preliminary blood pressure measurement, using a

blood pressure monitor or sphygmomanometer in the ideal scenario, and proteinuria testing are also included in the appraisal process. In the majority of cases, dipstick urinalysis (mechanised or visual) is utilised to assess for proteinuria (Romaguera, 2020). However, it's possible that the dipstick results are incorrect, and the urea: creatinine ratio should be checked as well (Romaguera, 2020).

Gestational Hypertension

Gestational hypertension or preeclampsia and chronic hypertension are common medical complication of pregnancy and constitute a major cause of foetal, maternal and perinatal morbidity and mortality. (Andrea *et al*., 1997)

Pregnancy-induced hypertension is a rise in blood pressure that occurs during gestational period without any other symptoms of toxaemia. Pregnancy-induced high blood pressure is associated with an increased risk of developing toxaemia (up to 25% depending on the gestational period) and the development of cardiovascular disease in the future (Kitt, 2019). Labour hypertension isn't generally associated with fetal growth restriction. Symptoms of pre-eclampsia include hypertension, pedal oedema, proteinuria, dizziness, severe vomiting and nausea, haemoconcentration, hypoalbuminemia, liver function / coagulation abnormalities, increase urate level and vision impairment. Pre-eclampsia is general and cautiously managed by anti-hypertensive drugs, corticosteroids and anticonvulsant medication such as magnesium silicate is a drug for impending convulsion in eclamptic phase of the disease (Lindhelmer and Katz, 1989)

Postpartum Management

In pregnant hypertension or pre-eclampsia, hypertension usually goes away few weeks after giving birth. Consideration should be given to primary or secondary hypertension if this does not occur. The systolic blood pressure should be reduced to less than 120 mmHg by down titration of antihypertensive medications postnatally, with regular monitoring of blood pressure. For women with chronic hypertension, the choice to return to their previous antihypertensive therapy will depend on its compatibility with nursing and their plans for future pregnancies (Phipps, 2016). As long as they are aware of the significance of reviewing their therapy prior to any subsequent pregnancies, it would be fair to restore them back to their customary treatment early postpartum. If one is taking an antihypertensive medication during pregnancy, one may continue taking it while nursing. While the risk of depression is 30 percent, methyldopa is generally discontinued postpartum because of this (Crossland, 2019). There are relatively small quantities of ACE inhibitors in breast milk and they are often used during breastfeeding. Due to a lack of relevant safety information, angiotensin receptor blockers are not advised (Gupta and Yusuf, 2019).

Current / Novel Trends in Management of Hypertension in Dog and Cat

ACE inhibitors, ARBs, beta blockers, diuretics, and calcium channel blockers are some of the most often used medications for canine hypertension management. Depending on the patient's response to therapy, more medications may be necessary (Guan, 2019). A dog with hypertension should have a systolic pressure of 140mmHg or less and a diastolic pressure of 90mmHg or less as a therapy goal. The outcomes of medication and the spread of illness will be monitored by periodic laboratory tests. Congestive cardiovascular collapse, renal disease, retinal degeneration, and vision loss are all possible complications of hypertension in the canine (Petricevic, 2020).

Routine testing for hypertension has not been adopted by the veterinary community, despite the fact that modest heights in blood pressure may have real and unexpectedly hazardous consequences. The lack of a common definition of hypertension and the confusion about the accuracy of circuitous blood pressure measurement methodologies have both been cited as reasons for this reluctance (Ferrières, 2018). In addition, there has been no consensus on the best technique to determine whether people are at risk of developing hypertension and how to establish a successful treatment regimen. It's possible that hypertension is one of the most under-recognized basic illnesses that affect animals since it's so subtle. Patients with hypertension are often not evaluated until they have developed retinal separations and a severe visual deficit (Reckelhoff, 2018). This is not uncommon. Many veterinarians have been reluctant to introduce hypertension testing, analysis, and treatment into clinical practice because of the vulnerability, which includes the meaning of hypertension and failure to determine the population at risk, Conventions for treating hypertension in cats and dogs have also proven difficult to establish. It is becoming more apparent that the recurrence rate of fundamental blood vessel hypertension is higher than previously thought, since it affects patients' endurance and sense of well-being. Subclinical or clinical symptoms of another underlying infection process are seen in patients with hypertension (HT). Constant HT may cause damage to the eyes and kidneys, as well as the mind and cardiovascular system, known as target-organ injury. Novel trends involve the use of phytocompounds, antioxidants and natural supplements in addition to or as alternative to the orthodox anti-hypertensive medications in order to prevent organ damage associated with hypertension and avoid the side effect of conventional orthodox medicines.

Ethnoveterinary Approach to Hypertension Management

The primary goal of ethnoveterinary medicine (EVM) is to validate the legitimacy of traditional veterinary medicine practices. One may find several non-Western practices of veterinary medicine in Africa, China and Tibet. Plants have been used extensively throughout history to cure and prevent a wide range of illnesses and diseases in both humans and domesticated animals(Parsanathan and Jain, 2020). Today, these old-fashioned remedies are promoted in veterinary medicine because of their promising therapeutic efficacy, chemotherapeutic outcomes and reduction of pharmaceutical buildups in animal products ingested by humans (Silversides, 2018). New perspectives are being developed to better understand how ethno pharmacology research may be done and how it might be done better in the future. It is important for scientists to have a clear vision of the latest facts in order to achieve pragmatic and relevant resonance and as in other fields, adherence to globally recognized environmental factors, moral and monetary concerns and correct exploitation of plants. (Ganguly et al., 2019).

Bioactiveplant constituents may be extracted and used in little amounts, allowing for a high level of survivability with a small amount of the parent spice. Now that strychnine, atropine, ephedrine havebeen discovered and used extensively in veterinary medicine, it's no surprise that these natural remedies are becoming more popular with pet owners(Kitt, 2019). In contrast to patented synthetic drugs, garlic has been shown to be an effective alternative. Garlic has long been used in traditional medicine to prevent and cure diseases in humans and domesticated animals. Other than its use as a food additive, garlic has made significant success in controlling hypertension and hypercholesterolemia. Garlic was employed in Egyptian pyramids and ancient Greek temples at the beginning of recorded history. In many cultures, garlic was used as a means of boosting the strength and endurance of physical workers. Ethnoveterinary medicine has been discussed in the past, but the focus has been on the traditional and local uses of these medicines in certain regions or countries (Rouhi-Boroujeni, 2017). As a result, the concept of plant species, bioactive metabolites and environment will be unique to the Far East and Middle East in terms of the development strategy and animal illnesses.

A lot of plant products have been found useful in management of hypertension by their direct anti-hypertensive activities, free radical scavenging and antioxidant activities (Omobowale *et al* 2019). Some of these plants prevent oxidative damage by direct antioxidant activity or indirect potentiation of enzymatic and non-enzymatic antioxidant defense mechanism (Omobowale *et al.,* 2019), thus offering cardiac and renal protective effect through these activities. Some also possess anti-inflammatory activities and organ protective properties (Akinrinde *et al.,* 2016). Example of such plants are *Azadirachtha indica* (Omobowale, 2019), and Garcinia kola (Akinrinde *et al*., 2016) *Thymus serpyllum L* (Mihailovic-Stanojevic *et al*., 2013)

II. Conclusion

Hypertension is a chronic disease of great economic importance in man and animal with attendant high morbidity and mortality rates from organ damage and complications. The economic losses also include maternal and fatal losses due to pregnancy toxaemia. Therefore there is need for timely, effective and efficient management of this cardiovascular disease. It warrants the need for routine diagnosis and effective management. The current management protocols are costly and are with the attendant side effects of the drugs. Hence the need for exploitation of natural products and phytochemicals which are readily available, cheaper, with less toxicity, adverse and residual effects. Effective research into plant products and discovery of drugs from them for management of hypertension and other health problems of animals will enhance veterinary clinical practice and livability of animals and pets.

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