Case Study # 2

1.) Briefly describe the pathophysiology of this patient’s problems

SL is a 66 African American female that ambulated into the ED to evaluate her blood pressure. Using contralateral arms to evaluate BP the results are as follows: R arm: 146/88, L arm: 148/88, P 88, RR 18. She denied stress connected from being in the office that might lead to white coat syndrome. SL had two prior “high blood” screening, one done last week and another one year ago at a church health screening with no medical follow up.

A sustained BP >140/90 is considered hypertensive and has an impact on the entire cardiovascular system. Hypertension is the result of both genetic and environmental factors: resulting from a dysfunction of SNS, RAA, adducin, and natriuretic hormones; insulin resistance and inflammation. These changes result in both vasoconstriction as well as renal salt and water retention. This in turn results in peripheral vascular resistance and increase blood volume that creates the sustained hypertension.

Chronic high blood pressure can be caused by a multitude of factors, the most commonly related to unhealthy lifestyle choices such as smoking, lack of exercise, poor diet, excessive intake of alcohol, and caffeinated drinks. SL denies both alcohol and smoking however further evaluation needs to be done on her daily dietary and caffeine intake, sleep patterns, and possible recreational drug use. Even without this information, SL has enough factors that would predispose her to HTN.

Genetic make up resulting in family history can be a huge proponent of whether or not a patient is predisposed to an illness, especially cardiovascular indicators. SL’s mother died at 70 of a stroke and father at 65 of an MI. SL’s sisters as well have a cardiovascular disease history, suffering from hypertension and diabetes. A family history such as SL’s is a poor indicator that not only is she
predisposed to hypertension, but, without proper management, she may have a severe or fatal outcome from her hypertension.

SL also has other factors that lead to her predisposition to hypertension including her weight. During a drs appointment three years ago, the MD told her to “lose weight” which makes me believe her hypertension may have been going on for an extended period of time. Her height of 5’6’’ and weight of 210 lbs puts her the category of obese with a BMI of 33.9. SL also has a waist circumference of 38 inches, 96.52 cm that can also cause possible secondary problems related to hypertension in the future. A study done regarding waist circumference of African American women suggests a fivefold risk of hypertension and diabetes for a circumference of 88 cm or 34.64 inches (Warren, 2012). Being overweight or having obesity establishes a higher risk of developing high blood pressure and should be considered when looking to manage SL.

Racial consideration also needs to be part of the evaluation of SL. African Americans are disproportionately more affected by hypertension than other races impacting 42% and 44% of men and women (Bernard, 2011). African American women are even more inclined to be affected by obesity and hypertension. One study suggests approximately 87% of AA women are overweight or obese and 44% have hypertension (Warren,2012). Even a recent study published in this week’s journal of AMA found blacks were more likely to have risk factors such as CAD than whites within the study. The large study beginning with 24,443 healthy participants followed for an average of 4.2 years, many being diagnosed with coronary disease during the time frame of the study. The study ultimately concluded black men and women were twice as likely to die from CAD than white individuals. With so much research indicating African American’s are more at risk for cardiac complications, its even more of a reason to do a detailed workup on SL.
SL alluded that she partakes in church group to “reduce stress”. Some possible chronic stressors could be that she had to come out of retirement secondary to the economy, her past divorce, the fact she lives alone, and that her two daughters live in another state. It would be good to further evaluate her stress level as well as her emotional states which could also impact her health.

Besides poor lifestyle choices, family history, racial factors, and life stressors considerations of age may also be a contributing factor to SL’s hypertension. The dilation and stiffening of arteries, specifically in the proximal thoracic aorta and parts of the aortic arch to the upper limbs and head, can lead to hypertension in older adults. Although aging is not the primary concern for SL, changes to the structure and function to the heart and its vessels need to be considered. A large 15 year study in China looked at cause of death in elderly with hypertension revealed nearly half of the population died of heart related diseases (Cui, 2012).

Besides the above considerations we also have to consider other possible comorbid for SL. Although at this point SL does not have a diagnosis of DM or hyperlipidemia, further workup may also find a more underlying diseases. SL is a complicated case and needs to be thoroughly evaluated accordingly.

2. Identify assessment data needed for work up of each identified clinical problem. Depending on the type of APN program (CNS or NP), assessment data may include history, physical exam, lab tests, environment, and/or requests for interprofessional collaboration

**History**: Further examination needed on SL’s diet, caffeine intake, sleep schedule, use of possible recreational activities, and possible organ damage (particularly to the kidneys.). I would also like to further assess in the psychosocial realm to see potential life stressors and depression may also be present. In order to elicit these answers I will as the following questions to SL:
How do you feel you are eating?
Do you eat three meals a day?
How often do you eat out?
Please tell me what an average dietary intake looks like for you?
Do you drink caffeine?
Do you take any over the counter drugs (NSAIDS)?
How are you sleeping?
Do you wake up rested?
On average, how many hours do you sleep a night?
Has anyone told you that you stop breathing during your sleep?
Do you have any trouble voiding?
Have you seen any recent changes to the amount you are voiding?
Do you use any recreational activities? Looking specifically at possible cocaine use
You said you go to church groups to reduce your stress, what is your stress like daily?
Have you felt sad lately?

**PE:**

**COR (regular rate and rhythm):** Examination of the heart for abnormalities in rate and rhythm, increased size, precordial heave, clicks, murmurs, and third and fourth heart sounds
**Neck (WNL):** Examination of the neck for carotid bruits, distended veins, or an enlarged thyroid gland. Enlargement could be related to HTN, ie cushing syndrome
**Neuro (Grossly WNL):** Assess for mental changes that could be secondary to a TIA
**Funduscopic exam (grossly WNL):** Funduscopic examination for hypertensive retinopathy
**Lungs (clear):** Examination of the lungs for rales and evidence for bronchospasm
**Abd (WNL):** Examination of the abdomen for bruits, enlarged kidneys, masses, and abnormal aortic pulsation
**Extrem (1+ nonpitting edema in B ankles):** Examination of the extremities for diminished or absent peripheral arterial pulsations, bruits, and edema

In addition to the assessment already completed on SL as seen above. I would also like to evaluate:

**Bilateral lower extremities** to assess for loss of sensation that may be tied to peripheral vascular disease.

**Lab Tests:**

After reviewing the US Department of Health guidelines SL is at high risk for target organ damage. Out
of the eleven cardiac risk factors SL has five and potentially more depending on the lab results we may find. Although the initial physical examination revealed no s/s of retinopathy, CHF, MI, Stroke, TIA., CKD it is possible lab results may reveal beginning stages of these processes.

12-lead EKG: Assess electrical activity and rhythms. To rule out possible L ventricular hypertrophy, possible damage from silent MI, and other heart changes that may complicate SL’s status

Electrolyte panel: evaluate for possible electrolyte imbalances. Na+ levels secondary to B ankle edema looking for possible acute hypernatremia. K because of hypertension and kidney disease can affect level. Potassium level may be needed prior to using certain hypertensive medications.

Calcium: to assess amount of calcium in the blood stream that that may have parathyroid involvement if it is high which in turn could cause hypertension

Fasting blood glucose and A1c: r/o DM2

Lipid panel (total cholesterol, HDL, LDL, triglycerides): assess for hypercholesterolemia and risk of developing atherosclerosis

TSH and T4: to assess for thyroid dysfunction

BUN, Creatinine, and Microalbumin: to determine if kidney dysfunction exists and get a baseline function for possible use of hypertension medications

Urinalysis and Urine albumin: assess kidney function

Many of these tests are performed to diagnose potential secondary diseases like DM2 and high cholesterol that may complicate SL’s health status. Another reason is to rule out potential target organ damage that may have occurred such as kidney dysfunction

Interprofessional collaboration:

Besides collaborating with a medical practitioner I would also consider involving a dietitian, a counselor
to deal with SL’s life stressors, and possibly a personal trainer.

3. Identify possible diagnosis and differential diagnoses

**Diagnosis: Stage 1 hypertension:** a systolic pressure ranging from 140-159 mmHg and a diastolic from 90-99 mmHg.

As noted above in number one, SL is a 66 African American female ambulating into the ED for an evaluation of her blood pressure. Upon consideration of her past two bp screenings that resulted in “high blood” as well as the results in the emergency room (contralateral arms) R arm: 146/88, L arm: 148/88, P 88, RR 18. As well as ruling out a possible false positive from white coat syndrome, standards of US department of health and human services suggest SL, having had two or more blood pressure measurements with high bp readings, can be diagnosed with hypertension.

**Differential Diagnosis:**

**Metabolic Syndrome:** According to American Heart Association to diagnose metabolic syndrome there must be the presence of three or more of the following:

1.) Central abdominal obesity- women greater than 35 inches

*SL has waist circumference of 38 inches*

2.) Blood pressure \( \geq 130/85 \)

*SL’s BP in the ER was R arm: 146/88, L arm: 148/88*

3.) Fasting blood triglyceride \( \geq 150 \) mg/dl

4.) Fasting glucose \( \geq 100 \) mg/dl

5.) HDL for women \( < 50 \) mg/dl

Even though SL only has two of the five factors Metabolic syndrome is closely linked to obesity, lack of
physical activity, and insulin resistance (AHA, 2012). SL is considered obese with a BMI and there is a good possibility that she will have at least one other risk factor. Besides the evidence prior, genetics, and older age, SL has many factors that may cause her to have metabolic syndrome.

**Secondary Hypertension:** Although unlikely, it is possible SL’s elevated bp is secondary to an underlying disease processes. It would be advantageous to rule out the following:

- Chronic kidney disease (CKD)/obstructive uropathy (GFR< 60 ml/min)
- Thyroid and parathyroid disease
- Drugs (prescription, over-the-counter, herbal supplement, illicit drugs)
- Obstructive sleep apnea
- Primary aldosteronism
- Renal artery stenosis
- Pheochromocytoma
- Cushing's syndrome
- Aortic coarctation
- porphyria
- lead poisoning

If detected certain interventions can lead to the reversal of hypertension

4. **Identify and discuss your treatment plan including both pharmacologic and nonpharmacologic interventions, evaluation/follow-up strategies, possible interprofessional collaboration and educational plan**

As addressed above, racial differences may predispose individuals like SL to hypertension. Considerations should be made in the racial lifestyle differences, to create the greatest impact on SL
Definition of hypertension and treatment options vary greatly for each individual taking into account factors that could affect the way they react to a medication. For example, age should be considered in treatment of SL as well and should be started at a low dose so not to negatively impact kidneys or cause hypotension. Besides finding a risk/benefit balance, it would be good to also consider cost. However whatever intervention is chosen, whether pharm. or non pharm. interventions, they should be introduced gradually, not to bombard SL with too much information that could result in noncompliance. Staggered education with assistance from a multidisciplinary team will ensure better chance of follow through and empower SL to take control of her own life.

**Pharmacologic Interventions:**

Through research there is a variety of treatment options some differ based on age, some based on race. According to Ferris, thiazide is the preferred for initial therapy in someone diagnosed with stage 1 uncomplicated hypertension. Another study suggests those of African descent may better benefit from calcium channel blockers as a first line, ARB’s as a second line. Although CCB may an option for others it is not a suitable choice since the side effects consist of ankle swelling and headaches. Since SL already suffers from migraines and currently has B ankle edema CCB may not be a good first line choice. One study (HYVET) of over 3800 elderly patients on htn meds suggests the adverse effects of antihypertensive drugs may cause serious risk to the geriatric population because of the risk of orthostatic hypotension, dizziness, and falls. To prevent possible hip fractures that can majorly complicate matters the study suggests starting hypertensives at lowest possible dose and gradually increasing medications (Mitka,2011). This study also recommends thiazides as a first line initial treatment choice. Since thiazide is deemed both safe from multiple studies and will work well to relieve SL’s ankle swelling it would be the medication of choice starting SL on hydrochlorothiazide 12.5 mg q
day to begin with. I would want to closely monitor SL for reactions to treatment, educating her on potential SE she needs to be concerned about. I would want to reevaluate her in no more than two weeks and to have SL call if any concerns. It is good to remember that fewer than 50% of patients can control their hypertension on a single drug. As much as SL is against taking medications, I would reiterate the importance for her in particular and potential complications if she continues to ignore this silent killer. Cost of HCTZ is relatively inexpensive at around 20 dollars for 100 pills, which should alleviate any potential financial concerns.

**Nonpharmacologic Interventions:**

Lifestyle modifications should be at the cornerstone of therapy for patients and should utilize use of multidisciplinary team approach to improve hypertension management. “Optimal antihypertensive treatment requires a comprehensive approach that encompasses multifactorial lifestyle modifications (weight loss, salt and alcohol restriction, and increased physical activity) plus drug therapy” (Flack, 2011). It would be good to slowly introduce SL to lifestyle changes to help decrease her hypertension and improve her overall health. It might be good to set short and long term goals for SL. According to Ferris a patient should attempt to achieve a BMI of under 25. Since this would take time to achieve a low BMI this would be a good marker for SL’s long term goal. Other modifications that have been known to prevent and manage hypertension involve exercise and diet alterations.

Regular aerobic exercise is key to weight loss and the recommendation for SL is a regime of at least 30 minutes a day. This can be as simple as SL beginning to take a brisk walk before or after work, incorporating it into her daily routine. If SL is finding this too challenging, it would be an option to look for a local sports center such as the YMCA that can be easy and affordable to SL.
As for diet, Ferris recommends decreasing sodium to less than 1.5 g a day and increasing potassium to greater than 3500 mg day if normal kidney function is found. A good way to follow these guidelines is to implement the DASH eating plan. This includes consuming a diet with reduction of saturated and total fats, with low fat dairy intake as well as an increased consumption of fruits and vegetables. By changing exercise patterns and diet SL can see a bp reduction of between 2-20 mm/hg.

Another nonpharmaceutical intervention is to support and promote these lifestyle changes for SL. Whether that be counseling to assist with the stress or potential depression, these can be addressed and ultimately help with lifestyle shifts. Also incorporating relaxation therapies can be useful techniques to learn to better handle and manage stress.

Although not commonly used, some studies have suggested acupuncture to help with hypertension. In a double blind study completed, research suggests acupuncture can be used to improve the circadian rhythm of blood pressure (Kim, 2012).

One last nonpharmaceutical intervention important to include into SL’s regime is home bp monitoring. Accurate home monitoring is important for the patient to understand blood pressure. To have a goal to keep bp less than 135/85 mmHg is ideal for most patients.

**Follow-up strategies:**

It is important to be deeply dedicated to newly diagnosed hypertension patients. Not only monitor for basic hypertension changes but also by evaluating for possible target organ damage secondary to sustained Htn. Having SL help with deciding on short and long term goals will be beneficial. Reassessing lifestyle changes on a regular basis is important so the goals can be altered if needed. Once BP is stable and SL has an understanding of her Htn it would be important to see SL once
every 3-6 month: to assess for adherence to pharmaceutical and nonpharmaceutical interventions, satisfaction on current plan as well as monitor potential changes with target organ. If SL is able to follow through and lose weight, eat well, and exercise it would be important to reassess to see if her BP medication can be decreased. It would also be good to encourage SL to continue home bp monitoring, giving her parameters of when it is important to call the office. Lifestyle modification should be addressed on every visit, reviewed, reemphasized and documented. Overall it is important to involve SL in all strategies to improve long term adherence to the regiment ultimately improving blood pressure and overall health.

**Interprofessional collaboration:**

**MD:** continued collaboration with MD on SL’s case

**Dietitians:** Institute best eating plan to prevent further heart related complication from excess fat, high sodium diet. A dietitian would also assist SL to understand why it is important to change and maintain new diet.

**Personal Trainers:** Unaware of SL’s past experience with exercise it would be good to begin with a personal trainer. They can instruct SL on how to safely exercise to prevent injury, gradually adding time to regiment, and teaching a low weight routine to increase muscle strength and endurance. This will not only help with improving Htn but also to help with osteoporosis, arthritis, balance, and obesity.

**Educational Plan:**

As stated above in the nonpharmaceutical interventions, good health promotion is key to helping SL combat hypertension. The topics to educate include exercise, decrease stress levels, and incorporating
healthy diet into her lifestyle shift. It is also important to make sure SL understands that her hypertension may exacerbate frequency and severity of migraines. SL should also have an understanding about possible SE involved with new hypertensive medications and goals of home bp monitoring, making her aware when it is important to call office. Educating SL on the importance of compliance is also important since she is resistant to taking medications. Good open communication with SL can improve rapport and in turn remove barriers that otherwise may hinder proper self care.

References


http://www.heart.org/HEARTORG/Conditions/More/MetabolicSyndrome/Symptoms-and-Diagnosis-of-Metabolic-Syndrome_UCM_301925_Article.jsp.


doi:10.2165/11586930-000000000-00000

doi:10.1089/acm.2011.0508


National heart and lung institute:(2012).Hypertension. Retrieved from:

[http://www.nhlbi.nih.gov/health/health-topics/topics/ms/](http://www.nhlbi.nih.gov/health/health-topics/topics/ms/)


