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2:Hypertensive Emergency

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Hypertension is the one of the leading cause of the global burden of disease. Approximately 7.6 million deaths and 92 million disability adjusted life years worldwide were attributable to high blood pressure in 2001.

Hypertensive emergencies encompass a spectrum of clinical presentations in which uncontrolled blood pressures (BPs) lead to progressive or impending end-organ dysfunction. In these conditions, the BP should be lowered aggressively over minutes to hours.

Neurologic end-organ damage due to uncontrolled BP may include hypertensive encephalopathy, cerebral vascular accident/cerebral infarction, subarachnoid hemorrhage, and/or intracranial hemorrhage. Cardiovascular end-organ damage may include myocardial ischemia/infarction, acute left ventricular dysfunction, acute pulmonary edema, and/or aortic dissection. Other organ systems may also be affected by uncontrolled hypertension, which may lead to acute renal failure/insufficiency, retinopathy, eclampsia, or microangiopathic hemolytic anemia.

The history and the physical examination determine the nature, severity, and management of the hypertensive event. The history should focus on the presence of end-organ dysfunction, the circumstances surrounding the hypertension, and any identifiable etiology.

The most common clinical presentations of hypertensive emergencies are

1. cerebral infarction (24.5%),
2. pulmonary edema (22.5%),

3. hypertensive encephalopathy (16.3%),
4. congestive heart failure (12%).

Other clinical presentations associated with hypertensive emergencies include intracranial hemorrhage, aortic dissection, and eclampsia, as well as acute myocardial infarction, and retinal and renal involvement.

Blood Pressure Stages

Blood Pressure Category	Systolic mm Hg (upper #)		Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Elevated	120-129	and	less than 80
High Blood Pressure (Hypertension) Stage 1	130-139	or	80-89
High Blood Pressure (Hypertension) Stage 2	140 or higher	or	90 or higher
Hypertensive Crisis (Seek Emergency Care)	higher than 180	and/or	higher than 120

Source: American Heart Association

DIAGNOSIS: Blood pressure of more than 200/140 mmHg with papilloedema, alteration in consciousness, convulsions, coma and evidence of end organ damage with no focal neurological deficit.

Note: patient might not present with all the above mentioned sympyoms. Patient can also present with severe headache, dizziness, uneasiness or little drowsy or some irrelevant talks. So one should properly take the history and do relevant examination to find out the exact cause and check blood pressure on their own and proceed with the management and treatment.

Aim of the treatment: is the immediately bring down the blood pressure.

Rate of reduction:

- 25% in 2 hours, nearing 160/100 mmHg In 6 hours.
- Reduce diastolic pressure by 1/3 over 12-24 hours

- Moitor blood pressure every 15-30 min.(also monitor urine output and look for focal deficits often)

Caution:

- Too rapid reduction is dangerous in acute cerebral infarction and subarachnoid hemorrhage.
- In aortic dissection Systolic blood pressure to be bought down to 100-120mmHg

Treatment:

1. **S**odium Nitroprusside Iv infusion. 0.25-10 mcg/kg/min .used only for 48-72 hours, but avoid in acute myocardial infarction, eclampsia, post CABG patiets. *Use only if BP monitoring is possible*
2. Nitroglycerine (NGT) IV 25-100 microgram/min IV . Avoid in associated inferior wall infarction with right ventricular infarction.
3. Enalprilat IV Intermittent 1.25mg 6QH IV or Infusion 5mg/hour IV increased upto 15mg/ Hour.
4. Frusemide IV 40-160mg IV
5. Diazoxide IV 50-150 mg stat over 5-10 min Repeat every 15min upto total 600mg
6. Methyl dopa Infusion 150-500mg is the drug of the choice of eclampsia
7. Selective Dopamine agonist can also be used.

Symptomatic treatment of convulsions and cerebral edema if observed.

Accelerated Hypertension

Sudden increase in blood pressure with alteration in conscious state and without end organ damage .

Systolic BP > 240mmHg

Diastolic BP >140mmhg

Aim of the treatment: Reduce BP slowly over 12-24 hours

Treatment:

1. **Clonidine** PO loading with 200ug followed by 100ug every hour till total 700ugs. Check blood pressure every 15min**.**
2. Sublingual **Nifedepine** 5-10mg given sublingually acts in 15-30min. can be repeated once in 30min for 4 times. ***Caution: avoid in acute myocardial Infarction or stroke, as sudden fall in blood pressure may precipitate ischemia of the vital organs***
3. **Captopril**-12.5 – 25mg oral stat then 6-8 hourly.
4. Start with log acting drugs like Beta blockers/ ACE inhibitors/Diuretics.

BP HAS TO BE MONITORED EVERY 15-30 MIN UNTIL IT IS REASONABLE LOWERED.

FEW DEFINATIONS:

HYPERTENSION: Clinically hypertension is defined as that level of blood pressure at which the institution of therapy reduces blood pressure related morbidity and mortality.

PRIMARY HYPERTENSION: it is called as idiopathic hypertension with no secondary cause. It usually tends to be familial and is likely to be consequence of an interaction between Environmental and genetic factors.

RENOVASCULAR HYPERTENSION: Hypertension due to an occlusive lesion of a real artery. It is potentially curable form of hypertension. Mechanism is mostly related to Renin-angiotensin system.

MALIGNANT HYPERTENSION: It is a syndrome associated with an abrupt increase in blood pressure with underlying hypertension or related to sudden onset of hypertension in a previously normotensive individual.

MASKED HYPERTENSION: The phenomenon of masked hypertension (MH) is defined as a clinical condition in which a patient's office blood pressure (BP) level is <140/90 mm Hg but ambulatory or home BP readings are in the hypertensive range.

WHITE COAT HYPERTENSION: The term “white coat” comes from references to the white coats traditionally worn by doctors. The term white coat hypertension may be used if you have high blood pressure readings (i.e. readings that are consistently 140/90mmHg or above) *only* when you are in a medical setting. Your blood pressure readings may be normal when they are taken at home.

ECLAMPSIA/ PRE-ECLAMPSIA: Preeclampsia is defined as the presence of (1) a systolic blood pressure (SBP) greater than or equal to 140 mm Hg or a diastolic blood pressure (DBP) greater than or equal to 90 mm Hg or higher, on two occasions at least 4 hours apart in a previously normotensive Pregnant individual.

Eclampsia is defined as seizures that cannot be attributable to other causes in a woman with preeclampsia. HELLP syndrome (hemolysis, elevated liver enzyme, low platelets) may complicate severe preeclampsia.

Risk factors for preeclampsia and their odds ratios are as follows

- Nulliparity (3.1)
- Age older than 40 years (3:1)
- Black race (1.5:1)
- Family history (5:1)
- Chronic renal disease (20:1)
- Chronic hypertension (10:1)
- Antiphospholipid syndrome (10:1)
- Diabetes mellitus (2:1)
- Twin gestation (but unaffected by zygosity) (4:1)
- High body mass index (3:1)
- Homozygosity for angiotensinogen gene T235 (20:1)
- Heterozygosity for angiotensinogen gene T235 (4:1)

Antihypertensive Agents

1	ACE inhibitors (*Angiotensin converting enzyme inhibitors)*	Enalapril, Lisinopril, Ramipril, Captopril
2	ARBs *(Angiotensin receptor blockers)*	Telmisartan, Olmesartan, Losartan, Candesartan, Valsartan
3	Calcium channel blockers	Amlodipine, Felodipine, Nimodipine, Nifedipine, Isradipine, Verapamil, Diltiazem
4	Beta blockers	Atenolol, Metoprolol, Bisoprolol, Labetolol, Propranolol,
5	Diuretics	Hydrochlorthiazide, Chlorthiazide, Chlorthalidone, Spironolactone, Furosemide
6	Direct Vasodilators	Hydralazine, Minoxidil, Sodium Nitropruside, Diazoxide
7	Alpha blockers	Terazosin, Doxazosin, Prazosin
8	Central Alpha 2 Agonists	Clonidine, Methyldopa