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Review on hypertensive emergency (HTN-E) and hypertensive urgency (HTN-U) as systemic arterial hypertension (HTN) and hypertension-mediated organ damage (HMOD).

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ABSTRACT

To make a review work on Hypertensive emergency (HTN-E) and Hypertensive urgency (HTN-U) as a part of Systemic arterial hypertension (HTN). as the efficiency of medications as well as the patient education and regular treatment. Various literature reviews are done about Pathophysiology, factors responsible, symptoms, complications, diagnosis, treatment, medications and patient education related with Hypertensive emergency (HTN-E) and Hypertensive urgency (HTN-U). Hypertensive emergency happens when diastolic pressure greater than 120mm/Hg and occurs end organ damage, Ischemic heart disease, heart failure, acute chronic syndrome etc. Hypertensive urgency happens when diastolic pressure is greater than 110mm/Hg without any end organ damage but patients have risk factors; heart disease and renal disease etc. Treatment of (HTN-E) require immediate medical care. The treatment of Hypertensive Urgency is a long term treatment process. In case of pregnancy the B.P should be treated urgently before end organ damage. Patient education for hypertension emergency and urgency is most effective. Prevention is better than cure. So early detection is important. Regular blood pressure checking, and by treatment by both prescribed medication and maintaining healthy life style by balancing the mental stress can control the hypertension and can be avoided from Hypertension emergency and urgency. So Patient education for hypertension emergency and urgency is most effective.

Keyword: Hypertensive emergency, Hypertensive urgency, Patient education.

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INTRODUCTION

Emergency is the situation of health condition where the body organs at risk and need immediate care. Urgency is the situation in which life is not in threatening condition that requires care with very short period of time. [1]

Hypertensive emergency happens when diastolic pressure greater than 120mm/Hg. So there is chance of end organ damage. Ischemic heart disease, heart failure, acute chronic syndrome etc.

Hypertensive urgency happens when diastolic pressure is greater than 110mm/Hg without any end organ damage but patients have certain risk factors; heart disease and renal disease etc.[2]

According to the 7th report of the Joint National Committee on Prevention, detection, Evaluation and Treatment (JNC7) in the normal blood Pressure is 120/80 mm/Hg. When Blood pressure is 180/120 mm/Hg then it is considered as severe hypertension which include hypertension urgency or hypertension emergency. [2]

According to practice guideline for the Management of Arterial hypertension of the European Society of Cardiology ESH/ESC Task force of the Management of Arterial Hypertension at High Blood Pressure the systolic pressure is 180mm/Hg . Even if without any target organ damage may be considered as Hypertensive urgency. [3]

The guideline for pharmacological treatment of Hypertension is released by, the WHO In 2021.It evidence recommended the developed health care system for treatment of Hypertension.

Global Heart Initiative was launched in September 2016 by WHO and United States Centre for Disease Control and Prevention (U.S.CDC) .They implemented six modules of heart technical package to improve cardiovascular health worldwide; [4]

- Healthy lifestyle counseling
- Evidence based treatment protocols
- Access to essential medicines and technology
- Risk based management
- Team based care
- System for monitoring.

Hypertensive emergency and urgency produce morbidity and mortality due to cause of coronary heart disease, cerebrovascular disease, renal disease, It also causes the end organ death; heart, brain and kidney. North American studies reported that among the 5,00000 strokes , death of 2,50,000 happened and 1,000,000 myocardial infraction death of 1,000,000 people happened.

In this study we have to make more research upon Hypertensive emergency and urgency to find out the better way of control and prevent of the disease.

PATHOPHYSIOLOGY:

Cardiac output means stroke volume multiplied by heart rate. Blood pressure is measured by multiplication of Cardiac output and Peripheral resistance. The Peripheral resistance is due to presence of various vaso active substances which depends upon humeral and natural factors in case of acute Hypertension. [5][6][7][8][9]

- Due to failure of auto regulatory function increases systemic vascular resistance.
- The end organ damage occurs endovascular injury and fibrin narcosis arterioles.
- Decreases renal perfusion and lowering tubular sodium concentration.
- Renin- Angiotensin- Aldosterone system also responsible for hypertension emergency and urgency.

The Pathophysiology of Hypertension Emergency and Urgency also related with [10]

- Impaired renal pressure natriuresis due to
- Impaired renal function
- Inappropriate activation of hormones that regulate salt and water extraction by the kidney.
- Excess activation of sympathetic nervous system.

FACTORS RESPONSIBLE FOR HYPERTENSION EMERGENCY AND URGENCY:

[11].

Factors responsible for Hypertension Emergency and Urgency are mentioned in Table 1

SYMPTOMS OF HYPERTENSION EMERGENCY AND URGENCY:[12]

Symptoms of Hypertension Emergency and Urgency are mentioned in Table-2

Table 1: Factors responsible for Hypertension Emergency and Urgency

Sr. No.	Factors	Examples
1	Humeral factors	Angiotensin –II, Catecholamine, Thromboxine, Leukotrienes, Endothelins, Prostaglandin
2	Cardiac factors	Heart rate, Contractility
3	Neural factors	α - Adrenergic, β - Adrenergic
4	Physical factors	High obesity, heart disease, Excess consuming of Blood Pressure Medicines. History of somatoform disorders. Diabetics
5	Daily life	Lack of exercise, Excess taking of junk foods, Severe gastric, Insufficient sleeping, Mental stress, obesity, alcohol consumption, high sodium intake, sedentary lifestyle
6	Others	Gene, age, race,

Table 2: Symptoms of Hypertension Emergency and Urgency

Sr.No.	Symptoms	Examples
1	Blood pressure	Systolic pressure .180mm/Hg
2	Neurological abnormalities	Confusion, Transient Cortical blindness, Hemiparesis, Hemi sensory defect, Seizures.
3	Global Cerebral defects	Confusion, stress.
4	Normal mental status with local deficits	strokes
5	Severe retinopathy	Sclerosis, Cotton wool spot, arterial narrowing, hemorrhage, papilledema
6	Cardiovascular systems	Chest pain, dyspepsia
7	Acute renal failures	Chronic Kidney Disease

Complications of Hypertension Emergency and Urgency:[13],[14],[15]

- Myocardial infraction
- Stroke
- Heart failure
- Renal failure
- Hypertensive retinopathy
- Dementia
- Aneurysms

Diagnosis of Hypertension Emergency and Urgency:[16][17]

1. Blood pressure should be tested with correct measurement technique.
2. ECG
3. Urine analysis
4. Blood Urea Nitrogen (BUN)
5. Testing of creatinine.
6. Patient with neurological problem should test the head CT.
7. Testing of intracranial bleeding.
8. Testing of urine analysis abnormalities RBC cast, Protinurea.
9. MRT
10. Chest X ray.
11. Aortic dissection.
12. Hypertensive encylopathy.
13. Ecocardiogram.
14. Urine toxicology.
15. Complete blood count.

Treatment Of Hypertension Emergency [18][19]

1. The aim of the treatment is not to decrease Blood Pressure no more than 25% in first 1 hour. The Blood Pressure reduction should be 160/100 in next 2 to 6 hour.
2. It requires immediate medical care. Continuous cardiac monitoring, frequent measurement of urine output and various neurological studies must be continued.
3. Implimentation of IV medication ; Clavendipin, Esmolol, Lobetolol,
4. Admit to I.C.U.
5. First line medication- Nitropruside, Fenolodopam, Nicardipine, Labetolol.
6. Use of Nitroglycerin because it affect veins more than arterioles.
7. I.V Nitroglycerin is also applicable for severe coronary artery.

MEDICATIONS OF HYPERTENSION EMERGENCY:

Medication of Hypertension Emergency are mentioned in Table-3

TREATMENT OF HYPERTENSION URGENCY:[20][21][22]

The treatment of Hypertensive Urgency is a long term treatment process.

The aim of the treatment is to lower the Blood Pressure within 24 to 48 hours by oral administration. In case of pregnancy the B.P should be treated urgently before end organ damage. They should be treated with Nifedipine, Methyldopa, and Labetolol during pregnancy. The Angiotensin –Covering enzyme Inhibitor (ACEIs), Angiotensin receptor blocker and direct renin inhibitors should not be administrated in pregnancy.

Table 3: Medication of Hypertension Emergency

Sr. No.	Class	Drugs	Onset of action	Duration of action	Dose	Adverse effects
1	Adrenergic receptor antagonist	Labetolol	2-5 minutes	2-18 hrs	Max dose- 300mg/h	Othostasis, fatigue, dizziness, nausea
2	B ₁ Adrenergic receptor antagonist	Esmolol	1-2 minutes	10-30 min	0.5-1 IV bolus	Nausea, vomiting, diaphoresis, hypotension
3	Calcium Chanel Blocker	Nicardipine	5-15 min	2-4 min	Max dose- 15mg/h	Headache, Peripheral edema, hypotension
4	Nitric oxide diator	Nitroglycerin	2-5 min	3-5 min	Max dose- 200mcg/h	Severe hypertension, headache, reflex tachycardia
5	Nitric oxide diator	Sodium Nitropruside	Within sec	2-5 min	Max dose- 10mcg/kg/min	Headache, cardiac toxicity
6	Dopamine agonist	Fenoldopam	Within 5 min	30-60 min	Max dose-1.6mcg/kg/min	Headache, nausea, hypotension
7	Direct arterial vasodilator	Hydralazine	5-20 min	2-12 hr	Max dose- 40mg/dose	Trachycardia, hypotension, flushing

MEDICATION OF HYPERTENSION URGENCY:

Medication of Hypertension Urgency are mentioned in Table-4

Table 4: Medication of Hypertension Urgency

Sr. No.	Class	Drugs	Onset of action	Duration of action	Dose	Adverse effects
1	ACE-1 inhibitor	Captopril	5-15 min	2-6 hours	Max dose- 50mg	Hyperkalemia, angioedema, decrease renal function
2	Centrally acting α_2 agonist	Clonidine	15-30 min	2-8 hrs	Max dose- 0.8mg	Sedation, dry mouth, rebound hypotension
3	α_1 selective & β nonselective antagonist	Labetalol	2 hrs	4 hrs	Max dose- 1.200mg	Hypotension, dizziness, headache, nausea, vomiting

PATIENT EDUCATION FOR HYPERTENSION EMERGENCY AND URGENCY: [23] [24]

1-Consuming heart-healthy diet include;

- fruits
- vegetables
- whole grains
- lean proteins like fish

2- Regular Physical Exercise.

3- Avoiding obesity.

4- . Other activities include.

- meditation
- deep breathing
- massage
- muscle relaxation
- yoga or tai chi

5- Intakeing limited amount of sugar-sweetened foods, sodas, cold drinks, packed beverages by daily basis.

6- Daily sodium intake should be between 1,500 milligrams and 2,300 milligrams per day.

7-Regular checkup of Blood pressure.

RESULTS AND DISCUSSION:

Hypertensive emergency happens when diastolic pressure greater than 120mm/Hg. So there is chance of end organ damage. Ischemic heart disease, heart failure, acute chronic syndrome etc.

Hypertensive urgency happens when diastolic pressure is greater than 110mm/Hg without any end organ damage but patients have certain risk factors; heart disease and renal disease etc.

It happens due to Due to failure of auto regulatory function, increasing systemic vascular resistance. Endovascular injury, fibrin narcosis arterioles, Renin- Angiotensin- Aldosterone system, humeral factors, cardiac factors, neural factors, physical factors and bad habits.

It produces symptoms like Blood pressure, Neurological abnormalities, Global Cerebral defects, Normal mental status with local deficits, Severe retinopathy, Cardiovascular systems, Acute renal failures.

It produces complications like Myocardial infraction, Stroke, Heart failure, Renal failure, Hypertensive retinopathy, Dementia, Aneurysms.

Blood pressure can be diagnosed by various methods; ECG, Urine analysis, Blood Urea Nitrogen (BUN), Testing of creatinine. Testing of intracranial bleeding, MRT, Chest X ray, Hypertensive encephalopathy. Ecocardiogram. Urine toxicology. Complete blood count etc.

Treatment of Hypertension Emergency must be aim not to decrease Blood Pressure no more than 25% in first 1 hour. The Blood Pressure reduction should be 160/100 in next 2 to 6 hour. It require immediate medical care. Continuous cardiac monitoring, frequent measurement of urine output and various neurological studies must be continued. Implementation of IV medication ; Clavendipin, Esmolol, Lobetolol, Admit to I.C.U. First line medication- Nitropruside, Fenolodopam, Nicardipine, Labetolol. Use of Nitroglycerin because it affect veins more than arterioles. I.V Nitroglycerin is also applicable for severe coronary artery. It can be treated by various drugs mentioned in Table 3

The treatment of Hypertensive Urgency is a long term treatment process. The aim of the treatment is to lower the Blood Pressure within 24 to 48 hours by oral administration. In case of pregnancy the B.P should be treated urgently before end organ damage. They should be treated with Nifedipine, Methyldopa, and Labetolol during pregnancy. The Angiotensin – Covering enzyme Inhibitor (ACEIs), Angiotensin receptor blocker and direct renin inhibitors should not be administrated in pregnancy. It can be treated by various drugs mentioned in Table 4.

Patient education for hypertension emergency and urgency must be required ;Consuming heart-healthy diet include, fruits, vegetables, whole grains, lean proteins like fish, regular Physical Exercise, avoiding obesity, meditation, deep breathing, massage ,muscle relaxation ,yoga etc. In taking limited amount of sugar-sweetened foods, sodas, cold drinks, packed beverages by daily basis. Daily sodium intake should be and regular check up of Blood pressure.

CONCLUSION:

Health is wealth. Hypertension emergency and urgency associated with Blood pressure, Neurological abnormalities, Global Cerebral defects, Normal mental status with local deficits, Severe retinopathy, Cardiovascular systems, Acute renal failures, intra cerebral hemorrhage, subarachnoid hemorrhage, atherosclerosis other harmful diseases. Without producing any symptoms it can damage blood vessel, heart, eye, kidney etc., from the above study we concluded that Hypertension is a silent killer that can generate emergency and urgency. Hypertensive emergency and urgency produce morbidity and mortality due to cause of coronary heart disease, cerebrovascular disease, renal disease, It also causes the end organ death; heart, brain and kidney. Prevention is better than cure. So early detection is important. Regular blood pressure checking, and by treatment by both prescribed medication and

maintaining healthy life style , in taking heart- healthy diet, Increasing physical activity, maintaining body weight and by balancing the mental stress can control the hypertension and can be avoided from Hypertension emergency and urgency .

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