

# HYPERTENSION CASE CONFERENCE

## **Student Material**

Ambulatory Component of the Internal Medicine Clerkship  
Yale University School of Medicine

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## I. Goals and Objectives for Students

The goal of this workshop is to provide students with basic knowledge and skills required to provide care for adult patients with hypertension. By the end of the session, we hope that all students will achieve the specific learning objectives listed below.

### Learning Objectives

1. State the current diagnostic criteria for hypertension.
2. State the distinction between primary and secondary hypertension.
3. List the biological factors, drugs, and dietary substances that may influence blood pressure.
4. List the major causes of morbidity and mortality among hypertension patients.
5. Describe appropriate strategies for the initial management of hypertension.
6. State the indications and protocols for home blood pressure monitoring.
7. Describe considerations for selecting initial and add-on oral therapy agents.
8. Describe practices for helping patients attain goals for hypertension control.
9. Describe a diagnostic and therapeutic approach to patients with resistant hypertension.

## II. INSTRUCTIONS FOR STUDENTS

### A. Read the three papers provided (if you have not read them recently).

The papers provided will help you solve the cases described in this conference. The papers are:

1. Buse JB. Primary Prevention of Cardiovascular Diseases in People with Diabetes Mellitus. *Diabetes Care* 2007; 30: 162-172.
2. Chobanian AV, Bakris, GL, Black HR, Cushman WC, Green LA, Izzo JL, Jones DW, Baterson BJ, Oparil S, Wright JT, Roccella EJ, and the National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7 Report. *JAMA* 2003;289:2560-2572.
3. Moser M, Setaro, JF. Resistant or difficult-to-control hypertension. *N Engl J Med* 2006;355:385-392.

### B. Read the cases before class.

Each case description is followed by one or more potential questions to guide you in developing an appropriate management plan. Prepare your responses to these questions, and write down other questions that come to mind as you proceed. Bring your questions to the attention of the faculty facilitator during the classroom conference.

### III. Case I: Found by the Nurse

Elvis Lighter is a 42-year-old man who is referred by the nurse at his place of work because of repeatedly elevated morning blood pressure readings averaging 145/105 mm Hg.

Mr. Lighter feels well. The cardiovascular review of symptoms is negative. His wife reports that he snores heavily and experiences interrupted sleep.

His family history includes no cardiovascular disease, and both parents are alive and active in their 70's. Mr. Lighter follows no special diet, but commonly eats fast foods. He quit smoking five years ago, and subsequently gained 15 pounds. He drinks 3-4 beers per day during the week. On the weekends, he also drinks a cocktail or two. Physical activity has been limited because of a knee injury, for which he is taking ibuprofen.

Other than ibuprofen, his only medication is a nasally inspired decongestant for seasonal allergies.

PE: GENERAL: he appears well but heavy.  
VITALS: Height 5'8". Weight 210 lbs.  
BP supine 138/98 right arm, 134/94 left, pulse 94.  
BP upright 135/102, pulse 98.  
HEENT: Ocular fundi show mild arteriolar constriction.  
NECK: Thyroid is not enlarged, no carotid bruits  
CV: JVP 4 cm H<sub>2</sub>O. The cardiac impulse cannot be felt.  
Grade 1/6 murmur right upper sternal border. Second heart sound split (physiologic, but wide).  
LUNGS: The chest is clear and resonant.  
EXT: There is a trace of peripheral edema.

#### DATA:

ECG demonstrates SR with mild peaking of P waves in leads 2,3,F, and borderline voltage criteria for left ventricular hypertrophy. Hematocrit is 49%, MVC 98, urine analysis normal, and serum creatinine is 1.3 mg/dl. SGOT is 75, glucose 136 mg/dl, total cholesterol 293, and triglycerides 345 mg/dl.

- Potential Questions:
- 1) What behavioral factors may be contributing to his HTN?
  - 2) Would you write "hypertension" in this his problem list?
  - 3) How would you manage this patient?

## Case II: High and Bye

Hilda Boatwright is a 58-year-old woman who is seen as a new patient for a comprehensive examination. She sees a cardiologist for high cholesterol, but he has urged her to see a generalist to manage this and other issues. The cardiologist recently placed her on atenolol for hypertension. She has not started it because her blood pressures are always normal at home, ranging from 112-134/54-84 (her daughter is a certified nursing assistant). It is only high in her doctor's office. "He scares the hell out of me and then my blood pressure is high," she says. She reports that her blood pressure has been 200/100 in the cardiologist's office, but she feels she does not need medication.

MEDS: calcium 500 mg BID, Multivitamin one daily  
PMH: None.  
FH: No hypertension or coronary disease.  
SH: She is married and lives with her husband. Although she does not exercise, she describes herself as active. She does not smoke. She drinks one alcoholic beverage three nights a week.  
ROS: Non-contributing  
PE: General: looks well  
Vitals: Weight 150 lb, Height 5'5", BP 150/80, 152/84, 148/80. Blood pressures by her home monitoring machine, when used in the office right after BP is taken by conventional device are about 154/82.

- Potential Questions:
- 1) Does this woman meet the diagnostic criterion for hypertension?
  - 2) Is she at increased risk for consequences of high BP?
  - 3) Would you order a 24 hour BP monitor?
  - 4) Would you tell her to start the atenolol?

## VI. Case III: Not at Goal

S. D. is a 68-year-old woman with diabetes. Her blood pressure has been difficult to control despite multiple medications. ACE inhibitors have been avoided because of borderline hyperkalemia. Except for mild exertional dyspnea, she is asymptomatic, although she reports episodes of pedal edema after prolonged dependency. Today she has not taken her “water pills” because of a wish to avoid urinary frequency during her medical visit.

**MEDS:** hydrochlorothiazide 50 mg BID, atenolol 50 mg once daily, hydralazine 50 mg QID, and clonidine 0.2 mg BID, fluticasone 110 µg metered dose inhaler as needed, insulin glargine 10 units QHS, sliding scale regular insulin before breakfast and dinner.

**PMH:** Asthma, hypertension, diabetes

**FH:** Because of adoption, the family history is obscure.

**SH:** She smokes one-half pack of cigarettes per day.

**PE:** **GENERAL:** mildly obese

**VITALS:** sitting BP 180/115 mm/Hg, P 90.

**HEENT:** Hemorrhages and exudates in the ocular fundi.

**LUNGS:** Soft rales present at the lung bases, and faint expiratory wheezes were appreciated.

**CV:** Jugular veins were distended 8 cm above sternal angle. A fourth heart sound was present. Hepatojugular reflux was present.

**ABDOMEN:** Normal

**EXT:** Diminished pulses and 2+ pitting edema halfway to the knees.

### DATA:

**ECG:** shows SR with 16 mV R wave height in Lead 1. Asymmetric T wave inversions were noted in Leads 1, L, V4-V6.

**CXR:** pulmonary vascular redistribution, normal heart size.

**LABS:** BUN 31 mg/dl, creatinine 2.0 mg/dl, fasting blood glucose 200 mg/dl, sodium 130 mEq/L, potassium 4.9 mEq/L. Urine showed 2+ protein and 2+ glucose.

**Potential Questions:** 1) Why is she not at her BP treatment goal?

2) How would you manage her?

3) Would you expect her LVEF to be abnormal?

IV. Optional Case IV (may not be covered in detail): The Cheap Clue

T. W. is a 47-year-old woman, referred by her gynecologist for hypertension. If she requires treatment, she has a preference for dietary and non-pharmacologic therapies. The office nurse finds a blood pressure of 152/108.

MEDS: None

PMH: Hysterectomy five years ago

FH: Her father had hypertension and died of a stroke at age 56 years. Her mother had breast cancer.

SH: She is physically active, and a vegetarian. She consumes neither alcohol nor tobacco at present, though she smoked for 15 years in the past.

ROS: Current symptoms include occasional flushing and headache, mild heat intolerance, and palpitations that often awaken her from sleep.

DATA: Serum creatinine 0.8 mg/dl, potassium 3.7 mEq/L.  
ECG = SR with occasional PAC.  
Urine analysis is normal.

Potential Questions: 1) What is the differential diagnosis?  
2) What, if any, further evaluation is warranted?

## VII. References:

1. American Diabetes Association. Treatment of hypertension in adults with diabetes. *Diabetes Care* 2003; 26 (Supplement 1): S80-S82.
2. Setaro JF. An update on the diagnostic evaluation of the hypertensive patient. *J Clin Hypertens* 2000; 2: 25-32.
3. Moser M. *Clinical Management of Hypertension 6<sup>th</sup> Edition*. Professional Communications. 2002.
4. Chobanian AV, Bakris, GL, Black HR, Cushman WC, Green LA, Izzo JL, Jones DW, Baterson BJ, Oparil S, Wright JT, Roccella EJ, and the National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7 Report. *JAMA* 2003;289:2560-2572.
5. Moser M, Setaro, JF. Resistant or difficult-to-control hypertension. *N Engl J Med* 2006;355:385-392.
6. Buse JB. Primary Prevention of Cardiovascular Diseases in People with Diabetes Mellitus. *Diabetes Care* 2007; 30: 162-172.