HYPERTENSION HIGHLIGHTS 2019
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Conflict of Interest Disclosure
I have no conflicts and nothing to disclose

OBJECTIVES

• 1. Define hypertension
• 2. Describe the best way to obtain an accurate blood pressure reading
• 3. Discuss how to diagnose hypertension
• 4. Discuss treatment options for hypertension with a focus on life style changes
One in three people in US have hypertension

- There are **103 million people** in the US with high blood pressure
- There was a **38 percent rise** in the number of high blood pressure deaths between 2005 and 2015
- 38% of adults were obese as of 2014
- 15% who smoked as of 2015
- One million people who will have a heart attack or die from coronary heart disease this year
- 795,000 people who will have a stroke this year

HOW ARE WE DOING WITH CONTROL?

- According to Examination Survey (NHAMES), US 2003-2010 only **46%** of people with Hypertension were controlled
- Of the **53 percent not controlled**, 39% were unaware, 16% were aware but untreated and 45% were aware and treated
Definition of Hypertension

- Defined by the American Heart Association as a condition in patients with systolic and diastolic pressures >140/90 mm Hg, receiving antihypertensive medications, or told he or she has hypertension on >2 occasions; incidence ≈35%, highest among non-Hispanic black men and non-Hispanic black women, increases with age, equilibrated in men and women over much of lifetime, and increasing since late 1980s in all ethnic groups and in men and women; rates of recognition, treatment, and control increasing; however, gap between treatment and control large (in men and women, all ages, and all ethnic groups; largest among non-Hispanic black men and non-Hispanic black women).

White coat Hypertension

White coat hypertension describes patients whose blood pressure is high in an office or clinic setting, with a normal daytime ambulatory pressure.

Resistant Hypertension

Blood pressure of greater than or equal to 140/90 mm Hg despite three drugs of different classes at maximum approved doses, given for at least a month.
Conditions related to masked hypertension

**Morning HTN**
- Alcohol
- Orthostatic hypertension
- Augmented stiffness of large vessels
- Antihypertensive education with insufficient duration of action

**Stress Induced HTN**
- Mental stress at work
- Mental stress at home
- Physical stress

**Night-time HTN**
- Increase in the circulating blood volume (heart failure, renal insufficiency)
- Autonomic nervous dysfunction (orthostatic hypotension, diabetes)
- Sleep apnea syndrome
- Depression
- Cognitive dysfunction
- Cerebral vascular disease

Pathophysiology of hypertension

**HYPERTENSION TYPES**

**PRIMARY**
- More common
- Gradual in onset
- Age: affects after 40
- Strong family history
- Cause: Premature atherosclerosis

**SECONDARY**
- Less common
- Dramatic in onset
- Age: 1st-2nd decade/5th to 6th
- Family history may not be present
- Causes: Endocrine tumors/chronic contraceptive/chronic steroids
- Surgical Rx or drug withdrawal
SECONDARY HYPERTENSION

- High blood pressure caused by an identifiable and potentially curable disorder such as:
  - 1. Renal parenchymal disease
  - 2. Renovascular
  - 3. Coarctation
  - 4. Primary aldosteronism
  - 5. Pheochromocytoma

How to take an accurate blood pressure reading

- 1. Posture should be feet flat on floor and back supported
- 2. Cuff size: length of the bladder should be 80% and the width of the bladder should be at least 40% of the circumference of the upper arm. Arm should be supported at the level of the heart.
- 3. No talking during, no caffeine up to one hour before, no smoking up to one hour before. Bladder should be empty.
- 4. Aneroid gauges should be calibrated every 6 months
- 5. Take at least 2 readings as far apart as possible

What’s wrong here?
Getting the most accurate reading

Patients should use same guidelines when monitoring at home

Device

Getting it right

Trial by American Medical Association (AMA): 159 medical students taught proper technique for measuring blood pressure using 11-point checklist; when tested, average score of 5.1 out of 11; one student achieved passing grade; when similar study performed by same AMA team with faculty of University of Pittsburgh, rate of passing score 10%
FACTORS AFFECTING BLOOD PRESSURE READINGS

**Incorrect technique**
- Cuff too small
- Cuff over clothing
- Feet not on floor/back not supported
- Not resting for 5 minutes
- Talking
- Full bladder
- Pain

**Variance mm Hg**
- 10-40 increase
- 10-40 increase/decrease
- 5-15 increase
- 10-20 increase
- 10-15 increase
- 10-15 increase
- 10-30 increase

What goes up must come down (or should)

See Pharmacy-Peoples.com for Graphic on:
- Hypertension Affects Your Whole Body

BLOOD PRESSURE GOALS

**JNC 7**
- Non-systematic literature review by expert committees
- <140/90 for most
- <130/90 for DM and CKD
- Lifestyle changes based on literature review and expert opinion

**JNC 8**
- Systematic review of randomized controlled trials
- <140/90 for age <60
  - 130/80 for age >60
- Endorsed the evidence based findings of the Lifestyle Work Group
JNC 8 Recommends

• Maximize initial drug before adding a drug
• Emphasize lifestyle changes and adherence at each stage of intervention
• Start with thiazide, CCB, ACE or ARB
• Choose an ACE or ARB in DM or CKD

JNC 8

• Don’t start with beta blocker unless patient has CAD or CHF
• Don’t use ACE and ARB together

GUIDELINES FOR HYPERTENSION

<table>
<thead>
<tr>
<th>JNC 8</th>
<th>2017 ACC/AHA</th>
<th>2018 ESC/ESH</th>
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<tbody>
<tr>
<td>In 2014, panel members of the Eighth Joint National Committee published the results of their evidence review and deliberations about the prevention, detection, evaluation, and treatment of high blood pressure. The 2014 guideline offers recommendations for the management of hypertension in: People older or younger than age 60 years People aged ≥18 years with chronic kidney disease People aged ≥18 years with diabetes Black and nonblack populations.</td>
<td>In 2017 the ACC/AHA and 9 other specialty organizations published an updated guideline which, among other changes, lowered the definition of elevated blood pressure to lower BP levels, enlarging the population considered for monitoring and treatment.</td>
<td>In 2018 the ESC/ESH published a guideline which retains the 140/90 threshold definition of hypertension, including for patients with chronic kidney disease (CKD), and emphasizes lifestyle interventions as primary treatment, with consideration of antihypertensive drug therapy only in adults at very high risk, eg with established CVD. In many other respects the 2018 guideline is similar to the 2017 ACC/AHA guideline.</td>
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GUIDELINES FOR HYPERTENSION GOALS

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<thead>
<tr>
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<th>ESH/ESC</th>
<th>AHA/ACC</th>
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<td>&lt;60 age</td>
<td>&lt;140/90</td>
<td>&lt;140/90</td>
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<tr>
<td>&gt;60 age</td>
<td>&gt;150/90DM</td>
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<td>&lt;140/90</td>
<td>CKD &lt;140/90</td>
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<td>&lt;140/90</td>
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AND THEN......

SPRINT Important Goals

SPRINT tested whether a treatment strategy aimed at reducing systolic blood pressure to:

- lower goal (SBP < 120 mm Hg)
  - compared with

- currently recommended (SBP < 140 mm Hg)
  - is able to reduce the occurrence of cardiovascular disease (CVD)

SPRINT

- SPRINT demonstrated that among adults with hypertension but without diabetes, lowering systolic blood pressure to a target goal of less and 120 mm Hg, vs the standard goal of less than 140 mm Hg, resulted in significantly lower rates of fatal and nonfatal cardiovascular events and death from any cause.
SPRINT MONITORING

Blood pressure readings were conducted in a unique manner that is not usually used in most PCP offices. Patients were asked to sit quietly for 5 minutes before BP readings were measured by an automated unit. Three readings were obtained over several minutes with no clinician in the room. The patients were in for close monitoring of blood pressure, renal function and electrolytes every 3 months.

“The good physician treats the disease; the great physician treats the patient who has the disease”

William Osler

Diagnostic algorithm for high Blood Pressure including Office, ABPM and Home Blood Pressure Measurement

[Diagram showing the algorithm]
**Thiazides**
- Works by causing natriuresis in renal tubule
- Works well with other hypertension meds
- Minimal efficacy with GFR <45
- Watch for hypokalemia
- Be careful in elderly, hypercalcemia, gout and diabetics due to volume constriction

**Calcium channel blockers**
- Works by reducing vascular smooth muscle contractility
- Good efficacy
- Do not use short acting CCBs
- Dihydropyridine can cause pedal edema at higher doses
- Non dihydropyridine CCBs potential for conduction abnormalities and constipation, drug interactions
- Caution in CHF

**ACE or ARB**
- Blocks angiotensin in kidneys
- Usually well tolerated
- Preferred in patients with CHF and DM and CKD
- Can cause angioedema or dry cough
- Do not use and ACE with an ARB
- Watch for hyperkalemia and do not use in patient with RAS
- Contraindicated in pregnancy so avoid in women of child bearing age
Don’t forget beta blockers

CLASSIFICATION

- 1st Generation: Non-selective
- 2nd Generation: S-selective
- 3rd Generation: Additional properties, for example, vestibular

Medication compliance

- Expect a challenge
- Conceptualize difficulties
- Written information
- Use behavioral habits
- Address concerns
- Use technology
- Involve the family

Low-dose aspirin might be considered for primary prevention of ASCVD in select higher ASCVD adults aged 40-70 years who are not at increased bleeding risk.

Low-dose aspirin should not be administered on a routine basis for primary prevention of ASCVD among adults >70 years.

Low-dose aspirin should not be administered for primary prevention among adults at any age who are at increased bleeding risk.
stop the salt storm

- Read food labels
- Stick to fresh food rather than their packaged counterpart
- Check restaurant websites
- Rinse canned foods to remove salts
- Choose low sodium versions of foods
Daily Nutrient Goals Used in the DASH Studies
(for a 2,100 Calorie Eating Plan)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Percentage of Calories</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Total Fat</td>
<td>27%</td>
<td>25 grams</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>7%</td>
<td>7 grams</td>
</tr>
<tr>
<td>Protein</td>
<td>19%</td>
<td>19 grams</td>
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<tr>
<td>Carbohydrate</td>
<td>55%</td>
<td>55 grams</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>150 mg</td>
<td>1.5 grams</td>
</tr>
<tr>
<td>Fiber</td>
<td></td>
<td>30 grams</td>
</tr>
</tbody>
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* 1,500 mg sodium was a lower goal tested and found to be even better for lowering blood pressure. It was particularly effective for middle-aged and older individuals, African Americans, and those who already had high blood pressure.

DASH diet
6-8 servings of vegetables
4-5 servings of fruits
4-5 servings of low-fat dairy
2-3 servings of whole grains

Mediterranean Diet Pyramid
See: www.oldwayspt.org
Times have changed........

On left, old Lucky Strike ad with image of physician...
"20,679 Physicians say 'Luckies are less irritating.'"

On right, old Camels ad with image of nurse...
"'Fresh' to do it!"

Everybody has an excuse.............
“Giving up smoking is the easiest thing in the world. I know because I’ve done it thousands of times.”
- Mark Twain

That’s not what the doctor meant when she said to use alcohol after each injection.

What do our patients consider a drink?
What's in a drink?

12 fl oz of regular beer = 8-9 fl oz of malt liquor (sworn in a 12 oz glass) = 5 fl oz of table wine = 1.5 fl oz shot of 80-proof spirits

about 5% alcohol
about 7% alcohol
about 12% alcohol
about 40% alcohol

The percent of "pure" alcohol, expressed here as alcohol by volume (AAV), varies by beverage.

SLEEP TIGHT

• Even minor periods of inadequate sleep can cause an elevation in blood pressure.
• Studies have found that a single night of inadequate sleep in people who have hypertension can cause elevated blood pressure throughout the following day.
• This effect may begin to explain the correlation between poor sleep and cardiovascular disease and stroke.

Hypertension and Alcohol

Drinking too much alcohol can increase your blood pressure. Guidelines from the American Heart Association state that if you drink alcohol, you should limit the amount to no more than two drinks a day for men, or one a day for women. They define a drink as one 12-ounce beer, four ounces of wine, 1.5 ounces of 80-proof spirits, or one ounce of 100-proof spirits.
Circadian Rhythms in Humans
see Hypersomnolence Australia
Vitamin D and Hypertension

- In a study of hypertensive patients who were exposed to ultraviolet B radiation three times per week for 3 months, 25 OH vitamin D levels increased by approximately 180% and both SBP and DBP were reduced by 6 mm Hg. (Krause, Lancet 1998)
- Proposed mechanism: The 1,25 OH vitamin D produced in the kidney enters the circulation and down regulates renin production in the kidney.
How exercise improves blood pressure

ALL EXERCISE COUNTS

How stress raises blood pressure

“It's not the load that breaks you down. It's the way you carry it.”

- Lou Holtz
FIND PEACE

“These mountains that you are carrying, you were only supposed to climb.”
- Najwa Zebian

Drugs that can raise blood pressure

- Sympathomimetic agents (diet pills, decongestants, ADD meds)
- NSAIDS and Cox-2 inhibitors
- Corticosteroids
- CNS stimulants
- Dietary supplements (Ginseng, natural licorice, yohimbine)
- SNRIs (venlafaxine, sibutramine)
- Immunosuppressants (cyclosporine, tacrolimus)

IMPACT OF LIFE STYLE CHANGES

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Blood pressure reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>8-14 mm Hg</td>
</tr>
<tr>
<td>Reducing salt intake</td>
<td>4-9 mm Hg</td>
</tr>
<tr>
<td>Moderation of alcohol</td>
<td>2-8 mm Hg</td>
</tr>
<tr>
<td>Weight loss</td>
<td>2-4 mm Hg</td>
</tr>
<tr>
<td>Adequate sleep</td>
<td>3 mm Hg per 4-8% body weight lost</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>2.5 mm Hg</td>
</tr>
<tr>
<td>Stress reduction</td>
<td>6 mm Hg</td>
</tr>
<tr>
<td>Smoking</td>
<td>4.5 mm Hg</td>
</tr>
<tr>
<td></td>
<td>5 mm Hg</td>
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BENEFITS OF LOWERING BLOOD PRESSURE

• 37% DECREASE IN STROKE
• 21% DECREASE IN CORONARY ARTERY DISEASE
• 25% DECREASE IN DEATHS FROM CARDIOVASCULAR DISEASE
• 13% DECREASE IN DEATHS FROM ALL CAUSES

• ACCORDING TO THE CDC