

Hypertension

- Def: **high blood pressure**
- Factors influencing BP
 - BP = (cardiac output) *(systemic vascular resistance)
- Demographics
 - Non-hispanic blacks are more prone to having HTN (not necessarily genetic but more **socioeconomic**)
- Controlling HTN is hard due to late onset of **symptoms** and poor adherence of pts

CLINICAL MANIFESTATIONS

- Most are **asymptomatic**
- Subjective:
 - Dizziness
 - Activity intolerance
 - Angina
 - Dyspnea
 - Palpitations
 - Headache
 - Others
- Objective
 - Ophthalmic exam; **noticeable HTN symptoms tend to manifest in eyes**
 - Labs
 - EKG
 - CXR
 - Nosebleed
- There are 3 organs that are most affected
 - **Heart**
 - **Brain**
 - **Kidneys**
- Tests to run
 - Blood
 - **BMP (focus on BUN and creatinine)**
 - Baseline electrolytes
 - Lipid panel
 - Urine
 - Urinalysis
 - Microalbuminuria (this could be misleading since DM can also lead to protein in urine)
 - Creatinine clearance for GFR
 - ECG
 - HTN → left ventricular hypertrophy → higher O2 demand of heart → heart failure (larger QRS complex)
 - CXR for **cardiomegaly**

Primary vs Secondary HTN

- **Primary** (unknown cause)
 - Multiple issues in BP regulatory mechanisms
 - Age
 - **Alcohol**
 - **Tobacco**
 - **Hyperlipidemia**
 - **Too much Na+**
 - Gender
 - Genetics
 - Others
- **Secondary** (identifiable cause)
 - Endocrine
 - Pregnancy (usually BP should go down when pregnant)
 - Renal disease
 - Renovascular disease
 - **Meds**
 - Sleep apnea

Diagnosing HTN

- You need at least 2 consecutive measures of BP in proper conditions
- Ambulatory home BP monitoring –this is done when pt's BP is higher at home than hospital
- Make sure to use proper techniques to measure BP

BP stages

- You always go with the worst number (ex: 135/94 will be classified as stage 2 HTN)

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

Main Nursing Diagnosis

- **Ineffective tissue perfusion related to complications of HTN**

MANAGEMENT

- Cornerstone is **lifestyle changes**
 - Stage 1 can be managed very well with lifestyle changes

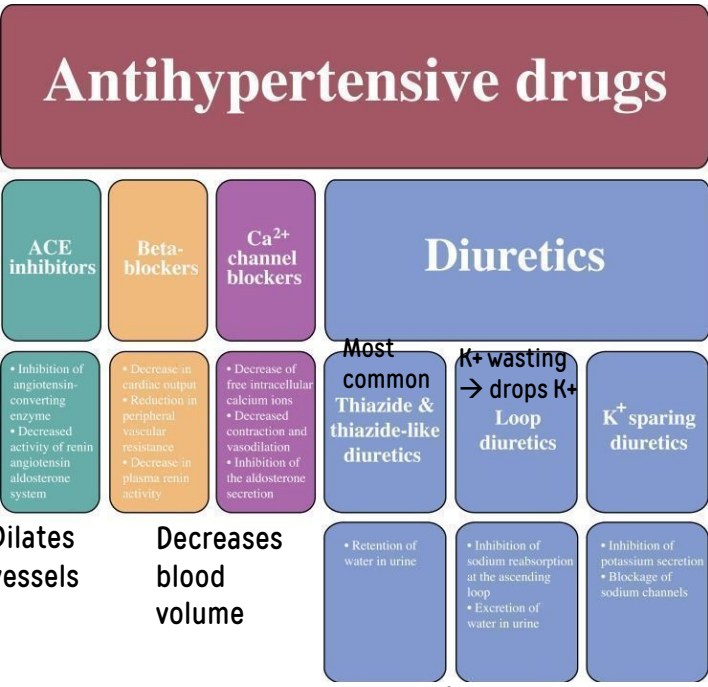
- Medication
 - Stage 2 needs med in addition to lifestyle changes

Lifestyle Changes

- Lose weight
- Exercise
- DASH eating plan or Mediterranean (recent)
 - Low Na+
 - Whole grains
 - Others
- Physical activity
- Others

MEDICATION ADMINISTRATION

- Goal BP
 - **<140/90mmHg** in adults 18-59 yrs or pts with DM or CKD
 - **<150/90 mmHg** in adults 60 yrs and older without DM or CKD; this is usually more lenient since aging contributes to higher BP
- Goal of med
 - **Decreased blood volume**
 - **Systemic vascular resistance**



- **ACEI can cause angioedema (rare but very serious) and hyperkalemia**
- **Beta-blockers** are not considered first line of med anymore for HTN

- **Selective beta₂ blockers** can broncho-constrict, so do not use for pts with airway issues
- **Thiazide diuretics and calcium channel blockers** are most commonly used
- **Some diuretics** can cause **hyperkalemia or hypokalemia**

OLDER ADULTS CONSIDERATION

- More than 2/3rd have HTN
- Similar guidelines as adults
- Lower initial drugs may be given to avoid symptoms
- Precautions for **falls** should be taken b/c HTN meds can cause **orthostatic hypotension**
 - Education pts to change position slowly
 - Bone pathologies can make falls fatal

CAUSES OF RESISTANT HYPERTENTION

- Improper BP measurement
- Excess Na+
- Inadequate med doses
- Drug interaction
- OTC and supplement interaction
- Others

Teaching Guide for HTN

- Educate pts that HTN is often asymptomatic but have **deadly complications**
- Explain need for lifestyle changes
- Educate follow up and consistent checks
- Teach that HTN cannot be cured
- Others

HYPERTENSIVE CRISIS AND URGENCY

Causes of HTN Crisis

- Exacerbation of chronic HTN due to failure of adherence to regimen
- **Renovascular HTN**
- **Preeclampsia** for pregnant women
- **Pheochromocytoma** (adrenal gland tumor causing too much epi and NE)
- Drugs (cocaine or meth)

- **Monoamine oxidase inhibitors** taken with **tyramine** foods
- **Rebound HTN** due to abrupt discontinuation of meds
- Others

Treatments for HTN Crisis

- Checking BP every **5-15min**
- **Decreasing BP slowly to prevent adverse consequences**; if you drop BP too fast you can cause brain to not receive enough blood
 - Special circumstances:
 - **Aortic dissection**: high BP can rupture weak aorta
 - **Acute ischemic stroke**: when there's a problem with blood supply to brain, the brain may be relying on high BP to get perfused, so you will NOT reduce BP

Hypertensive Urgency

- **Def**: high BP but no evidence of organ damage
- Goal is to **normalize BP within 24-48 hours**
- Take v/s every 5 mins, and then in 15-30 mins intervals
- May give **fast-acting oral agents (beta-blockers, ACE-I, alpha₂ agonists)**

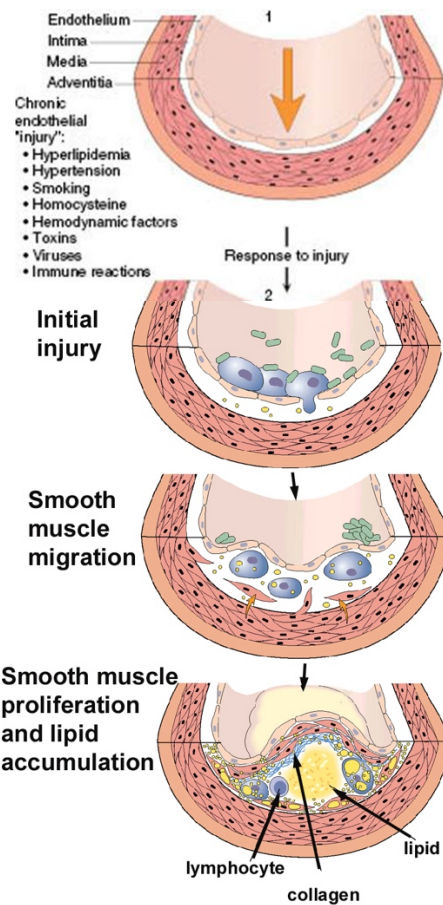
Hypertensive Emergency

- BP is very high (**above 180/120mmHg**) with **organ damage**
- Goal is to **reduce BP up to 25% within first hour**, then to 160/100 over a period of 6 hours
- Can give **IV vasodilators (Nipride, Enalaprilat, and NGT)**
 - NTG is preferred b/c you can give med based on the effects seen on pts
 - Make sure you give med via IV for fast resolution
 - Put pts on cardiac monitor and **arterial line** to monitor vessels from dilation after giving IV med

Target Organ Damage

- No clear cause but we believe in "response of injury" theory of **atherosclerosis**
 1. HTN damages endothelium of arteries
 2. Intimal layer is exposed and activates WBC and platelets

3. Growth factors are released and induces smooth muscle proliferation
4. **Stiffened arterial wall and narrowed**



- **Organs that are damaged**
 - **Heart**
 - Left ventricular hypertrophy
 - Angina or MI
 - Heart failure
 - **Brain**
 - Stroke or TIA
 - **Kidney**
 - CKD
 - **PAD**
 - **Eyes**
 - Retinopathy