NorthBay HEALTH

Hypertension Overview

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Financial Disclosure

- None

Objectives

- Overview of diagnosis and management of hypertension.
- Understand Resistant Hypertension, Refractory Hypertension and Pseudoresistant Hypertension.
- Secondary Hypertension
  - Renal artery stenosis
  - Hyperaldosteronism

Definition

- ACC/AHA (2017)
  - Normal BP Sys <120, Dias<80
  - Elevated Sys <120-129, Dias<80
  - Stage 1 Sys <130-139 or Dias 80-89
  - Stage 2 Sys >140, Dias>90
- Higher value determines the stage
- ESC/ESH, NICE(National Institute of Hypertension and Care Excellence)
  - Office based measurement of systolic more than or equal to 140 or
  - Diastolic more than or equal than 90

Measurement

- Office
  - 5 minutes rest, three times measurement, average of the 2nd and 3rd
  - Appropriate cuff size
  - Resting back and arm, uncrossed legs
  - Both arms (difference of 10 significant for SCA stenosis)
  - Postural (20 mmHg drop supine to standing)
- Home
  - Average of 12 measurement am/pm per week
- Ambulatory BP Monitoring (ABPM)
  - A 24-hour mean of ≥125 mmHg systolic or ≥75 mmHg diastolic
  - Daytime (awake) mean of ≥130 mmHg systolic or ≥80 mmHg diastolic
  - Nighttime (asleep) mean of ≥110 mmHg systolic or ≥65 mmHg diastolic

ABPM

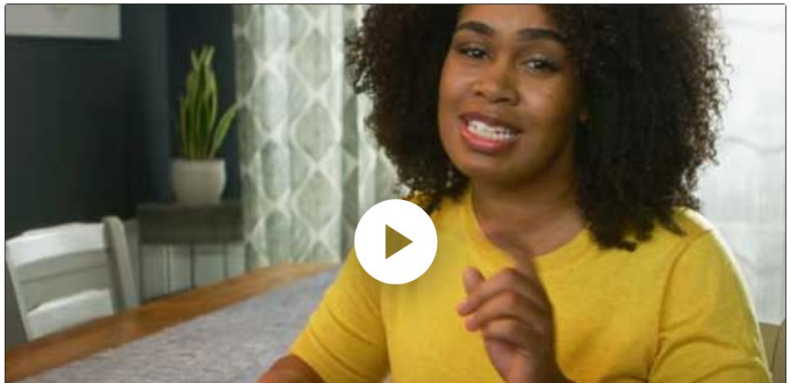
- White Coat
- Suspected Masked Hypertension
- Determining therapeutic response in patients with White Coat
- Suspected episodic hypertension
- Hypotensive symptoms on medication
- Resistant hypertension
- Autonomic dysfunction

HBPM

- Appropriate device preferably with memory and appropriate cuff size
- Determine arm to be used
- Rest for 5 minutes
- Avoid smoking, caffeinated beverages, exercise 30 minutes prior
- Correct sitting, supported back and arm, right cuff position
- 2-3 readings one minute apart before taking medications in am and before supper in pm
- Daily for a week per month or two weeks after medication change

HBPM

Monitoring Your Blood Pressure at Home



TARGET:BP™

SMBP TRAINING VIDEO

Primary Hypertension

- Formerly known as “Essential Hypertension”
- Blood Pressure= Cardiac Output(EV X HR) X Peripheral Resistance
- Compounding causes of Genetic and Environmental
- Age
- Obesity
- Race, Family history
- Reduction in Nephrons
- Social determinants, stressors, inequity and disparities
- Physical inactivity
- Sleep less than 7 hours
- OSA
- Diet
  - Salt more than 3 gram per day
  - Alcohol

Resistant Hypertension

- Resistant Hypertension, Uncontrolled hypertension with three or controlled with four medication, one should be diuretic if tolerated
- Refractory hypertension, uncontrolled with five or more medication, including diuretic and aldosterone receptor antagonist
- Apparent resistant
- Pseudoresistant hypertension,
  - Erroneous measurement, poor adherence to medications and life style, White coat effect

Secondary

- Medications
  - Contraceptives, NSAIDs, Stimulants (Methylphenidate, Amphetamine), Decongestants, Antidepressant (Tricyclics, SSRIs), Antipsychotics (Olanzapine, Clozapine), Tacrolimus or Cyclosporine, Corticosteroids, Anti-angiogenesis (Bevacizumab), Tyrosine Kinase inhibitors (Sunitinib, Surafenib), ESA
  - Illicit drugs (Cocaine, Methamphetamine)
- Primary Kidney disease
- Endocrine diseases (Aldosteronism, Pheochromocytoma, Cushing's, Hyperthyroidism, Hypothyroidism, Hyperparathyroidism)
- OSA
- Renal artery stenosis
- Coarctation of Aorta

Diagnosis

- Hypertensive urgency or emergency (BP>180/120)
- Systolic BP>160 or diastolic >90 with end organ damage such as LVH or CKD or retinal arterial thickening
- HBPM or ABPM with more than or equal to 130/80
- Office BP more than 130/80 in three occasions

Monitoring

- All adults should have blood pressure measurement annually
- Adults with one risk factor should have BP check semi annually
- Adults with elevated blood pressure in the office need to have AOBPM
- White Coat hypertension need ABPM
- Masked Hypertension should be treated

Evaluation

- History
  - Family
  - Medications Prescribed and OTC
  - Alcohol consumption
  - Habits (smoking, Exercise, Diet)

- Physical examination
  - End organ damage (Cardiac Exam, Pulses, Edema, Bruits, Fundoscopy)
  - Evidence for secondary hypertension(Thyroid exam, Abdominal Bruit)

Evaluation

- Electrolytes (Creatinine, potassium, CO2, Calcium)
- Fasting glucose
- Urinalysis (hematuria, proteinuria, Pyuria)
- Complete blood count
- Thyroid-stimulating hormone
- Lipid profile
- Electrocardiogram
- Urine ACR
- Calculate 10-year atherosclerotic cardiovascular disease risk

Evaluation for Secondary hypertension

- Not recommended routinely
- Warranted if
  - Confirmed Resistant Hypertension
  - Age, very young and very old at the time of diagnosis
  - Sudden onset or sudden rise in established hypertension
  - Abdominal bruits
  - Hypokalemia
  - Metabolic alkalosis
  - Proteinuria or hematuria

Management

- Life style modification
  - Weight loss (0.5-2 mmHg per kg weight loss)
  - Salt restriction (4.8/1.9 mmHg decline)
  - High Potassium diet(3.5-5 g/day 4 mmHg decline)
  - DASH diet (-11 mmHg)
  - Exercise (moderate aerobic and isometric, resistance, 40 minutes 3-4/week)
    - Reduction 4-6/3 mmHg after 12 weeks
  - Stress reduction, Meditation
  - Sleep Hygiene, CPAP for sleep apnea

Pharmacologic Therapies

- Diuretics
- ACE inhibitors
- Calcium channel blockers
- Alpha Blockers
  - Central
  - Peripheral
- Beta Blockers
- Vasodilators

Renal Artery stenosis

- Resistant hypertension
- Age of onset
  - Fibromusclular dysplagia
  - Atherosclerosis
- Unilateral versus bilateral
- Ischemic nephropathy
- Decline in eGFR
- Revascularization

Hyperaldosteronism

- Primary 10-20%,
  - Normotensive-Hypertension stage 1,2-Resistant HTN
- Unilateral 30-40%
  - Nodule, adenoma, hyperplasia (PAH 3%), carcinoma
- Bilateral 60-70%
  - IAH
- Secondary
  - RAS, Diuretic,

Renal Sympathetic Nerve Ablation

- Untreated Hypertensive patients
- Resistant Hypertensive patients RADIANCE-HTN TRIO

Complications

- Cardiac
  - LVH
  - Diastolic and systolic heart failure
- Vascular
  - Ischemic Heart Disease
  - CVA
  - PAD
  - Risk doubles for every 20 mmHg above systolic 115 mmHg , or 10 mmHg above diastolic of 75mmHg.