Implementing Interprofessional Approaches to the Management of Hypertension

Carolyn Bradley-Guidry MPAS, PA-C
Clinical Assistant Professor
Physician Assistant Studies
UT Southwestern
Dallas TX
Ms. Bradley-Guidry has disclosed that she has no actual or potential conflict of interest in relation to this topic.
Educational Objectives

By the end of this activity, the participant will be better able to:

• Describe the proper utilization of ambulatory blood pressure monitoring and home blood pressure measurement.
• Discuss interprofessional approaches to achieve hypertension goals.
# Classification of Hypertension

## JNC 7 Definitions

<table>
<thead>
<tr>
<th>Blood Pressure (mm Hg)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>Diastolic</td>
</tr>
<tr>
<td>&lt;120 and &lt;80</td>
<td>Normal</td>
</tr>
<tr>
<td>120-139 or 80-89</td>
<td>Prehypertension</td>
</tr>
<tr>
<td>140-159 or 90-99</td>
<td>Stage 1 hypertension</td>
</tr>
<tr>
<td>≥160 or ≥100</td>
<td>Stage 2 hypertension</td>
</tr>
</tbody>
</table>

Making the Diagnosis of Hypertension

• The diagnosis of hypertension is based on average of 2 or more readings >140/90 mm Hg, taken at each of 2 or more visits after an initial screening.
• If the initial average of 2 or more readings is >160/100 should be seen in less than 1 month
Reliable Blood Pressure Measurement

- Seated Position after 5 minutes of quiet rest
- Proper cuff sizing
- Arm at heart level
- The average of at least 2 consecutive measurements
- No coffee or smoking within 30 minutes of measurement
Office Measurement of BP

- Deceptively simple
- Manual
  - Hg (no longer used)
  - Technical error and bias
- Automatic
  - Oscillometric relies on MAP and computer algorithm
  - Eliminates bias but still subject to technical error
Definitions of Hypertension Subtypes

**White Coat Hypertension**

Synonym: *isolated office hypertension*

Hypertensive by clinic (office) measurement and normotensive by ambulatory measurement

**Masked Hypertension**

Synonyms: *white coat normotension; reverse white coat hypertension; undetected ambulatory hypertension*

Normotensive by clinic measurement and hypertensive by ambulatory measurement

White Coat Hypertension

- BP > 140/90 in the clinic, but <135/85 by ABPM
- Present in ~20% of all patients with untreated HTN
- Significantly more prevalent in treated women than men

Safar ME Am J Htn 2004;17:82-87.
White Coat Hypertension

Office visits

BP
mm Hg

3 pm  midnight  3 pm
Conventional, 24-hr, Daytime and Night-time SBP as Predictors of Cardiovascular Endpoints – Syst-Eur

2-yr incidence of cardiovascular endpoints vs Systolic blood pressure (mm Hg)

- Nighttime
- 24-hr
- Daytime
- Conventional

Incidence of CV Events According to Office Systolic Blood Pressure

Limitations of Office BP

- Poor quality control due to technique
  - Cuff size
  - Patient position (e.g. feet not on floor, arm not at heart level)
  - Failure to allow 5 minutes rest
  - Letting air out of cuff too rapidly
  - Digit bias (rounding to nearest 5 or 10 mmHg)
  - Expectation bias
1. Using ambulatory blood pressure monitoring (ABPM) in practice & research

2. Advantages/disadvantages of ABPM

3. Combining office BP with ABPM

4. Barriers to the use of ABPM in clinical practice

5. Home BP monitoring as another strategy
ABPM in Clinical Practice

• Assessment of possible white-coat effect (only indication currently reimbursable by Medicare)
• Other clinical indications
  – Confirm hypertension in children
  – Symptoms with hypertension
  – Resistant hypertension
    • Up to a third of such patients have controlled ABPM
  – Labile hypertension
  – Hypotensive episodes
  – Postural hypotension/Autonomic Dysfunction

## Suggested Values for the Upper Limit of Normal Ambulatory Pressure

<table>
<thead>
<tr>
<th></th>
<th>Optimal</th>
<th>Normal</th>
<th>Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daytime</strong></td>
<td>&lt;130/80</td>
<td>&lt;135/85</td>
<td>&gt;140/90</td>
</tr>
<tr>
<td><strong>Nighttime</strong></td>
<td>&lt;115/65</td>
<td>&lt;120/70</td>
<td>&gt;125/75</td>
</tr>
<tr>
<td><strong>24-hr</strong></td>
<td>&lt;125/75</td>
<td>&lt;130/80</td>
<td>&gt;135/85</td>
</tr>
</tbody>
</table>
Ambulatory BP monitoring

- Nurse or MA provides instructions and fits the monitor
  - Instructions include not to remove the cuff, to avoid strenuous activity, to try to relax arm when device is taking a reading
- Person wears monitor (usually) 24-hours
- Programmed for automatic readings at desired intervals (e.g., every 30 minutes)
Ambulatory Blood Pressure Units

Modern ABPM Units Provide Ease of Use

1. Photo provided by Spacelabs Medical, Inc.
2. Photo provided by Suntech Medical, Inc.
Ambulatory Blood Pressure Algorithm

Use of Ambulatory Blood Pressure in Hypertension Management

Office Blood Pressure
- >140/90 mmHg in Low-risk Patients (no target organ disease)
- >130/80 mmHg in High-risk Patients (target organ disease, diabetes)

Self-Monitored BP <135/85 mmHg
- Perform Ambulatory BP Monitoring

24-hour BP <130/80 mmHg
- Follow up with nondrug therapy on a 6-12 month basis
- Repeat ambulatory BP measurement every one to two years

24-hour BP >130/80 mmHg
- Initiate Antihypertensive Therapy

Perform ambulatory blood-pressure monitoring

24-hour BP <130/80 mmHg
- Maintain present therapy
- Follow up with an ABPM every two years

24-hour BP >130/80 mmHg
- Change antihypertensive therapy to improve control (target <130/80 mmHg)
- Follow up with ABPM every two years

Data transferred to a computer using a USB cable and the device’s software; interpretation entered & report generated
ABPM Graph of Data

- Systolic BP
- Diastolic BP
- Nocturnal dip
- Heart rate

“White coat” period
Awake period
Sleep time period
Awake period
Ambulatory BP Data

• Average ambulatory BP (i.e. “true” BP)
• Diurnal rhythm of BP
  – Nocturnal BP
  – Nocturnal dipping
  – Morning surge
  – Masked nocturnal hypertension
• Blood pressure variability
Barriers to ABPM in Clinical Practice

- Few providers trained
- Not widely available
- Poor reimbursement
- Patient tolerability
Out-of-Office Blood Pressure Measurement

- Provides a better risk prediction than office-based monitoring
- Correlates better with the cardiac (LVH) and renal (albuminuria) consequences of hypertension than office readings
- Use and Advantages:
  - Helps identify WCH and masked hypertension
  - Multiple readings throughout the day may reveal patterns in blood pressure and periods when control is inadequate
  - Improves patient adherence
  - Reduced costs

Out-of-Office Monitoring Confirms or Refutes Diagnosis

<table>
<thead>
<tr>
<th>Office BP</th>
<th>HTN</th>
<th>Ambulatory BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Normal&quot;</td>
<td>&quot;Normal&quot;</td>
<td>&quot;True Normal&quot;</td>
</tr>
<tr>
<td>&quot;Normal&quot;</td>
<td>&quot;Sustained HTN&quot;</td>
<td>White Coat HTN (&quot;false +&quot;)</td>
</tr>
<tr>
<td>&quot;Normal&quot;</td>
<td>Masked HTN (&quot;false –&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

"White Coat HTN" ("false +")
"Masked HTN" ("false –")
"True Normal"
ABPM in Research

• “Gold standard” for BP assessment
  – White-coat and masked HTN studies
• Studies of BP-lowering drugs
• Chronotherapy studies
• Studies of drugs not intended to have BP effect (off-target BP response)*

ABPM Summary

- ABPM is a valuable component of modern hypertension management
- ABPM is not yet widely available
- ABPM should be the preferred method of BP assessment in research studies
- HBPM may be more feasible for managing hypertensive patients but it has several limitations as well
Home BP Monitoring

- May be a more feasible method
- Widely available
- Relatively affordable (or could be loaned)
- Systematically performed, home BP averages correlate (reasonably) with daytime ABP average
Home BP Monitoring Problems

- Still relies on proper technique
- Dependent on patient effort / engagement
- Concerns over “trustworthiness” of data
- Still misses large segments of day (and nocturnal)
Real World Approach to Medication Adherence

• How do you know if you patient is taking their medications?
• How do you know how often you patient is taking their medications?
• How do you get your patients to take their medications regularly?
• What tools are available to help?
At One Year As Many As 50% of Patients May Not Be Fully Adherent

Hill MN et al, J Clin HTN 2010;12(10)
Vrijens B et al, BMJ 2008;336:1114-1117
Potential Strategies to Improve Adherence

- Fixed dose combinations
- Once daily medications
- Self monitoring of BP
- Team interventions
  - Particularly use of clinical pharmacist as part of care team

- Fill reports from pharmacy
- Customized blister packs
- Pill boxes
- Reduced out of pocket for ‘essential’ medications
- Refill reminders
- Improve communication

Hill MN et al, J Clin HTN 2010;12(10)
Phone Applications to Improve Lifestyle Weight & Heart Health Eating

- Patients enter daily food intake and exercise
- Apps tally up quantity
- Provide objective data
- Beneficial to target goals of
  - Reduced saturated fat and sodium
  - Increased potassium and fiber
  - Increased exercise

- MyNetDiary
  www.mynetdiary.com
- MyFitnessPal
  www.myfitnesspal.com
- Lose it!
  www.loseit.com
- Noom Coach
  www.noom.com
Phone Applications for Blood Pressure & Exercise

- Track patients' blood pressure over time with options to email reports to medical staff
- Provide visual graphs
- Patients have the ability to enter and track medications
- Encourage doable workouts of 20-30 minutes of activity three times a week
- Measure time and distance of walk, run, or ride

- Withings
- HeartWise (SwEng LLC)
- BP Monitor (Taconic Systems)
- Runkeeper [www.runkeeper.com](http://www.runkeeper.com)
- JogTracker [www.jogtracker.com](http://www.jogtracker.com)
- Couch to 5k [www.activenetwork.com](http://www.activenetwork.com)
Application Resource

Best Apps of 2015

Heart Disease

Best Apps of 2015

Weight Loss
Barriers to Blood Pressure Control
Lifestyle Modification and Drug Treatment

**PROVIDER**
- Lack of agreement with clinical guidelines
- Therapeutic inertia
- Confidence to implement strategies

**ENVIRONMENT**
- Access to care
  - lack of insurance
  - lack of transportation
- Features of practice setting
  - lack of visit time
  - lack of office support

**THERAPY RELATED**
- Adverse effects
- Cost
- Complexity of regimen

**PATIENT**
- Demographic characteristics
  - age
- Psychological factors
  - health beliefs
  - health literacy
  - self-efficacy
- Social/cultural factors
  - socioeconomic status
  - lack of social support
  - cultural values

**Compatibility of regimen with patient lifestyle**

**Availability of resources for therapy**

Scisney Matlock Postgrad Med 2009;121:159
Interdisciplinary HTN Clinic Model

PA/NP Review Referrals

Prelim information collected by staff electronically

Nurse performs Orthostatic BP Protocol

Prelim information collected by staff electronically

Nurse performs Orthostatic BP Protocol

Nurse Home BP education

Nutritionist Education

MD Evaluation & Plan

Nutritionist Education

MD Evaluation & Plan

PA/NP Follow-up

MD Follow-up & review

Nurse Interim BP visit (2-3 weeks)
  - 24 hour ABPM placed

PA/NP Follow-up

MD Follow-up & review
Linking Communication and Adherence

How do we link communication to outcomes?

Communication → Patient Satisfaction → Adherence → Health Outcomes
A Patient-Based Approach to Communication:

- Explanatory Model
- Social Risk for Noncompliance
- Fears/Concerns about the Medication
- Therapeutic Contracting/Playback

Exploring the Explanatory Model

1. What does it mean for you to have hypertension?
2. Do you know why I think it is important for you to take your BP medications?
3. Do you know about the risk of stroke with HTN?
4. What treatments do you think work for your hypertension? Anything besides the medication?
Determining **Social Risk** for Non-adherence

1. Does your insurance cover your medications?
2. How difficult to afford are your medications or copayments?
3. Where do you get your medication?
4. Do you simply forget to take your medications?
5. Are there family members who can help with your medications (and are you interested in that)?
6. How are your medications organized at home? Pill box?
Determining Fears and Concerns about Medications

1. How do you feel about taking this medication?
2. What have you heard about this medication?
3. What worries do you have about side effects?
4. What concerns do you have about the:
   – Dosage?
   – Size of pill?
   – Color of pill?
Taking medications for (hypertension) can be difficult...

1. Can we come to an agreement about how you will take your medications until next visit?
2. Playback
Multi-Factorial Interventions

Quality Improvement Initiatives Improve Hypertension Care Among Veterans.

Figure 1. Current process map of hypertension treatment and proposed interventions.
Questions?