Dietary Approaches to Manage Blood Pressure

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Hypertension Prevalence

• 70 million people in the US age 20 and older have high blood pressure, or 1 in 3.
• One-third of people are unaware they have hypertension.
• Less than half of American adults have optimal blood pressure.
• Increases in prevalence and severity in African Americans.
What is Blood Pressure?

- The force of blood against the wall of the arteries.
- Systolic means the pressure while the heart beats.
- Diastolic pressure is measured as the heart relaxes.
- Read blood pressure (BP) as a ratio: systolic BP / diastolic BP
- New recommendations for blood pressure treatment specify different cutoffs for treatment based on age
High Blood Pressure

• If you are 60 years of age or younger, have diabetes or chronic kidney disease (CKD):
  A consistent blood pressure of 140/90 mm Hg or higher is considered high blood pressure.

• If you are over 60 years of age with no diabetes or CKD:
  A consistent blood pressure of 150/90 mm Hg or higher is considered high blood pressure.

These treatment goals reflect recent changes in BP treatment guidelines

High BP has no warning signs or symptoms.
Why is High Blood Pressure Important?

- Makes the heart work too hard.
- Increases the pressure on the walls of arteries and can cause hardening of arteries.
- If left untreated, can cause heart failure, kidney disease, and blindness.
- Increases risk for heart disease and stroke.
Untreated Hypertension

Target Organs that are Damaged:

- heart – heart disease
- brain - cerebrovascular disease
- kidneys - renal disease
- arteries - large vessel disease
How Does It Effect the Body?

The Brain

- High BP is the most important risk factor for stroke.
- Can cause a break in a weakened blood vessel which then bleeds in the brain.
The Heart

- High BP is a major risk factor for heart attack.
- Is the number one risk factor for Congestive Heart Failure.
- CHF is usually preceded by enlargement of the left ventricle.
The Kidneys

- Kidneys act as filters to rid the body of wastes.
- High BP can damage the small blood vessels in the kidneys.
- Waste builds up in the blood leading to a need for dialysis.
The Eyes

- Can eventually cause blood vessels to break and bleed in the eye.
- Can result in blurred vision or even blindness.
The Arteries

- High BP can cause damage to arterial wall.
- Arteries build scar tissue and attract lipid deposits at the damaged site.
- Increased risk for stroke.

Image: http://www.cdc.gov
What causes High Blood Pressure?

- Genetic factors
- Being overweight or obese
- High salt intake
- Narrowing or stiffening of the arteries
- Aging
- Loss of elasticity of arterial wall
- Stress
- Too much alcohol
Who can develop High Blood Pressure?

Anyone, but it is more common in:

- African Americans. They tend to get it earlier and more often than Caucasians.
- Older individuals. 60% of Americans over 60 have hypertension.
- Those who are overweight and obese.
- Those with a family history.

Diastolic BP most important – research suggests most benefit by keep diastolic BP $\leq 90$ mm Hg regardless of age.
Detection

- Dr.’s will diagnose a person with 2 or more readings taken on more than one occasion.
- Measured using a spygmomameter.
- They will consider your age and if you have diabetes and /or chronic kidney disease.
Risk Factors

Non-Modifiable

• Age
• Race/ethnicity
• Gender
• Family history

Modifiable

• Overweight
• Abnormal lipid metabolism
• Smoking
• Physical inactivity
• Unhealthy diet
• Excessive alcohol intake
Overweight and Obesity

- Measure BMI routinely at each regular check-up.
- Weight (kg)/Height (meters)$^2$
- Classifications:
  - BMI 18.5-24.9 = normal
  - BMI 25-29.9 = overweight
  - BMI 30-39.9 = obesity
  - BMI $\geq$40 = extreme obesity
### BMI Chart

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Measuring Waist Circumference

- Large waist circumference (WC) can be used to assess increased risk for type 2 diabetes, high blood pressure, high cholesterol, and heart disease.

- A high-risk waist circumference is:
  - A man with waist measurement over 40 inches (102 cm).
  - A woman with waist measurement over 35 inches (88 cm).

- A high waist circumference means you have too much abdominal fat.

- Abdominal fat ➔ good predictor of ectopic fat which increases risk of chronic diseases.
Lose Weight if Overweight

- If follow DASH diet and increase activity, weight loss should occur gradually
- Even 10 pounds can make a big difference!
Reducing Overweight and Obesity

Lifestyle modification:

- Calculate weight maintenance calories using reliable Apps or websites: [https://www.supertracker.usda.gov](https://www.supertracker.usda.gov)
- Reduce caloric intake by 500-1000 kcal/day (depending on starting weight)
- Target 1-2 pound/week weight loss
- Increase physical activity
- Health diet
- Track what you eat
Diet and Hypertension

- Non-pharmacologic way of treating hypertension
- DASH diet
  - Dietary Approaches to Stop Hypertension
  - High in whole grains, fruits, vegetables, and low-fat dairy
  - Adequate Calcium, Potassium, Magnesium
  - Low in red meat, sweets and sugar beverages
  - Low in saturated and trans fat, cholesterol
DASH is Unique

- Tested dietary pattern rather than single nutrients
- Experimental diets used common foods that can be incorporated into recommendations for the public
- Investigators planned the DASH diet to be fully compatible with dietary recommendations for reducing risk of CVD, osteoporosis and cancer

![Image of DASH diet diagram]

**FIGURE 2** Mean systolic and diastolic blood pressures at baseline and during each intervention week, according to diet, for participants in the DASH study. [Reprinted with permission from Ref. [6], Appel, L. J., Moore, T. J., Obarzanek, E., et al. (1997). A clinical trial of the effects of dietary patterns on blood pressure. *N. Engl. J. Med.* 336, 1117–1124.]
Mineral Intake and Hypertension

Potassium

- Clinical trials and meta-analyses indicate potassium (K) supplementation lowers BP
- Adequate K intake, preferably from food sources, should be maintained → 4.7 g/day best BP lowering
- Evidence is strong enough to support a health claim on high potassium foods
- Best sources are fruits and vegetables - about 8 servings to get 4.7 g/day
- Some diuretics cause K retention → check with physician
Mineral Intake and Hypertension

**Magnesium**

- Evidence suggests an association between lower dietary magnesium intake and high blood pressure
- Diets high in processed food -> low in magnesium
- Food sources are nuts, beans, vegetables
- 1 serving nuts/day + 4 vegetable servings meet need
- 310 mg/d
Mineral Intake and Hypertension

Calcium

- American Heart Association Statement
  - Increasing calcium intake may preferentially lower blood pressure in salt-sensitive people
  - Benefits more evident with low initial calcium intakes (300-600 mg/day)
- Best food sources are low fat dairy products (yogurt, milk, fat free cheese).
- 1000-1200 mg/d
- Dairy protein may have natural anti-HTN activity
DASH Reduces Homocysteine Levels

- Homocysteine $\rightarrow$ amino acid that can damage blood vessels at high levels
- Diet high in vitamin B-rich milk and milk products, fruits and vegetables $\rightarrow$ lowers this amino acid
- Lowering homocysteine with DASH may reduce CVD risk an additional 7%-9%

DASH Diet Pattern
based on a 2,000 calorie diet

<table>
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<tr>
<th>Food Group</th>
<th>Servings*</th>
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<td>Grains</td>
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<td>Vegetables</td>
<td>4-5</td>
</tr>
<tr>
<td>Fruits</td>
<td>4-5</td>
</tr>
<tr>
<td>Low-fat or fat free dairy</td>
<td>2-3</td>
</tr>
<tr>
<td>Meats, poultry, fish</td>
<td>less than 6</td>
</tr>
<tr>
<td>Nuts, seeds, dry beans and peas</td>
<td>5/week</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>2-3</td>
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<tr>
<td>Sweets</td>
<td>5/ week</td>
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<tr>
<td>Sodium</td>
<td>2300 mg</td>
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</table>

* Per day unless indicated
Dash Diet

- Slowly increase intake of fruits and vegetables to 8 or more per day
- Three servings of low fat and non-fat dairy products a day
- Nuts, seeds and dried beans 5 times per week
DASH Diet continues...

- More whole grain cereals and breads
- 6 ounces or less of meat, fish or poultry per day
- Small amounts of liquid or soft margarine or oil
Eat Less Sodium

- DASH is more effective if also reduce sodium
- Less than 2400 milligrams per day
- Reduce slowly in 2-3 weeks so that taste buds will get use to less salt
Ways to Cut Sodium

- Remove salt shaker
- Add little if any salt to cooking
- Buy more fresh or plain frozen “no added salt” veggies
- Use more herbs and spices
- Make soups and stews ahead without salt and let flavors blend
- Use fresh poultry, lean meat, and fish
Ways to Cut Sodium

We get most of our salt from convenience foods.

- Use unsalted canned or frozen vegetables. If use regular, rinse canned foods to reduce sodium.
- Choose convenience foods low in salt when available.
- Use fewer convenience foods
- Compare labels

Ways to Cut Sodium

- Most restaurant foods are very high in sodium
- Eat out less often
- Make more foods from scratch.
Using the Food Label to Cut Sodium

- Sodium is a chemical that makes up ½ of table salt
- Limit to 2400 milligrams per day
- Look for “low sodium” or “salt free” – watch “reduced sodium”
- Choose more foods with Daily Value less than 10%
- Balance higher sodium foods with lower sodium foods
• Look for the amount of sodium in foods by finding it on the Nutrition Facts Label.

• Choose foods that have lower amount of sodium based on the label.
Be Physically Active

- Helps lower blood pressure and lose/maintain weight.
- 30 minutes of moderate level activity on most days of week. Can even break it up into 10 minute sessions.
- Use stairs instead of elevator, get off bus 2 stops early, Park your car at the far end of the lot and walk!
Be Physically Active

- 30 minutes at least 5 days a week
- Can divide into 10-15 minute periods
- Work up gradually
- Do something that you enjoy
Physical Activity

Guidelines

• Fit into daily routine
• Aim for at least 150 minutes/week of moderate aerobic exercise
• Start slowly and gradually build intensity
• Wear a pedometer (10,000 steps)
• Take stairs, park further away or walk to another bus stop, etc.
Physical Activity

Benefits of Exercise

- Lower blood pressure
- Weight control
- Increased insulin sensitivity
- Improved lipid levels
- Improved blood glucose control
- Reduced risk of CVD
- Prevent/delay onset of type 2 diabetes
Be Physically Active

- brisk walking
- house cleaning
- lawn care
- gardening

- swimming
- cycling
- walking a golf course
- racket sports
- dancing
Don’t Smoke!
Quit Smoking

- Injures blood vessel walls
- Speeds up process of hardening of the arteries.
Limit Alcohol Intake

Excessive alcohol raises blood pressure and can harm liver, brain, and heart. Alcohol is an oxidant.

What counts as a drink?

- 12 oz beer
- 5 oz of wine
- 1.5 oz of 80 proof whiskey
Try to -

- Follow a healthy eating pattern.
- Be Active
- Not Smoke
- Control Your Weight
- Take Your Medicine
In Summary

- Make a “Dash” for more –
  - fruits and vegetables
  - whole grains and breads
  - non-fat and low fat dairy foods
  - nuts, seeds and beans
Conclusion

- Hypertension is a very controllable disease, with drastic consequences if left uncontrolled.
- Hypertension can be treated by diet and lifestyle measures that are as, or more effective than medication.
Resources

• www.nhlbi.nih.gov
• http://email.nhlbi.nih.gov/hbpSubLink.asp?p=2&h=3&g=27&r=1
• http://dashdiet.org