Hypertension and the Challenge of Adherence

Geneva Clark Briggs, Pharm.D., BCPS
Outline

Brief overview of HTN and pharmacologic therapies

Role of pharmacists in collaboration with patients and physicians to monitor patient progress and improve medication adherence/persistence
CVD Risk

- HTN prevalence ~ 50 million people in the United States.
- The BP relationship to risk of CVD is continuous, consistent, and independent of other risk factors.
- Each increment of 20/10 mmHg doubles the risk of CVD across the entire BP range starting from 115/75 mmHg.
- Prehypertension signals the need for increased education to reduce BP in order to prevent hypertension.
Target Organ Damage

- **Heart**
  - Left ventricular hypertrophy
  - Myocardial infarction
  - Heart failure

- **Brain**
  - Stroke or transient ischemic attack

- **Chronic kidney disease**

- **Peripheral arterial disease**

- **Retinopathy**
### Benefits of Lowering BP

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

Trends in awareness, treatment, and control of high blood pressure in adults ages 18–74

<table>
<thead>
<tr>
<th></th>
<th>National Health and Nutrition Examination Survey, Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>51</td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
</tr>
<tr>
<td>Control</td>
<td>10</td>
</tr>
</tbody>
</table>
Case Study

Julie is a 53 year old Asian American here for a blood pressure screening.

Currently takes a multivitamin and calcium supplement daily.

Type 2 DM, hypertriglyceridemia

BP:
- right arm 140/92
- left arm 138/96
# JNC-7 Classification of Blood Pressure

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic BP (mm Hg)</th>
<th>Diastolic BP (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>&gt;160</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

*JAMA 2003;289:2560-72.*
Blood Pressure Goals

≤ 140/80 mm HG

≤ 130/80 mm HG in patients with diabetes/impaired glucose tolerance or chronic kidney disease

JAMA 2003;289:2560-2572
Diabetes Care 2006;29(suppl 1)
Lifestyle Modifications for Hypertension Prevention and Management

- Weight loss
- Smoking cessation
- Increased physical activity
- Limit alcohol
  - 1 oz/day for men, ½ oz/day for women/lighter weight men
- Limit sodium intake to no more than 2.4 gm sodium or 6 gm sodium chloride per day
- Meet recommended daily intake of magnesium, potassium, and calcium
  - Emphasize increased consumption of fresh fruits, vegetables, and low-fat dairy products
<table>
<thead>
<tr>
<th>Modification</th>
<th>Approximate SBP reduction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>5–20 mmHg/10 kg 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>
Case Study

Julie was referred to her PCP.
She was started on lifestyle modifications (weight loss, walking, sodium restriction) 2 months ago
She asks for a BP check today
   - BP 140/90
Algorithm for Treatment of Hypertension

Lifestyle Modifications

Not at Goal Blood Pressure (<140/90 mmHg)  
(≤130/80 mmHg for those with diabetes or chronic kidney disease)

Initial Drug Choices

With Compelling Indications

Drug(s) for the compelling indications  
Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.

Without Compelling Indications

Stage 1 Hypertension  
Thiazide-type diuretics for most.  
May consider ACEI, ARB, BB, CCB, or combination.

Stage 2 Hypertension  
2-drug combination for most (usually thiazide-type diuretic and ACEI, or ARB, or BB, or CCB)

Not at Goal Blood Pressure

Optimize dosages or add additional drugs until goal blood pressure is achieved.  
Consider consultation with hypertension specialist.
Antihypertensive Therapies

Diuretics (THIAZ)
Angiotensin converting enzyme inhibitors (ACEI)
Angiotensin Receptor Blockers (ARB)
Beta Blockers (BB)
Calcium Channel Blockers (CCB)
Alpha Blockers (AB)
Aldosterone antagonists (Aldo Ant)
## Compelling Indications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>THIAZ, BB, ACEI, ARB, ALDO ANT</td>
</tr>
<tr>
<td>Postmyocardial infarction</td>
<td>BB, ACEI, ALDO ANT</td>
</tr>
<tr>
<td>High CAD risk</td>
<td>THIAZ, BB, ACE, CCB</td>
</tr>
<tr>
<td>Diabetes</td>
<td>THIAZ, BB, ACEI, ARB, CCB</td>
</tr>
<tr>
<td>Chronic Kidney Disease</td>
<td>ACEI, ARB</td>
</tr>
<tr>
<td>Recurrent Stroke Prevention</td>
<td>THIAZ, ACEI</td>
</tr>
</tbody>
</table>
Case Study

Julie was started on telmisartan 20 mg qd 3 months ago

Her BP today 130/72 mm Hg
Potential favorable effects

- Thiazide-type diuretics - slowing demineralization in osteoporosis.
- BBs - atrial tachyarrhythmias/fibrillation, migraine, thyrotoxicosis (short-term), essential tremor, or perioperative HTN.
- CCBs - Raynaud’s syndrome and certain arrhythmias.
- Alpha-blockers - prostatism.
Additional Considerations in Antihypertensive Drug Choices

Potential unfavorable effects

- Thiazide diuretics - use cautiously in gout or a history of significant hyponatremia.
- BBs - avoid in patients with asthma, reactive airways disease, or second- or third-degree heart block.
- ACEIs and ARBs - contraindicated in pregnant women or those likely to become pregnant.
- Aldosterone antagonists and potassium-sparing diuretics - hyperkalemia.
Adherence and Persistence with Antihypertensive Therapy
Adherence versus Compliance

Adherence: “the degree to which a person’s behavior coincides with medical advice”

Adherence requires the patient’s agreement with the recommendations

Compliance may suggest a passive approach by the patient to health care
Persistence

Overall duration of drug therapy

The interval between date of first Rx and point where patient would have insufficient supply of drug to cover days between Rx refills
U.S. Patients Do Not Take Medications as Prescribed

- 100% Rx prescribed
- 88% Rx filled
- 76%* Rx taken
- 47%* Rx continued

* 22% of U.S. patients take less of the medication than is prescribed

American Heart Association: Statistics you need to know. [http://216.185.102.50/CAP/pro/prof_statistics2.html](http://216.185.102.50/CAP/pro/prof_statistics2.html)
# Adherence Rates by Disease State


<table>
<thead>
<tr>
<th>Therapeutic area</th>
<th># Reports studies</th>
<th>Mean Adherence Rate (%)</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>5</td>
<td>80</td>
<td>35-97</td>
</tr>
<tr>
<td>Cardiovascular (all)</td>
<td>26</td>
<td>71</td>
<td>39-93</td>
</tr>
<tr>
<td>Hypertension</td>
<td>17</td>
<td>73</td>
<td>39-93</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>3</td>
<td>70</td>
<td>46-88</td>
</tr>
<tr>
<td>Medical - General (all)</td>
<td>14</td>
<td>75</td>
<td>51-85</td>
</tr>
<tr>
<td>Diabetes</td>
<td>3</td>
<td>73</td>
<td>66-85</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>4</td>
<td>78</td>
<td>75-83</td>
</tr>
<tr>
<td>Respiratory (all)</td>
<td>10</td>
<td>54</td>
<td>37-92</td>
</tr>
<tr>
<td>Asthma</td>
<td>7</td>
<td>55</td>
<td>37-92</td>
</tr>
<tr>
<td>COPD</td>
<td>3</td>
<td>51</td>
<td>50-52</td>
</tr>
</tbody>
</table>

By year two of chronic illness, the rate of adherence drops to < 50%
Adherence to Antihypertensives and Lipid-lowering Therapy

AHT, antihypertensive therapy; LLT, lipid lowering therapy

Poor Adherence Impacts Total Costs

Hypertensive Patients and Total Costs

- Received meds, 100% compliant: $4,850
- Purchased some, but took all purchased: $6,400
- Purchased some, taken irregularly: $10,500

Medical Interface 1993:April; 74-84
Patient-reported Reasons for Non-Adherence

- I just forget (54.9%)
- Don’t like being dependent on drugs (7.3%)
- Other (3.6%)
- Too expensive (1.8%)
- If I don’t take them, supply will last longer (1.3%)
- Side effects (6.4%)
- Don’t think drugs are working (3.4%)
- Hate taking drugs (7.1%)
- Don’t think it’s always necessary (13.7%)

Patterns of Adherence in Chronic Disease Management

1/6 come close to perfect adherence
1/6 take nearly all doses; some timing irregularity
1/6 occasionally miss single day’s dose; some timing inconsistency
1/6 take drug holidays 3 – 4 times a year; occasional omissions
1/6 take drug holidays at least monthly; frequent omissions
1/6 take few to no doses

“Adequate Adherence”

Drug & disease dependent

Most researchers use 80%
Consider nonadherence as a cause of:

- Failure to reach goal blood pressure
- Resistant hypertension
- Sudden loss of control.

Review medications to rule out iatrogenic causes of elevated blood pressure.
Ask what the patient takes for pain.
Case Study

Julie comes into the pharmacy for medication refills.

Her current med profile
- HCTZ 25 mg qd
- Telmisartan 20 mg qd
- Metformin 1000 mg bid
- Glipizide 10 mg qd
- Fenofibrate 145 mg qd

On average, she gets a 30 day supply of most items every 45 days.
Evaluating Adherence: Tablet Counts

Counting the number of remaining dosage units

Advantages:
- Easy
- Inexpensive
- Objective

Disadvantages:
- Patient must bring in all medications at each visit
- Does not capture information such as timing of doses & patterns of missed doses
- Patients can scam the system
Evaluating Adherence: Monitoring Refill Records

Check when prescriptions are initially filled, refilled over time & prematurely discontinued

Advantages:
- Relatively easy
- Relatively inexpensive
- Objective

Disadvantages:
- Obtaining a prescription does not ensure its proper use
- Information data base may be incomplete
Evaluating Adherence: Patient Self-Report

Patients can be accurate in reporting whether they are adhering to their medication treatment if they are asked simply & directly.

Advantages:
- Practical, easy
- No cost

Disadvantages
- All patients may not be forthcoming
- Susceptible to error with increasing time between visits
The Iceberg Effect

WHAT YOUR PATIENT TELLS YOU

WHAT YOUR PATIENT DOESN’T TELL YOU

Lifestyle concerns
Disabilities
Full extent of adverse effects
Confusion and memory problems
Doubts and fears
Five Dimensions of Adherence

- Health system factors
- Social/economic factors
- Patient related factors
- Condition related factors
- Therapy related factors
Personality traits do not consistently predict adherence. Sociodemographic factors, such as gender, ethnicity, marital status, income, and education also do not consistently predict adherence. Psychological distress (depression and anxiety), more serious mental disorders, and substance abuse adversely affect adherence. Self-efficacy, health beliefs and intentions predict adherence. Initial adherence to therapy predicts subsequent adherence.
Case Study

When questioned, Julie admits to forgetting her medications frequently. She forgets the morning doses of all her once daily medications about twice a week (leaves house and does not come back till 7 pm).

She also says they upset her stomach when she takes them all at once.
Strategies to Improve Adherence

Therapy Related Interventions

Patient Related Interventions
Therapy Related Interventions

Simplify the regimen

- Adherence declines significantly as the dosing frequency exceeds twice a day
- Combination products reduce the number of doses per day as well as patient copayments
- Help patient organize all medications and establish an administration schedule
- Match administration times to patient’s activities of daily living
Therapy Related Interventions

Periodic medication profile review

- Systematic, ongoing review of all medications
- Ensure patient is on the fewest medications possible
Multiple interventions required to improve adherence:

Self-Management (e.g., blood pressure monitoring)

Refill reminders (e.g., telephone, electronic, mail etc.)

Adherence aids (e.g., pill boxes, calendars)

Simplify dosing regimen (e.g., QD drugs, packaging)

Education on disease and drug (e.g., written and oral information)
Addressing Forgetfulness

Simplifying regimen

Use of organizers and reminders
- Blister packs
- Calendars
- Dosage counters

Adherence-aiding strategies
- Reminders via phone calls, e-mail, mail
- Medication diaries reviewed by health care provider

Addressing Forgetfulness

Reminder devices
Minimize the occurrence & impact of adverse effects

- Educate patients about the most common adverse effects
- Inform patients how to deal with adverse effects
- Ask patients if they are experiencing any possible adverse effects
  - “Are you experiencing any problems taking your medications?”
  - “Do your medications make you feel bad in any way?”
The pharmacist made the following interventions with Julie

- education on importance of adherence
- gave her a tablet organizer which she thinks will help her remember (she can take with her when she leaves house in morning)
- signed her up for automatic refill reminder phone calls
- recommended a home blood pressure machine
- called her MD to recommend combination ARB/HCTZ product
Conclusions

Hypertension is a prevalent condition. Although identification and control have improved, progress still needs to be made.

Nonadherence is a significant issue. Pharmacists can assist patients with adherence and persistence.