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RESEARCH ARTICLE

PATHOLOGY, DIAGNOSIS, COMPLICATION, TREATMENT OF HYPERTENSION: A SYSTEMIC RESEARCH

Ashwin Singh Chouhan, Aaliya Khan, Nayan Soni, Nehal Purohit, Praveen Rathi and Riya Raisighani
Jai Narain Vyas University, New Campus, Jodhpur (Rajasthan) India.

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Abstract

Background. Hypertension is a chronic disease characterized by elevation of blood pressure. Blood pressure is defined as the pressure exerted by blood against the walls of arteries. It is measured as mm of mercury indicating that the pressure will be sustaining that much Height mercury as indicated.
Method and material: We conducted this research paper by observing the different types of reviews, as well as conducting and evaluating literature review papers.
Result. We have seen in this research that antihypertensive drugs are not able to cure high blood pressure, but will help in controlling the condition of high blood pressure. The health care professional who is treating the condition can advise what measures may be necessary.
Conclusions. High blood pressure is prevalent around the world as our population is increasing and the aging of the population means that more and more people will suffer from high blood pressure. Therefore, the problem of diagnosis, treatment and control of hypertension is a big question arising in our coming days.

Introduction:-

Hypertension

Hypertension is a chronic disease characterized by elevation of blood pressure. Blood pressure is defined as the pressure exerted by blood against the walls of arteries. It is measured as mm of mercury indicating that the pressure will be sustaining that much Height mercury as indicated. The normal blood pressure is 80/120mm of mercury. The lower figure indicates diastolic blood pressure and the upper figure indicates systolic blood pressure. Changes in diastolic blood pressure are indicative of pathological changes either in heart or blood vessels. Patho-physiology of hypertension attempts to explain mechanistically the cause of hypertension.

Etiology

Arterial pressure depends on cardiac output and peripheral resistance. Cardiac output depends on stroke volume and heart rate. Stroke volume is the amount of blood pumped out after each contraction of heart. It depends on myocardial contractility and size of the vascular compartment. Peripheral resistance depends on vascular structure and function. Fig. 2.1 indicates inter-relation between factors influencing arterial pressure.

Corresponding Author:- Ashwin Singh Chouhan
Address**:-** Jai Narain Vyas University, New Campus, Jodhpur (Rajasthan) India.

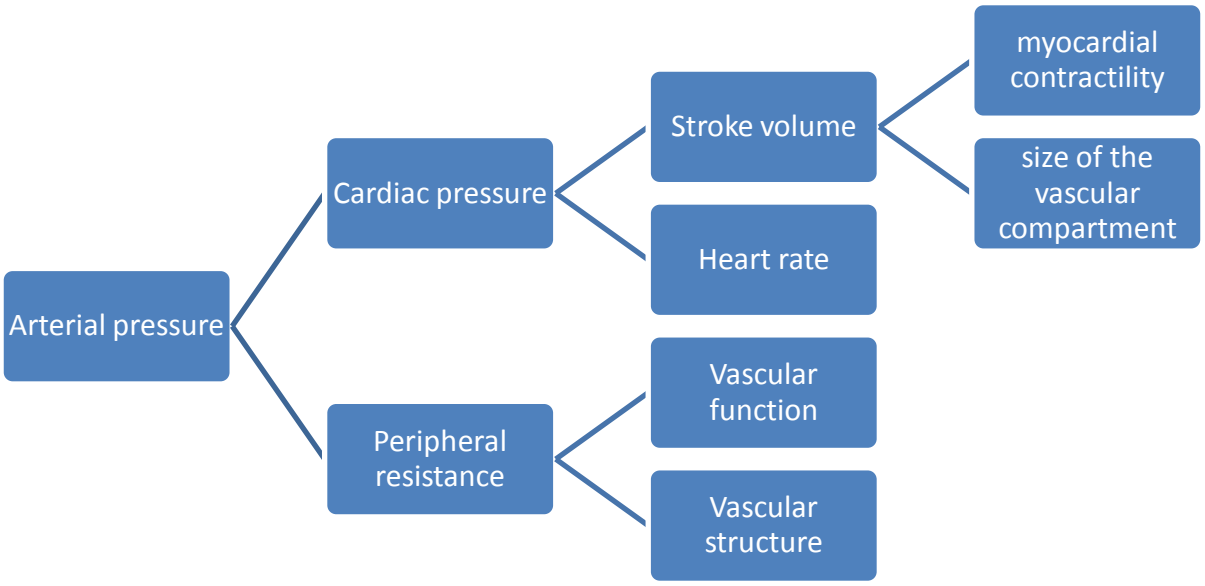

Figure 1:- Factor influencing Hypertension.

Cardiac output and peripheral resistance have reciprocal relation when blood pressure constant. Whenever there is increase in blood pressure it can be because of increase cardiac output or peripheral resistance. Physiologically, cardiac output increases when person is performing exercise. At rest, both heart rate and cardiac output return to normal During exercise there is increase in systolic blood pressure. Peripheral resistance determined by functional and anatomic changes in small arteries and arterioles.

Etiological factors for hypertension:

1. Genetic
2. Autonomic nervous system
3. Renin-angiotensin-aldosterone system (RAAS)
4. Endothelial dysfunction
5. Sodium/potassium ratio

Genetics:

Ten genes have been identified which can cause monogenic forms of hypertension. There are many genetic loci in the general population, each with small effects on blood pressure. Overall identifiable single-gene causes of hypertension are uncommon Multifactorial causes are factors responsible for hypertension.

Autonomic Nervous System (ANS):

ANS plays a central role in maintaining cardiovascular homeostasis via pressure, volume and chemoreceptor signals. It does this by regulating peripheral vessels and kidney function, which in turn influence cardiac output vascular resistance and fluid retention. Excess activity of sympathetic nervous system is associated with hypertension. One of the important contributory factors is stress. Exposure to stress increases sympathetic outflow. Repeated stress-induced vasoconstriction can result in vascular hypertrophy causing increase in peripheral resistance and blood pressure.

Renin-angiotensin-aldosterone-system (RAAS):

Renin is a circulating enzyme which participates in maintaining extracellular volume and arterial vasoconstriction. Thus, itregulates blood pressure. Renin hydrolyzes angiotensinogen, secreted from liver to angiotensin I. Angiotensin I is further broken down to angiotensin I by the enzyme angiotensin converting enzyme (ACE). Angiotensin II is most vasoactive peptide. It constricts blood vessels leading to increase in blood pressure. It also

stimulates adrenal glands to release aldosterone. Aldosterone intern increase reabsorption of salt and water, leading to increase in blood volume and therefore increase in blood pressure. Normal renin level in blood is 1.98-2.46 ng/ml in upright position.

Endothelial dysfunction:
The endothelium blood vessels produce a range of substances which influence blood flow. Endothelium secretes nitric oxide and endothelin. Oxidant stress alters many functions of endothelium including modification of vasomotor tone. It is observed that nitric oxide is inactivated during hypertension. Nitric oxide is an important regulator and mediator of numerous processes in nervous, immune and cardiovascular system, including smooth muscle relaxation; thus, it leads to vasodilation of artery and increases blood flow. Thus, inactivation of nitric oxide contributes to hypertension. Endothelin is a vasoactive peptide having both vasoconstrictor and vasodilator properties. Increased circulating endothelin has been observed in hypertensive patients.

Sodium/Potassium Ratio:
Increased sodium is associated with edema, which is a factor causing hypertension. It is also observed that deficit of potassium has a critical role in hypertension and its cardiovascular consequences. Epidemiological studies indicate that sodium/potassium ratio is strongly associated with hypertension and its outcome.

Signs and Symptoms:
Following highlights should be noted while understanding signs and symptoms of hypertension:
1. High blood pressure is generally a chronic condition and is often associated with few or no symptoms.
2. When symptoms do occur, it is usually when blood pressure spikes suddenly and extremely enough to be considered a medical emergency.
3. Rare symptoms include dizzy spells, headaches and nose bleeds.
4. High blood pressure is a risk factor for stroke, heart attack and other cardiovascular problems.

Hypertensive crisis occurs when systolic blood pressure is 180 mm of mercury or above or diastolic pressure is 110 mm of mercury or above. Symptoms of hypertensive crisis are as follows:
1. Severe headache
2. Severe anxiety
3. Shortness of breath
4. Nose bleed

If hypertension during pregnancy continues after 20 weeks, complications such preeclampsia may arise. It can cause damage to organs and the brain and can cause fata seizures. Symptoms of preeclampsia are presence of proteins in urine sample, constant headaches and excessive swelling of the hands and feet.

Complications:
Uncontrolled high blood pressure can lead to following consequences:
1. **Heart attack or stroke**: Hypertension can cause atherosclerosis i.e., hardening and thickening of arteries. It can lead to heart attack, stroke or other complications.
2. **Aneurysm:** Hypertension can cause weakening and bulging of blood vessels, forming an aneurysm. If an aneurysm ruptures, it can be a life-threatening condition.
3. **Heart failure**: Sustained hypertension can cause thickening of muscles of heart. Such thickened muscles, over the period of time find hard time to pump enough blood to satisfy needs of the body. If untreated, it can lead to heart failure.
4. **Weakened and narrowed blood vessels in kidneys**: Hypertension can be a cause for kidney failure. Weak and narrow blood vessels in kidneys prevent their normal function.
5. **Thickened, narrowed or torn blood vessels in the eyes**: Sustained untreated hypertension can lead to loss of vision.
6. **Metabolic syndrome**: It is a cluster of disorders related to metabolism. It includes increased waist circumference, high triglycerides, and low HDL and high insulin levels. Together the patient is likely to develop diabetes, heart disease and stroke.
7. **Trouble with memory and understanding**: Uncontrolled hypertension disturbs ability to think, remember and learn.

Method and Material:-
We conducted this research paper by observing the different types of reviews, as well as conducting and evaluating literature review papers.

Result:-
We have seen in this research that antihypertensive drugs are not able to cure high blood pressure, but will help in controlling the condition of high blood pressure. To avoid serious health problems caused by high blood pressure, patients may have to take medication for the rest of their lives. Apart from this, hypertension medicine cannot be found without a prescription at the medical store. People with high blood pressure may also need to avoid certain foods and keep their weight under control. The health care professional who is treating the condition can advise what measures may be necessary.

Future Aspect:-
It represents the second iteration of the Guidelines in the Future. There are many aspects to diagnosis, evaluation and treatment that could be further clarified. In the future, interventions related to pregnancy and cardiovascular risk of high blood pressure female may be undertaken

Conclusion:-
High blood pressure is prevalent around the world as our population is increasing and the aging of the population means that more and more people will suffer from high blood pressure. Therefore, the problem of diagnosis, treatment and control of hypertension is a big question arising in our coming days. At present, a lot of efforts are being made towards the detection and treatment of hypertension in middle and old age. The linear increase in the prevalence of hypertension with age means that measures to prevent hypertension, such as a healthy diet and regular physical activity, must begin early in life. For people who have already developed high blood pressure, early diagnosis and treatment is important. Existing antihypertensive drugs are not ideal individually and therefore a large proportion of patients require a combination of drugs. The choice of such drugs should be rational and evidence based.

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All authors are declaring that they have no conflicts of interest.

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