# Annotated Study Guide for Hypertension Management

## Instructions

Complete/Incomplete

Due Day 7

Each of the hypertension management topics you are responsible for knowing have been collected in this study guide. To help recall and master this material, you will annotate each topic in this study guide with notes, thoughts, and/or images as you perform the required readings at the start of this week. There will be prompts for each topic, but do not consider yourself constrained by these, as long as each topic is annotated in some way.

This assignment will be marked complete and receive full credit if most or all of the topics have been annotated. Your assignment will most likely not receive feedback since the value of this assignment is in its creation (taking notes while reading facilitates active learning which, in turn, promotes better recall) and as a study aid for class exams.

## Hypertension Management Topics

### Hypertension is

* the most common risk factor for MI and stroke
* Strong contributor to heart disease, CHF, Kidney disease
* Modifiable risk factor for premature cardiac disease
* Smoking
* Dyslipidemia
* DM

Notes:

**Blood pressure is**

* the major determinant in the reduction of CV risk

Notes:

**Complications associated with hypertension are**

* LVH
* HF
* Stroke- ischemic and hemorrhagic
* Ischemic heart disease
* MI
* CKD

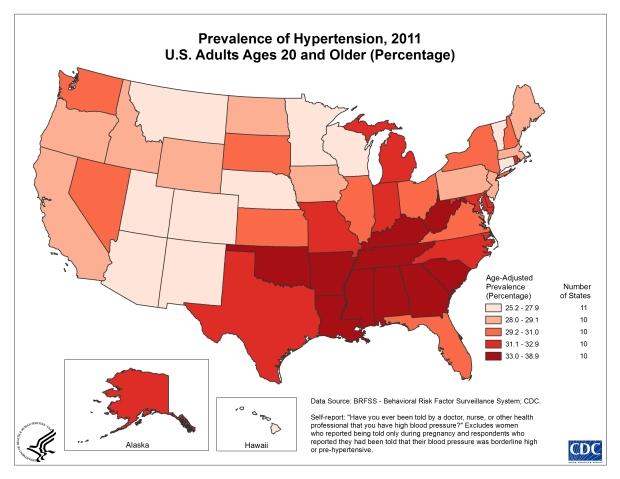
Notes:

**HTN Stats (CDC, 2016)**

* Approximately 1 of 3 adults in America (70 million people) have hypertension.
* 54% of those have their blood pressure under control.
* High blood pressure costs the nation $48.6 billion each year.
* 29.5% of adults are affected by high blood pressure, half of them have it under control

Notes:

### Hypertension prevalence



SOURCE: <https://www.healthypeople.gov/2020/topics-objectives/topic/heart-disease-and-stroke>

Notes: (How has this map changed since 2011?)

**Healthy People 2020**

* Visit the [HP 2020 progress review](https://www.cdc.gov/nchs/data/hpdata2020/hp2020_AOCBC_and_HDS_progress_Review_presentation.pdf)
* Present your key thoughts after reviewing slides 6, 7, and 24 - 31.

Key thoughts:

[**AHA 2017 guidelines for hypertension**](http://professional.heart.org/professional/ScienceNews/UCM_496965_2017-Hypertension-Clinical-Guidelines.jsp)

* Look at the US Preventative Task force for who, when, and how often you should be screening for HTN.
* USPSTF
* Annual screening: Adults over the age of 40
* High risk
* 130-139/80-8
* Obese
* African American

Notes:

**Risk factors for primary HTN**

* Age
* Obesity
* Family Hx (2x as common with hypertensive parent)
* Race – African American
* High sodium diet
* Excessive ETOH
* DM
* Dyslipidemia

Notes:

**Contributing factors for secondary HTN**

(Annotate table to reinforce understanding and recall)

|  |  |
| --- | --- |
| * Prescription/ OTC medications: * Oral contraceptives * Chronic NSAID use * TCA, SSRI * Glucocorticoids * Decongestants - pseudoephedrine * Weight loss medications * Stimulants or illicit drugs * Renal Disease * Renal artery stenosis * CKD | * Hyperaldosteronism * Hypertension * Unexplained hypokalemia * Metabolic alkalosis * Obstructive sleep apnea * Pheochromocytoma – paroxysmal HTN * Cushing's syndrome * Thyroid disorders * Pregnancy * Coarctation of the aorta |

**Be familiar with the complications of HTN**

(Annotate table)

|  |  |
| --- | --- |
| * LVH * CHF * CAD * MI * Sudden Death * Aortic Dissection * CVD | * Proteinuria * Renal Insufficiency * Atherosclerosis * Retinopathy * Decline in function- Vascular Dementia, Alzheimer’s Dx |

**Think about the clinical presentation of HTN**

* Often initially not noticed- Preventative Screening imperative
* Symptoms usually occur as consequences of end organ damage – stroke, renal dx, retinopathy, aortic dissection, sequelae of LVF
* 2nd HTN – usually present with s/s consistent with the underlying cause

Notes:

**Understand the following HTN information**

* Identify target organ damage
* Identify signs of secondary HTN
* Identify reversible exacerbating factors
* Develop baseline to document progression

Notes:

### Your assessment should include at a minimum

(Annotate table)

|  |  |
| --- | --- |
| * Aggravating factors: * Medications * ETOH * Diet * Duration: * Last known normal blood pressure * Previous attempts at treatment * Medications * Presence of risk factors for CV disease | * Smoking * DM * Dyslipidemia * Physical inactivity * Family History * Sleep Apnea * Snoring * Daytime somnolence * Psychosocial Factors |

**Look for signs / Sx of target organ damage**

* Heart: Chest pain, palpitations, activity intolerance, etc.
* Brain: dizziness, confusion, transient loss of function
* Kidneys: history of renal disease
* Peripheral arterial disease: intermittent claudication
* Retinopathy: visual disturbances

Notes:

### Review Metabolic Syndrome

* **3** **or more of the following**:
  + **Abdominal obesity:** Waist circumference >40” men >35” women
  + **Glucose intolerance:** Fasting glucose >110
  + **High Triglycerides:** >150
  + **HTN** : >130/85
  + **Low HDL:** <40

Notes:

**Important aspects of the PE**

* Accurate BP – 2 readings
* Height/Weight/BMI
* Vascular Effects:
  + Retinal exam: Arterial narrowing, AV nicking, exudate, hemorrhage, papilledema
  + Auscultate for carotid, femoral, renal artery, abd bruits
* Thyromegaly, nodules

Notes:

**Target organ damage & secondary causes of HTN**

* Derm: Signs of Cushing’s –

Cause of secondary HTN (striae and hirsutism)

Notes:

* Cardio-Resp: Signs of Heart Failure, Aortic insufficiency
  + Rales, murmurs, tachycardia, S3, S4, lifts, heaves, displaced PMI, edema
  + Abd: masses, bruits, pulsation

Notes:

* Neuro: focal deficits, h/o TIA or past stroke, cognitive impairment, visual field cuts
* **Peripheral Vascular**
  + Femoral bruits
  + Femoral pulses (Delayed or absent in aortic coarctation)
  + Symmetrical pulses
  + Lower extremity shin hair loss (shiny)
  + LE edema

Notes:

* **HEENT**
  + Retinal Exam – Arteriole narrowing, AV nicking, exudate, hemorrhage, papilledema
  + Oral Exam – Sleep Apnea
  + Palpate Thyroid
  + Carotid Bruits
  + Neck vein distension

Notes:

### Reference images

Go to Uptodate and search on ocular effects of hypertension to find an article with the following images:

* Cotton wool spots ocular effects of hypertension--view images
* Hypertensive retinopathy

Notes:

**Diagnostics to understand when treating hypertension**

* Electrolytes
* Creatinine
* Fasting glucose
* Urinalysis
* Lipid profile
* Abnormal EKG (LVH)
* Echocardiogram (ejection fraction)

Notes:

**Pregnant Women**

* ACE-I/ARB are contraindicated
* Treatment of HTN
* Methyldopa
* Beta blockers
* Vasodilators

Notes:

**African Americans**

* Prevalence and severity of HTN is elevated
* Generally respond best to Thiazide and CCB rather than ACE-I, monotherapy recommended for improved response to treatment
* Angioedema with ACE-I occurs 2-4x more frequently

Notes:

**Lifestyle Modifications**

* Review Dash diet
* Weight Loss: ca 1 mm Hg for every 1 pound
* Decrease ETOH
  + Women - 1 drink/day women
  + Men - 2 drinks/day
* Aerobic Exercise-30 min most days
* Smoking Cessation
* Stress Reduction
  + Yoga or meditation
  + Muscle relaxation

Notes:

**Treatment goals**

Review when you should initiate treatment and what your goals are.

* Non-black population (including diabetics):
  + Thiazide, CCB, ACE or ARB
* Black population (including diabetics)
  + Thiazide or CCB
* Age >18 years w/CKD
  + ACE or ARB

Notes:

**Thiazide diuretics**

* Act by decreasing blood volume/cardiac output
* Decrease peripheral resistance during chronic therapy
* No added benefit of increasing HCTZ higher than 25mg daily – add 2nd agent
* Drug of choice for pts with no comorbidities, African Americans, obese individuals and elderly

Notes:

**Side Effects/Precautions**

* Hypokalemia
* Hyponatremia
* Hyperglycemia
* Hyperuricemia
* Hyperlipidemia
* Not safe in renal and hepatic insuff
* Favorable - Osteoporosis

Notes:

**Angiotensin Converting Enzyme Inhibitors (ACE-I)**

* “-pril”
* Block conversion from Angiotensin I to angiotensin II
* **First line therapy:** 
  + HF or LV dysfunction (Reverse remodeling)
  + DM
  + Proteinuric kidney disease (renal protective)
* **Absolutely Contraindicated** in Pregnancy/Breast feeding
* **African Americans are more prone to angioedema** 
  + Can occur months to years after starting
  + ACE angioedema not a normal allergic reaction
  + Treatment is removal of drug and supportive care (airway management)
* Cough (dry and irritating) - 5 to 20%
  + More common in women and black patients
  + Should stop within 4 days when medication stopped
* Hyperkalemia (5% of patients)
* Renal Insufficiency (Baseline Serum Creatinine <3.0 mg/dl is safe)
* Hypotension (Restart at half dose)

Notes:

**Angiotensin II Receptor Blockers**

* Patients who do not tolerate an ACE-I
* “- sartan”
* Relative contraindication:
  + Previous angioedema with ACE
  + 2% will have reaction with ARB as well
* In general do not co administer with ACE
  + Only benefit with late stage CHF
* Peak effect 4-6 weeks
* Proteinuria control is equal to ACE-I

Notes:

**Calcium Channel Blockers (CCB)**

* Myocardial (non-dihydropiridine) and vascular smooth muscle relaxation
* Dihydropyridines – Amlodipine (Norvasc)
  + Peripheral vasculature
  + Adverse Effects: Peripheral Edema
    - Women
    - Doses >5 mg
    - Adding Ace decreases edema
* Non-Dihydropyridines – Diltiazem, Verapamil
  + Negative inotrope
  + Peripheral vasculature and cardiac tissue
  + Slow AV node conduction
  + Rate control
  + Reynaud's Favorable

Notes:

**CCB adverse effects**

* Peripheral edema
* Hypotension
* Flushing
* Nasal congestion
* Tachycardia
* Dizziness
* Nausea
* Nervousness
* Bowel Changes/constipation

Notes:

### Management for older adults

* Thiazide diuretic decrease morbidity and mortality in CVA, CHF, MI
* Observe closely for:
  + Dehydration
  + Orthostatic hypotension
  + Hypokalemia
* Start low and go slow – prevent falls

Notes:

**General management**

* Return one month after starting agent
  + Improves compliance
* Maximize compliance
  + Work with patients to reduce adverse effects
    - Pt education on what to look for
    - Switch to another agent if necessary

Notes:

### General treatment contraindications

Make notes for each contraindication to reinforce your recall:

|  |  |  |
| --- | --- | --- |
| **AHA, ACC and CDC 2013 Suggested HTN Drug choice by medical condition** | **Drug** | **Notes** |
| Systolic HF | ACE or ARB, BB, Diuretic |  |
| Post MI | ACE or ARB, BB |  |
| Proteinuric CKD | ACE or ARB |  |
| Angina | BB, CCB |  |
| Afib/flutter rate control | BB, nondihydropyridine CCB |  |

### General treatment contraindications

Make notes for each contraindication to reinforce your recall

|  |  |  |
| --- | --- | --- |
| **Contraindication** | **Drug** | **Notes** |
| Angioedema | ACE Inhibitor |  |
| Bronchospasm | Beta Blocker |  |
| Pregnancy | ACE or ARB |  |
| Heart Block | BB or nonhydropyridine CCB |  |