Introduction to Hypertension Management

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Objectives

- Define Hypertension (HTN)
- Learn how to measure blood pressure
- Understand initial clinical evaluation
- Identify causes of secondary HTN
- Describe lifestyle modifications that lower blood pressure
- Select appropriate anti-HTN medications
- Provide appropriate follow-up care

Case 1

- 55 y/o AAF seen your office for CPE
- Medical history is unremarkable
- BP = 158/92
- PE is unremarkable

- What do you do?

Case 2

- 72 y/o Caucasian female. No complaints.
- ROS: arthritis
- PM/S/OB-Gyn/F/S Hx all unremarkable
- No Allergies
- Takes IB daily for OA
- Blood Pressure = 168/86. Similar on 2 prior visits.
- 2/6 SM at LSB/Right 2 ICS
- Rest of exam unremarkable x OA of hands/knees

Case 3

- 26 y/o med student comes in for CPE
- No complaints
- Recent URI with nasal congestion
- PM/S Hx negative
- Social Hx: Binge drinker, occ tob, occ marijuana. Lives with roommate.
- FHx: neg

Case 3

- BP 160/100
- Pulse 108
- PE: Pupils 5mm, nares red with clear d/c, tachycardic, no murmur. Chest clear. Abd neg. Ext warm/moist.

Case 4

- 42 y/o white male comes in for STD check up.
- Pt nervous about recent sexual contact.
- Medical history unremarkable
- BP 152/94
- Exam unremarkable
- STD labs draw/Pt counseled/Will return in one week for results of labs

What is Hypertension?

Hypertension

- HTN = abnormal elevation of BP
- BP limits are different in children and pregnancy.
- BP goal is different if you have diabetes or chronic kidney disease.
- JNC-7 Guidelines for adults.

JNC-7

- Released May 2003
- Reclassified BP
  - Normal <120/80
  - PreHTN 120-139/80-89
  - Stage 1 140-159/90-99
  - Stage 2 >160/100

JNC-7

- Systolic is MORE important than diastolic
- Risk of CV disease doubles for every 20/10 increase above 115/75
- “PreHTN” emphasized
- Thiazide diuretics
- Goal BP <140/90 and <130/80 with DM/CKD
- Start with 2 meds if BP >20/10 above goal

Why do we care?

- Relationship b/w BP and CVD is positive and continuous.
- We want to prevent: Stroke, MI, HF, kidney damage, retinopathy, peripheral artery dz, other morbidity of atherosclerosis.

Does treatment help?

- YES
- 35-40% decline in stroke
- 25% decline in CAD/MI
- >50% decline in HF

Clinical Evaluation

Accurate BP Measurement

- How do you take a BP?

Proper BP Measurement

- MD should check
- PT seated/quiet/calm
- Arm resting at heart level
- Proper cuff: should cover 2/3 of arm and bladder should circle 80% of arm
- Lower edge of cuff 2.5cm above AC fossa
- Palp radial artery to determine systolic
- Use Bell to ausc over brachial artery
- Inflate cuff to 20-30 mmHg above est syst.

BP Measurement

- Deflate cuff at 2mmHg/seca
- Listen for Korotkoff I and V.
- Record at nearest 2mm Hg
- Repeat in 30 sec
- Check both arms

Factors that INCREASE BP

- Talking
- Cold Temp
- EtOH
- Tob
- Arm below heart
- Small Cuff

Factors the DECREASE BP

- Cuff too large
- Arm above heart
- Diastolic lower when supine
- MD Bias

Diagnosis of HTN

- Repeated abnormal elevation of BP using proper technique/cuff on 3 separate occasions over at least 6 weeks
- A single blood pressure >200/120
- Keep in mind:
  - Risk factors
  - Evidence of end-organ disease

White Coat HTN

- May be as great as 20/10 above pt's normal BP.
- Consider home BP monitoring, ambulatory monitoring, RN visits
- Always calibrate pt's home BP machine with office manometer

Hypertension

- Primary (“essential”) 95% of cases
- Secondary 5% of cases

What is Secondary HTN?

- HTN that has a demonstrable underlying cause.
- Such as?

Secondary HTN

- ABCDE mnemonic

“A”

- Accuracy
- Apnea (OSA)
- Aldosteronism (hyperaldosteronism)

“B”

- Bruits (renal artery stenosis/FMD)
- Bad Kidneys (intrinsic kidney dz)

“C”

- Catecholamines
- Coarctation
- Cushing’s Syndrome

“D”

- Drugs (stimulants, OCPs, NSAIDS)
- Diet (high Na/low K, Mg, Ca)

“E”

- Erythropoietin: elevated EPO in COPD or renal failure or exogenous use for anemia
- Endocrine: Thyroid/Parathyroid, pregnacy, pheochromocytoma, acromegaly

Clinical Evaluation

- History
- Physical Exam
- Laboratory Evaluation

History

- Risk Factors
- Symptoms of end organ damage
- Review PMHx/PSHx/POB-GynHx
- Review Family and Social history
- Review Meds

Physical Exam

- Vital Signs: Accurate BP, BMI
- Retinopathy
- Thyroid
- Neck circumference >17 inches
- C/V exam: LVH, valvular prob, pulses and bruits, leg edema
- Cushinoid features?

Laboratory Evaluation

- CBC
- Chem-7 (“renal lytes”)
  - Always calculate GFR. Use MDRD equation or similar equation.
- U/A
- Urine albumin:creatinine ratio
- FLP
- EKG

What do labs mean?

- CBC: Look for elevated Hb/HCT
- Chem7: Look for low K, elevated Bun/Cr, elevated Ca. Calc GFR
- U/A: Look for protein/blood
- Alb:Cr ratio: Look for microscopic albumin
- FLP: Look for abnormal lipids
- EKG: Look for LVH, CAD, arrhythmia

Treatment

- Life style modifications for all pts
  - Decrease weight: lowers BP 5-20mmHg/10 Kg
  - DASH diet: 8-14 mmHg
  - Low Na diet: 2-8 mmHg
  - Aerobic exercise: 4-9 mmHg
  - Decrease EtOH: 2-4 mmHg

Treatment

- Empathize with patient to encourage trust, motivation, and adherence to therapy
- Consider cultural beliefs and individual attitudes in formulating treatment plan
- Involve the whole family.

Medications

- ACE-I
- ARB
- Alpha Blockers
- Beta Blockers
- Calcium Channel Blockers
  - Dihydropridines
  - Non-Dihydropridines

Medications

- Diuretics
  - CAI
  - Loop
  - Potassium Sparing/Aldosterone Blockers
  - Thiazide

Medications

- Nitrates
- Misc:
  - Hydralazine
  - Midoxidil
  - Nitroprusside
  - Methyldopa
  - Clonidine

Which one do you pick?

- JNC-7 Recommendations
  - Stage 1 w/o compelling indications to choose something else, then use THIAZIDE
  - Stage 2 w/o compelling indications to choose something else, then use THIAZIDE plus ACE

Cautions/Contraindications for Thiazide

- Allergy to thiazide
- Allergy to sulfa
- Anuria/ESRD
- Electrolyte problems/low K/low Na
- Gout/Hyperuricemia
- Severe liver disease
- Pregnancy
- Pancreatitis?

“Compelling Indications”

- Heart Failure
- Post-MI
- High Risk CAD
- DM
- CKD
- Recurrent CVA prevention

Heart Failure

- ACE-I/ARB
- BB
- Loop Diuretic
- Aldosterone Blocker

Post-MI

- BB
- ACE-I
- Aldosterone Blocker

High Risk of CAD

- BB
- ACE-I
- CCB
- Thiazide

Diabetes

- ACE-I/ARB: Prevent nephropathy

Chronic Kidney Disease

- ACE-I
- ARB
- Non-Dihydropyridine CCB

Recurrent Stroke Prevention

- ACE-I

Other Clinical Considerations

- Young: Use ACE-I/ARB
- Elderly: Use Thiazide or Dihydro-CCB
- PVD: Treat like CAD but CCB may relieve leg claudication.
- Migraine: BB or CCB
- BPH: Alpha Blocker
- African-Americans: Thiazides

Clinical Follow-Up

- Initially, see pt as much as needed to stabilize BP
- Then, every 4-6 months for 1st year.
- Or, more often if pt needs motivation
- Monitor BP, Weight, RL, U/A, Lipids, EKG
- Encourage diet/exercise

Side Notes

- Remember CI to Thiazides
- Thiazides may inhibit bone loss.
- ACE-I: Can cause cough, angioedema, increase Cr (ok if <30% baseline).
- BB: Reactive airway dz, depression, AVB
- CCB: AVB, avoid short acting CCB
- ACE-I plus ARB?

Case 1

- 55 y/o AAF seen your office for CPE
- Medical history is unremarkable
- BP = 158/92
- PE is unremarkable

- What do you do?

Case 1 Con’t

- You have her return in 2 weeks for a RN visit to check her BP.
- BP at that visit 162/88

Case 1 Con't

What do you do now?

1. Have her check BP at home/pharmacy
2. Come back to see you with results in 1 month.

Case 1 Con't

1 month later her BP in your office is 160/86 and her home BP measurements are:

150/80

162/84

158/88

160/82

156/86

Case 1 Con't

How should you proceed?

1. Labs
2. EKG
3. Lifestyle modifications
4. Continue home BP measurement
5. Have patient return in 4-6 months

Case 1 Con't

Your patient returns 1 year later. Since her last visit her weight has increased by 2 lbs and her BP today is 166/90. Labs and EKG done at the last visit were normal.

What is her BP goal?

Case 1 Con’t

- Her BP goal is < 140/90
- How should you proceed?

Case 1 Con't

- Reinforce need to make lifestyle modifications.
- Consider referral to dietician.
- Start thiazide diuretic (HCTZ 12.5 QD)
- Have patient schedule more frequent appointments to stabilize BP and motivate her.

Case 2

- 72 y/o Caucasian female. No complaints.
- ROS: arthritis
- PM/S/OB-Gyn/F/S Hx all unremarkable
- No Allergies
- Takes IB daily for OA
- Blood Pressure = 168/86. Similar on 2 prior visits.
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What is your assessment?

Case 2 Con't

- Assessment: 72 y/o female with
  - Stage 2 HTN
  - OA hands/knees

What labs/studies do you want?

Case 2 Con’t

- CBC
- Chem 7
- U/A
- MicroAlb?
- FLP
- EKG

Case 2 Con't

- All labs reported as normal
- EKG: NSR 80
- Creatinine = 1.2

- What is her GFR?

Case 2 Con’t

- GFR = 47.5
- Is this normal?

NO

- Normal GFR 90-140
- 60-89 mild ckd
- **30-59 mod ckd**
- 15-29 severe ckd
- <15 is ESRD “failure”

Case 2 Con’t

- What is her BP goal?
- <130/80

Case 2 Con’t

- How would you treat her?

Case 2: Treatment

- Life style modifications
  - Weight Reduction
  - DASH Diet
  - Low Na Diet
  - Exercise
  - Decrease EtOH

Case 2: Treatment

- Avoid NSAID's
- Use Acetaminophen for OA

Case 2: Treatment

- Because she's >20 mmHg above her goal BP and she had moderate kidney disease you should consider meds.
  - Thiazide: Good for elderly
  - ACE-I: Protect kidney

Case 3

- 26 y/o med student comes in for CPE
- No complaints
- Recent URI with nasal congestion
- PM/S Hx negative
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- FHx: neg

Case 3

- BP 160/100
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Case 3

- What is your Assessment?

Assessment

- HTN
- Tachycardia
- Mydriasis
- Rhinorrhea
- Poly-substance use/?abuse

What do you do now?

Case 3: Work-Up

- Ask patient about medications/drugs/other secondary causes of HTN…pheo?
- Get EKG

Case 3: work up

- Pt states that he is on Advil cold and sinus for recent URI.
- He admits to nasal inhalation of roommates Ritalin over the last several days while studying
- EKG: Sinus Tach 108. No ST changes.

Case 3: Diagnosis/Treatment

- Likely stimulant induced hypertension
- D/C Advil cold and sinus
- D/C Ritalin
- RTC in 1 week to recheck BP.

Case 3 Con’t

- One week later the BP is still elevated.
- What other concerns do you have?

Case 3 Con't

- You need to r/o other causes of secondary hypertension.
  - Pheochomocytoma
  - HyperThyroidism
  - Persistent drug abuse…cocaine?
  - HyperAldosteronism
  - Steroids
  - Renal artery disease

Case 4

- 42 y/o white male comes in for STD check up.
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- Medical history unremarkable
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Case 4 Con't

- One week later:
- STD labs negative
- Pt's BP 148/98
- You ask patient to return for f/u BP in 1 month.

Case 4 Con't

- One month later:
- BP 156/94
- Exam negative
- EKG: NSR 72

- What do you do next?

Case 4 Con't

- You need to r/o "white coat" HTN.
- You have patient check BP at local pharmacy and bring list in for you in 1 month.

Case 4 Con't

- One month later:
- Pt brings in list of BP taken at Ralph's Pharmacy.
- BP: 130/82, 133/80, 138,84, 128/78

- Dx: White Coat HTN but also "pre-HTN"
- Rec: Life style modifications. Recheck 1 yr

Summary

- Follow JNC 7 Guidelines
- Make sure you have accurate BP
- Encourage lifestyle changes
- Remember secondary causes of HTN
- Start thiazide unless compelling indication
- Encourage/Motivate patients. Be respectful and culturally sensitive. Involve the whole family.