Turning Service Into Success In Primary Care Optometry

CARL SPEAR OD, FAAO
APRIL JASPER OD, FAAO

Dr. William J. Mayo:

In 1910, he told the graduating class of Rush Medical College:
As we men of medicine grow in learning we more justly appreciate our dependence on each other. The sum total of medical knowledge is now so great and wide spreading that it would be futile for any one man...to assume that he has even a working knowledge of any part of the whole...

Objectives

- To Review various ocular and systemic diseases
- To discuss specific challenges in diagnosis and treatment
- To highlight challenges that may arise during and best practices in co-managing these patients with their primary care physician (PCP)
Christine: Appointment

- Christine called the office to get an appointment the same day because she has been experiencing severe headaches and blurred vision with sensitivity to light for one week.

Christine: History

- 20 year old white female with history of weight gain since having a baby last year.
- She is 5 ft 3 inches and weighs 260 lbs at this time.
- No medications currently or since having the baby except analgesics for HA's.
- These headaches are more than she can handle and she wants to know if her eyes could be the cause as she is also sensitive to light.

Christine: Examination

### VF:
- Enlarged blind spot

### Retinal photos:
- Bilateral disc swelling

### CV testing:
- WNL OD and OS

Reviewed medication and pt reports chronic use of pain medications for headaches over the past year.

Reported to primary care at one time and then just dealt with it.

Here with complaint today because Vision is worse and headaches are worsening and more frequent.

Christine: Differentials of Bilateral Disc Swelling

1. Increased Intracranial Pressure (Papilledema)
2. Pseudopapilledema
3. Inflammatory Processes
4. Ischemic Processes
5. Infiltrative Processes

Christine: Frequent Causes of Papilledema

1. Intracranial tumors (Primary or metastatic)
2. Sagittal Sinus Thrombosis
3. Idiopathic intracranial hypertension (PTC)
4. Aqueduct stenosis
5. Subdural or epidural hematoma
6. Arteriovenous malformation
7. Subarachnoid hemorrhage
8. Brain abscess, encephalitis, meningitis
Pseudotumor Cerebri

At one time was called Benign intracranial HTN however is now termed Idiopathic intracranial HTN (IIH)

- It is not a benign disorder as many patients suffer refractory, disabling headaches and there is a risk of permanent, severe vision loss
- Treatment recommendations are limited due to absence of randomized clinical trials
- Natural history of untreated IIH is unknown however it is common to see a long lasting course of months to years

Pseudotumor Cerebri

- Normal MRI/MRV of the brain
- Increased opening pressure on lumbar puncture with normal CSF composition
- Absence of focal neurologic signs except CN VI palsies

Pseudotumor Cerebri

- Headache (92%)
- Transient (lasting seconds) episodes of vision loss (72%)
- Pulsatile tinnitus (Intracranial noise) (60%)
- Double Vision intermittent or continuous: typically due to unilateral or bilateral 6th CN palsy from increased intracranial pressure (38%)
- Nausea or vomiting with headache
- Sustained Visual Loss (26%)

Pseudotumor Cerebri

- Obesity (most common in obese women of childbearing age)
- Significant weight gain as in pregnancy
- Various medications
- Oral Contraceptives
- Tetracyclines
- Nalidixic Acid
- Cyclosporine
- Vitamin A
- Withdrawal of systemic steroids

Christine: Diagnosis and Tx

- I called Christine’s internist to manage the care that would be needed in determining her diagnosis
- The internist sent Christine to ER for evaluation by neurology and testing
- Gave Christine a letter and photos for ER
- Diagnosis after MRI, blood work, temperature and LP was Pseudotumor Cerebri

Pt was started on Acetazolamide
Pt was seen q3m by internist and neuro and myself for VA and VF’s for one year and then lost to follow-up
Pt returned to me 3 yrs later with same complaint
Pt had gained more weight and stopped meds b/c of tingling in hands and feet and metallic taste
Pt’s BVA was 20/25 and VF was unchanged
Pt refused another LP and wanted another treatment option

Symptoms:

- Headache (92%)
- Transient (lasting seconds) episodes of vision loss (72%)
- Pulsatile tinnitus (Intracranial noise) (60%)
- Double Vision intermittent or continuous: typically due to unilateral or bilateral 6th CN palsy from increased intracranial pressure (38%)
- Nausea or vomiting with headache
- Sustained Visual Loss (26%)

Associated Factors:

- Obesity (most common in obese women of childbearing age)
- Significant weight gain as in pregnancy
- Various medications
- Oral Contraceptives
- Tetracyclines
- Nalidixic Acid
- Cyclosporine
- Vitamin A
- Withdrawal of systemic steroids

Pseudotumor Cerebri

Diagnostic Criteria:

- Normal MRI/MRV of the brain
- Increased opening pressure on lumbar puncture with normal CSF composition
- Absence of focal neurologic signs except CN VI palsies

Pseudotumor Cerebri

Symptoms:

- Headache (92%)
- Transient (lasting seconds) episodes of vision loss (72%)
- Pulsatile tinnitus (Intracranial noise) (60%)
- Double Vision intermittent or continuous: typically due to unilateral or bilateral 6th CN palsy from increased intracranial pressure (38%)
- Nausea or vomiting with headache
- Sustained Visual Loss (26%)

Associated Factors:

- Obesity (most common in obese women of childbearing age)
- Significant weight gain as in pregnancy
- Various medications
- Oral Contraceptives
- Tetracyclines
- Nalidixic Acid
- Cyclosporine
- Vitamin A
- Withdrawal of systemic steroids
Pseudotumor Cerebri

Treatment:
- Weight loss if overweight (10 – 15%)
- Gastric bypass when needed b/c of severity of HA's and VA loss
- Diamox 250 mg p.o. q.i.d. building up to 500mg q.i.d. if tolerated (other diuretics have no proven efficacy)
- Discontinue causative medications
- ON sheath decompression if VA threatened
- Neurosurgical shunt if HA cannot be relieved

Follow-Up:
- Every 3 months (if no VA loss) with Neuro for evaluation and with optometrist as well for evaluation of CV, VA and VF (Photos??)
- Frequency of follow up will depend on the severity of Vision Loss

Prognosis:
- Significant vision loss at presentation suggests a higher risk of severe permanent vision loss
- Weight reduction on a low sodium diet is recommended for all obese patients with IIH and can reduce recurrences
- Corticosteroids should be avoided b/c of propensity for weight gain and b/c steroid withdrawal can cause severe rebound intracranial hypertension associated with marked visual loss

Take home messages:
- These patients have recurrences often, especially if they do not lose weight or if they lose and then gain again
- There has been a rise in children being diagnosed with Pseudotumor Cerebri as a result of the rise in childhood obesity and increased awareness, according to Dr. E. Steve Roach at Nationwide Children’s Hospital

Christine: Challenges
- These patients are at risk:
  - Drug abuse for pain
  - Emotional roller coaster of guilt and shame when obese and unable to lose weight
  - Vision Loss from lack of resolution of condition
  - Misunderstanding of their condition by family and friends
Christine: Challenges

These patients need us:
- They need someone that understands them to manage their care so they remain in the medical system
- When weight is a possible cause, they need nutritional counseling ASAP
- They need encouragement at every visit and they need for us to show concern for their pain
- They need us to communicate with PCP

Matthew: Appointment

- Pt called to schedule appointment for a complete eye health evaluation
- Pt said he feels fine just has spots in his eyes and blurred vision for past month
- When making the appointment he informed the staff that he is afraid of doctors and so never goes to appointments

Matthew: History

- 31 year old white male
- Chief Complaint is that he has blurred vision at distance and near and spots in his vision for a month that occurred suddenly
- Pt says he has not seen a primary care doctor in a few years however feels fine
- Family ocular and medical history is negative
- He takes no medication and works out at the gym every other day

Matthew: Examination

BVA: OD 20/50 OS 20/30
PH shows no improvement
EOM’s: Normal without restrictions OD and OS
CT: WNL
CF: FTFC OD and OS
Pupils: (+)D/C no APD
SLE: WNL OD and OS
IOP: 14 OD 16 OS

DFE:
- Bilateral Optic Disc Swelling
- Cotton Wool Spots in Posterior Pole OD>OS
- Striae
- Very few retinal hemorrhages

Matthew: Differentials

- CRVO-usually unilateral & more heme with greater loss of VA
- Radiation Retinopathy-Hx of irradiation
- Malignant Hypertension
- Purtscher’s Retinopathy (compression injury to the chest, head or lower extremities)
Matthew: Differentials

Purtscher’s-like Retinopathy: (no HTN or other retinal HTN changes)
- Acute Pancreatitis
- Fat embolization
- Amniotic Fluid embolization
- Pre-eclampsia
- HELLP syndrome: hemolysis, elevated liver enzymes & low platelets
- Vasculitic diseases such as Lupus

Matthew: Discussion

Final diagnosis: Malignant Hypertension
- Usually associated with diastolic pressure above 120
- Up to 1% of patients with essential hypertension go on to develop malignant hypertension
- It is more common in men than women
- The average age of diagnosis is 40

Matthew: Treatment

- Emailed de-identified photos to Retina Specialist and discussed over phone
- Most likely diagnosis: Purtscher-like retinopathy
- Sent patient immediately to Retina Specialist
- Retina Specialist did CEE and sent to ER after finding his BP to be 260/150
- Blood tests: FBS, Glycosylated hemoglobin, CBC with differential, platelets, PT/PTT, ESR, lipid profile, homocysteine, ANA, FTA-ABS

Matthew: Discussion

Final diagnosis: Malignant Hypertension
- Most often occurs in patients with long-standing uncontrolled hypertension, many of whom have discontinued their HTN meds
- Underlying Renal artery stenosis is also commonly present, especially in white patients

Matthew: Treatment

- All testing came back negative except Blood Pressure
- Pt was kept in hospital until BP controlled (5 days)

Matthew: Discussion

Malignant Hypertension
- Treatment of BP must be immediate yet gradual in order to prevent stroke
- The Optic Nerve demonstrates autoregulation so there is an adjustment in perfusion based on the HTN
- A sudden decrease in BP will reduce perfusion to the ON and CNS as a result of their autoregulatory changes, resulting in infarction of the ONH and also CNS
Matthew: Discussion

Malignant Hypertension
- Life expectancy in the past was less than 1 year due to stroke, renal failure or heart failure
- With present therapy the survival rate at 5 yrs is 90%

Matthew: Discussion

Hypertension and Eye disease:
- Through autoregulation, retinal arteries respond to elevation in BP by constricting
- If mild HTN then typically no ocular symptoms will be noticed by the patient
- If mild HTN then minimal or no funduscopic changes are seen as well

Matthew: Discussion

Funduscopic Changes: All are caused by thickening of the small arterial and arteriolar walls (arteriolar sclerosis)
- Focal and diffuse narrowing of the retinal arteries (most reliable early sign of HTN)
- Increase in the arterial reflex
- Arteriovenous crossing changes

Matthew: Discussion

Malignant Hypertension: Diastolic over 120
- Optic Disc swelling and a macular star can occur as a result of the extreme ischemic arteriolar and capillary permeability changes in the retina and optic nerve head

Matthew: Treatment

- Pt saw retina specialist one more time in the office at which time his BP was 120/70 and retinal findings were resolving and BVA was 20/30 OD and OS
- Neither the retina specialist nor I have been successful in getting the patient to schedule follow up visits

Matthew: Discussion

- Pt was very nervous during examination
- He had no pertinent medical history, however did say he had not been to a doctor in a long time because he doesn’t like doctors
- I used the retinal photos to discuss the findings with Matthew and the need for further testing
- Once I had him calm enough to agree to go, I stopped all discussion and testing and gave him a map and phone number and sent him on his way
**Matthew: Discussion**

- I did not take Matthew’s BP in my office
- When I saw this retinal picture I was extremely concerned about the patient and called specialist immediately who agreed that he should leave immediately
- Retina specialist is next door to hospital so we thought it best for him to be seen there and then seen at the hospital so he could order correct tests

**Matthew: Challenges**

- In a life threatening case like this it is imperative to coordinate care with specialist
- It is imperative to keep the patient calm especially when they have a fear of doctors
- Retinal photos can really help with patient education and adherence to treatment
- It is extremely helpful to be able to adapt your style of communication to the needs of the patient at that moment

**Matthew: Discussion of HTN**

- When should we take a patient’s blood pressure in the office?
- How should we take a patient’s blood pressure (what method of measurement)?
- What do we consider HTN?
- At what level of HTN do we send the patient for Tx and how urgently?
- How do eye findings add to the timing of treatment?

**Statistics from American Heart Association**

- CVD accounted for 32% of all deaths 2000-2010
- 33% of adults have HTN
- 25% of adults have Pre-Hypertension
- 77% know they have HTN
- 66% have uncontrolled HTN
- 60% of all Americans with chronic dz do not follow their doctors guidelines for lifestyle or medications
- 47% of all Americans have High Cholesterol
Statistics from American Heart Association

- 20% of Americans smoke
- 32.5% of Americans exercise 30 min a day at least 3 times per week (this includes walking)
- 12% of Americans never fill their medication scripts
- 12% of those that fill their scripts never take them
- #1 problem in Treatment of illness today is patients failure to take prescription meds correctly regardless of age
- 2/3 fail to take any or all of their medications

New Features and Key Messages

- Persons who are normo-tensive at age 55 have a 90% lifetime risk for developing HTN.
- Those with SBP 120–139 mmHg or DBP 80–89 mmHg should be considered pre-hypertensive who require health-promoting lifestyle modifications to prevent CVD.

National Heart, Lung, and Blood Institute
National High Blood Pressure Education Program

Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) EXPRESS

New Features and Key Messages

- The most effective therapy prescribed by the careful clinician will control HTN only if patients are motivated.
- Motivation improves when patients have positive experiences with, and trust in, the clinician.

New Features and Key Messages

- For persons over age 50, Systolic BP is more important than DBP as CVD risk factor.
- Starting at 115/75 mmHg, CVD risk doubles with each increment of 20/10 mmHg throughout the BP range.

New Features and Key Messages

- Empathy builds trust and is a potent motivator.
- The responsible physician’s judgment remains paramount.
Why Blood Pressure Control?
- Sub-optimal BP is the number one attributable risk factor for death throughout the world.
- There is an increasing trend in end-stage renal Disease by primary diagnosis and HTN is secondary only to diabetes as the most common antecedent for this condition.

Benefits of Lowering BP

<table>
<thead>
<tr>
<th>Average % Reduction</th>
<th>Stroke incidence</th>
<th>35–40%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Myocardial infarction</td>
<td>20–25%</td>
</tr>
<tr>
<td></td>
<td>Heart failure</td>
<td>50%</td>
</tr>
</tbody>
</table>

Office BP Measurement
- Use auscultatory method with a properly calibrated and validated instrument.
- Patient should be seated quietly for 5 minutes in a chair (not on an exam table), feet on the floor, and arm supported at heart level.
- Appropriate-sized cuff should be used to ensure accuracy.
- At least two measurements should be made on different arm.
- Clinicians should provide to patients, verbally and in writing, specific BP numbers and BP goals.

Benefits of Lowering BP
- In stage 1 HTN and additional CVD risk factors, achieving a sustained 12 mmHg reduction in Systolic BP over 10 years will prevent 1 death for every 11 patients treated.

Smoking and HTN
- Self measurement or ABPM may be particularly helpful in assessing BP in smokers.
- Smoking raises BP acutely, and the level returns to baseline about 15 minutes after stopping.

BP Measurement Techniques

<table>
<thead>
<tr>
<th>Method</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-office</td>
<td>Two readings, 5 minutes apart, sitting in chair. Confirm elevated reading in contralateral arm. After resting 5 min.</td>
</tr>
<tr>
<td>Ambulatory BP monitoring</td>
<td>Indicated for evaluation of “white-coat” HTN. Absence of 10–20% BP decrease during sleep may indicate increased CVD risk.</td>
</tr>
<tr>
<td>Self-measurement</td>
<td>Provides information on response to therapy. May help improve adherence to therapy and evaluate “white-coat” HTN.</td>
</tr>
</tbody>
</table>
The rise in Systolic BP continues throughout life unlike DBP, which rises until the age of 50 and levels off over the next decade and either remains the same or decreases later in life. We must change our emphasis to SBP or we will see increased rates of CVD and renal diseases. DBP control will follow SBP control.

We must change our emphasis to SBP or we will see increased rates of CVD and renal diseases. DBP control will follow SBP control.

Evaluation of patients with documented HTN has three objectives:

1. Assess lifestyle and identify other CV risk factors or concomitant disorders that affects prognosis and guides treatment.
2. Reveal identifiable causes of high BP.
3. Assess the presence or absence of target organ damage and CVD.

Cigarette smoking
Obesity* (BMI >30 kg/m²)
Physical inactivity
Dyslipidemia*
Diabetes mellitus*
Microalbuminuria or estimated GFR <60 ml/min
Age (older than 55 for men, 65 for women)
Family history of premature CVD (men under age 55 or women under age 65)

Hypertension* (Components of the metabolic syndrome)
Cigarette smoking
Obesity* (BMI ≥30 kg/m²)
Physical inactivity
Dyslipidemia*
Diabetes mellitus*
Microalbuminuria or estimated GFR <60 ml/min
Age (older than 55 for men, 65 for women)
Family history of premature CVD (men under age 55 or women under age 65)

Heart
• Left ventricular hypertrophy
• Angina or prior myocardial infarction
• Prior coronary revascularization
• Heart failure

Brain
• Stroke or transient ischemic attack
• Chronic kidney disease
• Peripheral arterial disease
• Retinopathy

BMI (Body Mass Index) Calc
www.nhlbisupport.com/bmi

BMI Components
- Standard
- Overweight
- Obese
- Very obese
- Morbid obesity

BMI Calculator
Calculate your Body Mass Index (BMI) is a measurement of body fat based on height and weight that applies to adult men and women.

Heart
• Left ventricular hypertrophy
• Angina or prior myocardial infarction
• Prior coronary revascularization
• Heart failure

Brain
• Stroke or transient ischemic attack
• Chronic kidney disease
• Peripheral arterial disease
• Retinopathy
Goals of Therapy

- Reduce CVD and renal morbidity and mortality.
- Treat to BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.
- Achieve SBP goal especially in persons ≥50 years of age.

Lifestyle Modification

Exercise:
- The CVD benefits of slow walking appear to be comparable to those of walking more quickly suggesting that the most important predictor of benefit was walking time not speed.

Lifestyle Modification

<table>
<thead>
<tr>
<th>Modification</th>
<th>Approximate SBP reduction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>5–20 mmHg/22 lbs weight loss</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>8–14 mmHg</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>2–8 mmHg</td>
</tr>
<tr>
<td>Physical activity</td>
<td>4–9 mmHg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>2–4 mmHg</td>
</tr>
</tbody>
</table>

Lifestyle Modification-Sodium

- Mean sodium intake is 4,100 mg per day in men and 2,750 in women
- 75% of which comes from processed foods
- Dietary sodium should be reduced to no more than 2,300 mg per day or 6g of sodium chloride (Remember that table salt is NaCl which is 40% sodium and 60% Chloride)
- It is important to reduce our children’s salt intake now to reduce their risk with age

Classification and Management of BP for adults

<table>
<thead>
<tr>
<th>BP Classification</th>
<th>SBP*</th>
<th>DBP*</th>
<th>Lifestyle modification</th>
<th>Initial Drug Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Encourage</td>
<td>No antihypertensive drug indicated.</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>120–139 or 80–89</td>
<td>Yes</td>
<td></td>
<td>Drug(s) for compelling indications.</td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140–159 or 90–99</td>
<td>Yes</td>
<td>Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.</td>
<td>Drug(s) for the compelling indications. Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>≥160 or ≥100</td>
<td>Yes</td>
<td>Two-drug combination for most (usually thiazide-type diuretic and ACEI or ARB or BB or CCB).</td>
<td></td>
</tr>
</tbody>
</table>

*BP Classification: SBP*: SBP morning, DBP*: DBP morning. Lifestyle modification: Encourage. Initial Drug Therapy: Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination. Drug(s) for the compelling indications. Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.
Follow-up and Monitoring

- Patients should return for follow-up and adjustment of medications until the BP goal is reached.
- More frequent visits for stage 2 HTN or with complicating co-morbid conditions.
- Serum potassium and creatinine monitored 1–2 times per year.

Follow-up and Monitoring (continued)

- After BP at goal and stable, follow-up visits at 3- to 6-month intervals.
- Co-morbidities, such as heart failure, associated diseases, such as diabetes, and the need for laboratory tests influence the frequency of visits.

Follow-up and Monitoring (continued)

- Low-dose Aspirin therapy should be considered only when BP controlled because of the increased risk of hemorrhagic stroke when HTN is not controlled.

Diabetes and Hypertension

- The United Kingdom Prospective Diabetes Study demonstrated that in patients with type 2 diabetes and HTN that each 10mmHg decrease in SBP was associated with an average of 13% decrease in Retinopathy

Minority Populations

- In general, treatment similar for all demographic groups.
- Prevalence, severity of HTN increased in African Americans.
- African Americans demonstrate somewhat reduced BP responses to monotherapy with BBs, ACEIs, or ARBs compared to diuretics or CCBs.
- These differences usually eliminated by adding adequate doses of a diuretic.

Hypertension in those over 65

- More than two-thirds of people over 65 have HTN.
- This population has the lowest rates of BP control.
- Treatment, including those who with isolated systolic HTN, should follow same principles outlined for general care of HTN.
- Lower initial drug doses may be indicated to avoid symptoms; standard doses and multiple drugs will be needed to reach BP targets.
### Postural Hypotension
- Decrease in standing SBP >10 mmHg and/or postural dizziness/fainting
- More frequent in older HTN patients with diabetes, taking diuretics, venodilators, and some psychotropic drugs.
- BP in these individuals should be monitored in the upright position.
- Avoid volume depletion and excessively rapid dose titration of drugs.

### Obstructive Sleep Apnea
- OSA occurs in 2-4% of the population
- >50% of individuals with OSA have HTN
- Obesity is so common in OSA that suspicion for any HTN pt whose BMI is above 27
- Symptoms include snoring, witnessed apnea, irregular breathing during sleep, restless sleeping and chronic morning fatigue

### Dementia
- Dementia and cognitive impairment occur more commonly in people with HTN.
- Reduced progression of cognitive impairment occurs with effective antihypertensive therapy.

### Obstructive Sleep Apnea
- It now appears that the potential causal association b/t OSA and HTN involves both the obesity-hypertension link and an independent role of OSA in chronic HTN
- Sustained treatment of OSA with CPAP has been reported to lower nighttime and daytime BP in hypertensive patients

### Hypertension in Women
- Oral contraceptives may increase BP, and BP should be checked regularly. In contrast, HRT does not raise BP.
- Development of HTN - consider other forms of contraception.

### Hypertensive Urgencies and Emergencies
- Patients with marked BP elevations and acute TOD (e.g., encephalopathy, myocardial infarction, unstable angina, pulmonary edema, eclampsia, stroke, head trauma, life-threatening arterial bleeding, aortic dissection, Malignant Retinopathy) require hospitalization and parenteral drug therapy.
- Patients with markedly elevated BP but without acute TOD usually do not require hospitalization, but should receive immediate combination oral antihypertensive therapy.
Classification and Follow-Up of BP for adults

<table>
<thead>
<tr>
<th>BP classification</th>
<th>SBP* mmHg</th>
<th>DBP* mmHg</th>
<th>Lifestyle modification</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Encourage</td>
<td>Re-check 2 years</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>120–139</td>
<td>or 80–89</td>
<td>Yes</td>
<td>Re-check 1 year</td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140–159</td>
<td>or 90–99</td>
<td>Yes</td>
<td>Confirm within 2 months</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>≥160</td>
<td>or ≥100</td>
<td>Yes</td>
<td>Confirm within 1 month</td>
</tr>
<tr>
<td>Markedly Elevated</td>
<td>&gt;210</td>
<td>or &gt;120 or &gt;130</td>
<td>Yes</td>
<td>Treat in few hours or Treat in one hour</td>
</tr>
</tbody>
</table>

Classification and Follow-Up of BP for adults

- Treatment determined by highest BP category.
- Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.
- Treat patients with chronic kidney disease or diabetes to BP goal of <130/80 mmHg.

Causes of Resistant Hypertension

- Improper BP measurement
- Excess sodium intake and/or excess alcohol intake
- Inadequate diuretic therapy
- Medication
  - Inadequate doses (adherence or inadequate tx)
  - Drug actions and interactions (e.g., non-steroidal anti-inflammatory drugs (NSAIDs), illicit drugs, sympatho-mimetics, oral contraceptives)
- Over-the-counter (OTC) drugs and herbal supplements

Strategies for Improving Adherence to Regimens

- Clinician empathy increases patient trust, motivation, and adherence to therapy.
- Physicians should consider their patients’ cultural beliefs and individual attitudes in formulating therapy.

Public Health Challenges and Community Programs

- Public health approaches (e.g. reducing calories, saturated fat, and salt in processed foods and increasing community/school opportunities for physical activity) can achieve a downward shift in the distribution of a population’s BP, thus potentially reducing morbidity, mortality, and the lifetime risk of an individual’s becoming hypertensive.

Public Health Challenges and Community Programs

- These public health approaches can provide an attractive opportunity to interrupt and prevent the continuing costly cycle of managing HTN and its complications.
**Supporting Materials**

- Web site www.nhlbi.nih.gov
- For patients and the general public
  - “Facts About the DASH Eating Plan” (Revised May 2003)
  - “Your Guide to Lowering Blood Pressure”
- For health professionals
  - Reference Card

**Web site: www.nhlbi.nih.gov**

**Reference Card**

**Reasons for Non-Adherence to therapy**

- 20% - Afraid of Side Effects
- 17% - Costs too much
- 14% - Don’t think I need it
- 25% - Forgetful of how to take meds and when
- 10% - No transportation to get meds

- Study by Harris Interactive and Boston Consulting group in 2002
**HTN and Adherence**

- To better control HTN we must increase patient adherence.
- Better HTN control = Less HTN retinopathy.
- 50% of reasons listed for non-adherence are directly influenced by better communication between the doctor and the patient.

> "Speech is the most important instrument possessed by the doctor"  
> Dr. Linus Geisler

**Jeff: Appointment**

- Jeff’s wife (neighbor of mine) called the office very agitated and said that she needed to bring Jeff right over because he had sap from a plant fall in his eye while doing yard work and was in pain.
- Jeff’s wife said that they had already rinsed the eye out for 15 minutes using the garden hose.
- We told her to come to the office immediately.

**Matthew: Best Interest of the Patient**

- Listen for what the patient does not say (body language).
- Fear can be manifest by denial of disease and if not recognized and addressed it will result in non-compliance and thereby a worsening of the disease process.
- Empathy is the key to patient adherence.
- Address a patient’s fear by first showing you care.
- Find a common connection to build a relationship.

**Jeff-History**

- 48 year old white male.
- Pt was brought in to office by his wife.
- He complained of mild discomfort in his right eye after a drop of sap from a cactus plant he was trimming fell in his eye.
- He says he immediately ran to the hose and washed it out for 15 minutes and now it is red and irritated and burns.
- No medical problems, No allergies, No medications.
- Last physical was 2 months ago.

**What about HTN?**

- Should we measure on everyone?
- If you do then you must have an action plan.

**Jeff-Examination**

- Uncorrected VA was 20/20 OD and OS.
- Irrigation of his right eye was initiated immediately with saline for 15 minutes.
- While waiting 5 minutes for diluant to be absorbed we continued other testing.
- EOM’s: FULL without restriction OD and OS.
- CT: Ortho at distance.
- CF: FTFC OD and OS.
- Pupils: (+)D/C no APD.
Jeff - Examination

- After 5 minutes had passed the pH of his tears was checked using a strip of litmus paper in the inferior fornix
- The litmus paper showed a neutral pH so irrigation was not restarted
- SLE: Mild conjunctival injection and chemosis, Eyelids normal and without evidence of chemical injury and cornea had mild superficial punctate keratitis
- IOP: 10 OD 12 OS

Jeff - Diagnosis

- DFE: WNL OD and OS
- During the irrigation process Jeff’s wife said that she had read on the internet that the sap from this plant could cause anaphylaxis and she wanted to know if Jeff was having an anaphylactic reaction
- Further questioning revealed that Jeff had trimmed this pencil cactus before and had developed a rash on his skin where the sap had touched him

Jeff - Treatment

- We checked Jeff’s BP which was 120/75 and his pulse was 70
- We asked Jeff if he had any difficulty breathing or swallowing or if his tongue felt swollen to which he said no
- An internet search revealed that the plant he was exposed to was not a cactus but was Euphorbia tirucalli

Pencil Cactus, Milkbush

- Produces white milky latex when stems are cut
- This sap most often causes an irritant contact dermatitis (blisters, rash and redness)
- It can cause anaphylactic reaction in patients especially those with repeated exposure and/or latex allergies
- This reaction can be immediate or delayed
- Other plants in this family are the poinsettia and crown-of-thorns

Discussion of Anaphylaxis

- Potentially Fatal
- Rate of occurrence is increasing
- Not always recognized because it can mimic other conditions and is variable in presentation

Discussion of Anaphylaxis

- Serious allergic reaction that is rapid in onset and may cause death
- Diagnosis is clinical
- Diagnosis is based on signs and symptoms as well as detailed description of the episode including antecedent activities and events
Discussion of Anaphylaxis

- New diagnostic criteria published in 2005 and 2006
- Anaphylaxis is underdiagnosed and undertreated
- Underdiagnosis is most likely due to the failure to recognize symptoms other than overt shock and obvious cutaneous symptoms

Anaphylaxis Criterion 1 (cont.)

- Ocular findings such as periorbital edema and conjunctival swelling would qualify as cutaneous symptoms as stated in part 1 of Criterion 1
- Cutaneous symptoms are present in up to 90% of anaphylactic reactions so this criterion will be used most frequently to make the diagnosis

Anaphylaxis Criterion 2:

- TWO OR MORE OF THE FOLLOWING that occur rapidly after exposure to a LIKELY ALLERGEN for that patient (minutes to several hours)
  A. INVOLVEMENT OF THE SKIN-MUCOSAL TISSUE (e.g., hives, itch-flush, swollen lips-tongue-uvula)
  B. RESPIRATORY COMPROMISE (e.g., dyspnea, wheeze-bronchospasm, stridor, reduced PEF in older children and adults, hypoxemia)
  C. REDUCED BP OR ASSOCIATED SYMPTOMS (e.g., hypotonia, collapse, syncope, incontinence)
  D. PERSISTANT GASTROINTESTINAL SYMPTOMS (e.g., crampy abdominal pain, vomiting)

Anaphylaxis Criterion 2 (cont.)

- 10% of people with anaphylaxis lack skin symptoms
- Criterion 2 incorporates GI symptoms
- Criterion 2 is applied to patients with exposure to a substance that is a likely allergen for them

References:

J Allergy Clin Immunol 2006; 117:391
Anaphylaxis Criterion 3:

- REDUCED BP after exposure to a known allergen for that patient
  A. Infants and children: low systolic BP (age specific) or greater than 30% decrease in systolic (from their baseline)
  B. Adults: Systolic BP of less than 90mmHg or greater than 30% decrease from that person's baseline

Discussion of Anaphylaxis

- The most common signs and symptoms:
  - Cutaneous (up to 90%) including flushing, itching, urticaria, and angioedema (including periorbital and conjunctival)
  - Respiratory (up to 70%) including nasal discharge, nasal congestion, change in voice quality, sensation of throat closure or choking, cough, wheeze, and dyspnea (shortness of breath as experienced during exercise)

Anaphylaxis Criterion 3

- Low systolic BP for children is defined as:
  - Less than 70 mm Hg from 1 month to 1 year
  - Less than (70 mm Hg + [2 x age]) from 1 to 10 years, and
  - Less than 90 mm Hg from 11 to 17 years

Discussion of Anaphylaxis

- The most common signs and symptoms (cont'd.):
  - Gastrointestinal (up to 40%) including nausea, vomiting, diarrhea, and crampy abdominal pain
  - Cardiovascular (up to 35%) including dizziness, tachycardia, hypotension and collapse

Anaphylaxis Criterion 3

- This criterion is intended to detect episodes of anaphylaxis that consist of isolated cardiovascular symptoms
- This criterion is applied to those who have been exposed to something they know they are allergic to

Discussion of Anaphylaxis

- Anaphylaxis can present with various combinations of up to 40 potential symptoms and signs
- It may be mild and spontaneously resolve due to the endogenous production of mediators such as epinephrine
- Death usually is a result of asphyxiation due to upper airway edema or respiratory failure due to bronchial obstruction or less commonly from cardiovascular collapse
### Discussion of Anaphylaxis

- **Uniphasic:**
  - Anaphylaxis can occur within minutes to hours

- **Biphasic:**
  - It can recur after resolution of the initial episode (in 1 to 20%) within 8 and up to 72 hours later

- **Protracted Anaphylaxis:**
  - Defined as an anaphylactic reaction that lasts for hours or even days in extreme cases

### Management of Anaphylaxis

- Assess airway, breathing, circulation and responsiveness
- Call 911
- Injection of epinephrine
- Removal of antigen (rinse eye or stop medication)
- Place pt in supine position with lower extremities elevated (because of low BP you need to help the heart get the blood to vital organs) if tolerated (no vomiting)
- Supplemental Oxygen
- Volume Resuscitation (IV saline infusion)
- Monitor Airway and heart rate and BP throughout

### Discussion of Anaphylaxis

- Anaphylaxis is often undetected because:
  - Blood pressure is not obtained until after administering epinephrine
  - Signs are not detected such as wheezing, sweating, confusion and nausea
  - Skin symptoms may be underneath clothing
  - Respiratory symptoms mistaken for asthma exacerbation in asthmatic patients
  - Patients take H1 antihistamines regularly so some of the symptoms are masked

### Discussion of Anaphylaxis

- Most common triggers are:
  - Children: \( \text{Foods} \)
  - Adults: \( \text{Medications and insect stings} \)
  - There is a rapidly expanding number of novel and/or unusual triggers

### Discussion of Anaphylaxis

- Treatment of Choice is Epinephrine
  - EpiPen for adults
  - EpiPen Jr for children
  - Injected in the thigh
  - Needs to be administered ASAP
  - In fatal cases Death is usually within 30 minutes of exposure
  - Steroids, Inhalers and Antihistamines can be used if needed after treatment with Epinephrine

### Discussion of Anaphylaxis

- Education for patient after acute treatment
  - An anaphylaxis emergency plan
  - An epinephrine auto-injector
  - Printed information about anaphylaxis and Treatment
  - A plan for arranging to see Allergist for evaluation of causative agent and possible allergy desensitization treatment
Jeff: Diagnosis

- Mild Chemical Burn
- No anaphylactic reaction

Jeff: Treatment

- Evaluation the next day was completely normal and BVA OD 20/20 OS 20/20 and no corneal staining and BP normal
- Advised patient to get rid of plant or at least to wear gloves when handling the plant

Jeff: Treatment

- Non-Preserved artificial tears to be used every hour for that day and then QID for two days
- Told pt to RTC immediately if symptoms, otherwise appointment made for next day

Jeff: Treatment

- After further questioning I reassured Jeff’s wife that he was not having an anaphylactic reaction and likely would not, however told her to watch for signs and symptoms
- Jeff and his wife were given instructions to discuss allergies and anaphylaxis with PCP

Challenge

- Focus:
  - Often he who does too much does too little
  
  Italian Proverb

  “If you chase two rabbits both will escape”

Challenge

- Thirst for Knowledge
  
  “If you will spend an extra hour each day in study of your chosen field, you will be a national expert in that field in five years or less”

  - Earl Nightingale as said during his program in 1972 “Our Changing World”
Mendoza: Appointment

- Pt scheduled appointment with complaint of "Eye pain for 2 days, possible foreign object in my eye"
- Came in for appointment with wife
- Very concerned about pain in his eye. He is certain he must have had plant material enter his eye at work 2 days ago.
- Vision seems to be fine and no redness or discharge

Mendoza: Examination

- Vision is 20/20 uncorrected OD and OS
- EOM's are full and unrestricted OD and OS
- CF's are FTFC OD and OS
- Pupils are normal with no APD
- SLX shows no redness or foreign body in either eye and no NaFL stain, however he does have 1+ cells in anterior chamber OS and trace flare
- IOP 14 OD and OS

Mendoza: History

- 30 y.o.h.m.
- During examination he continues to restate that his eye hurts and he figures he must have gotten something in it at work
- He has no recollection of an actual moment when something entered his eye
- He thinks the pain began mid morning two days ago and he is not sensitive to light
- He states the pain has increased every day slightly

Mendoza: Differentials

- Cytomegalovirus (immunocompromised, no pain, significant retinal hemorrhages)
- Toxoplasmosis (no retinal hemorrhages)
- Acute Retinal Necrosis (pain, vitritis, peripheral retina)
- PORN-(rapidly progressive retinitis, no retinal hemorrhages, no arteritis, little if any vitritis, impaired immunity)
- Syphilis
- Behcet disease (painful oral ulcers in 98 – 100% of pts, rash)
- Fungal or Bacterial endophthalmitis
- Large Cell Lymphoma (elderly with vitritis and no pain)

Mendoza: Diagnosis

- Called retina specialist same day and sent pt to see him that afternoon
- Retina specialist diagnosed ARN (diagnosis is primarily based on the clinical picture and exclusion of other causes) and did AC paracentesis for HSV and Zoster
- Retina specialist did B-scan to look for any optic nerve abnormalities and FL angiogram and OCT
Mendoza: Treatment

- Pt was subsequently admitted to hospital for IV treatment for ARN and lab work
- Tx was IV acyclovir for one week and the pt was seen by retina every day while in hospital. He was then given oral valacyclovir for 6 weeks after discharge
- Tx of ant. Uveitis was PF QID and Scopolamine QID for one week and then tapered over 3 weeks
- Pt had the following tests done in hospital:
  - HIV, CBC with diff, FTA-ABS and RPR, ESR, toxoplasmosis titers, PPD and chest x-ray

Mendoza: Discussion

- All patients with suspected ARN should be referred to a specialist immediately
- Prompt Tx is needed to decrease the occurrence of the disease in the fellow eye
- Treatment does not reduce the rate of retinal detachment in the first eye
- The second eye usually becomes involved within the first 6 weeks of tx so need to tx with oral valacyclovir for 6 weeks

Acute Retinal Necrosis

- Originally described in Japan in 1971 ARN can be visually devastating if not diagnosed and treated promptly
- More common in males
- Typically affects those ages 20–50
- Patients may first complain of mild ocular or periorbital pain and many times a mild red eye
- Central vision loss is not a presenting complaint because the posterior pole is affected last

Mendoza: Discussion

- The retinitis usually shows signs of regression within 4 days of tx however may get worse during the first 2 days of tx
- Prophylactic laser can be done to act as a barrier at the edge of the active retinitis to prevent later RD
- Patients should be seen daily until retinitis is resolved and then every few weeks to check for Retinal holes that can lead to RD

Acute Retinal Necrosis

- The posterior segment findings will probably be left undetected without a peripheral retinal examination
- ARN can cause Optic disc swelling
- Most cases of ARN are presumed to be a result of reactivation of a latent herpes infection (HZV or chickenpox or HSV)

Mendoza: Outcome

- Pt did not go on to develop problems in other eye as of 6 months post treatment
- Pt did not test positive for any of the tests and AC paracentesis was inconclusive
- Pt’s retinitis cleared up quickly and no retinal holes have developed
- Most likely diagnosis still ARN
Mendoza: Pearls

- Always look further when patient complains of pain.
- **Don't skip dilated retinal evaluation** on ocular emergencies or new patients.
- What if this patient had a FB also? Would I have not dilated and assumed the pain was from the FB?
- Call the specialist with report and ask for timeline for referral.
- Consider emailing retinal photos or other testing to specialist when in doubt.