Hypertension: Tips for Managing Difficult to Control Blood Pressure in the Office

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Over the Next 90 Minutes…

- Introductions
- Background discussion
- Case 1 (Work-up/White-coat)
  - Group discussion
- Case 2 (Diabetes and Diuretics)
  - Group discussion
- Case 3 (Uncontrolled on 4 meds)
  - Group discussion
- Wrap-Up and Questions
Over the Next 90 Minutes…

1) Avoid common pitfalls and challenges in hypertension care
2) Discuss approaches to achieve BP control in resistant hypertension
3) Implement recommendations from the Accord trial into the care of hypertensive diabetic patients.
4) List changes to recommendations for HTN care recommended by JNC-8 (if released by the time of the meeting).
Resistant Hypertension

- The Joint National Committee 7 defines resistant hypertension as failure to achieve goal BP (140/90 mm Hg for the overall population and 130/80 mm Hg for those with diabetes mellitus or chronic kidney disease) when a patient adheres to maximum tolerated doses of 3 antihypertensive drugs including a diuretic, or anyone on 4 drugs.
First Pass Evaluation

- Is the patient adherent with medications?
- Is the patient limiting sodium/salt intake?
- Has the patient been screened for Obstructive Sleep Apnea?
- Does the patient have renal disease?
Use the **Big Four**!

1) **Diuretics**
   - HCTZ, chlorthalidone, loop diuretics

2) **ACE Inhibitors**
   - & Angiotensin Receptor Blockers (ARB)

3) **Calcium Antagonists (CAB)**
   - Dihydropyridines (Amlodipine)

4) **Beta Blockers (BB)**
Obstructive Sleep Apnea

- Untreated strongly associated with hypertension
- May predict development of hypertension
  - In normotensive subjects
- Very common among resistant hypertensives
  - More common and more severe in men compared with women.
  - The more severe, the less likely BP will be controlled.
- The mechanism(s) is not clear.
  - Intermittent hypoxemia, increased upper airway resistance induces a sustained increase in sympathetic nervous system (SNS) activity?
Sodium intake

- Average US: 3.4 mg salt (1.5 tsp) daily
- Optimal: 1.5 mg (<1/2 tsp); less > age 50
- Resistant hypertensives
  - Average dietary sodium intake >10 g/day
- Dietary salt reduction to 3 g/day
  - Associated with modest BP reductions
  - More in highly salt-sensitive African-American and elderly patients.
Adherence

- 40% of patients with new hypertension discontinue antihypertensives during the first year.

- At 5 to 10 years of follow-up, <40% persist with antihypertensives.

- Poor adherence may be less common in specialty clinics.
Adherence

Measuring Adherence:
- Pill counts
- Validated Questionnaires
- Pharmacy Records

Addressing Adherence:
- Choose medications with low side effect profiles
- Choose once daily dosing
- Consider combination pills
- Use pillboxes or pharmacy blister packs
- Educate the patient
  - emphasize safety and efficacy of the regimen
Prognostic Value of ABPM

Ambulatory BP measurements predict CV events
- In treated HTN patients
- Even after controlling for office BP

Clement. NEJM 2003
Indications for ABPM

- White Coat HTN
- Labile or Episodic BP
- Resistant HTN
- Autonomic Dysfunction

Source: JNC 7 and AHA
**Limits of Normal ABP**

<table>
<thead>
<tr>
<th></th>
<th>Systolic</th>
<th>Diastolic</th>
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<tbody>
<tr>
<td>Awake</td>
<td>&lt;135</td>
<td>&lt;85</td>
</tr>
<tr>
<td>Night</td>
<td>&lt;120</td>
<td>&lt;75</td>
</tr>
<tr>
<td>24-hour</td>
<td>&lt;130</td>
<td>&lt;80</td>
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Dipping

- BP reduction <10/5 mmHg or <10% between day and night are non-dippers.
- Extreme dippers >20% drop
Information Retrieved

- Mean and extreme BPs
- Correlation with events and SX
- 24-hour BP control and gaps
- Dipping status
BP in DM: Guidelines

Hypertension Optimal Treatment (HOT) (1998)

- 15,000 patients with 1,500 diabetic subgroup
- Mean diastolic BP was 82.6 mmHg
- 51% reduction in CV events

Diabetic patients without previous coronary disease have at least as high a risk of MI as nondiabetic patients with known coronary disease.
BP in DM: Guidelines

American Diabetes Association Goals

- SBP <130 mm Hg and
- DBP <80 mm Hg
- All patients with hypertension and diabetes should be treated with a regimen that contains an ACEI or ARB

JNC VII
BP in DM: ACCORD subgroup

4700 Diabetic patients
Intensive vs standard BP control

In patients with type 2 diabetes at high risk for CV events, targeting a SBP <120 mm Hg, as compared with <140 mm Hg, did not reduce fatal and nonfatal major CV events.

Diuretics

- Hydrochlorothiazide
- Chlorthalidone
- Metolozzone
- Indapamide
- Furosemide
- Torsemide
- Triamterene
- Amiloride
- Spironolactone
- Epelrenone

Which do you choose?
Diuretics

- **HCTZ**
  - 12 Hour drug
  - $T_{1/2} = 9-10$
  - Data lacking with Conventional dosing

- **CTD**
  - 24 Hour drug
  - $T_{1/2} = 50-60$
  - Survival benefit
  - ALLHAT, SHEP, MRFIT

Double potency without increased S/E
HCTZ 25mg = CTD 12.5mg
Diuretics in CKD

Decision of which diuretic must also consider patient’s renal function

GFR <50  ØHCTZ
GFR <30  ØCTD

Use Furosemide BID
or Torsemide daily
Aldosterone Independence

The most common secondary cause of hypertension
- 8-15% of all hypertensives
- >20% of resistant hypertensives (controversial)
- Provoked or spontaneous hypokalemia, alkalosis can be cues

Screen with early morning, fasting aldosterone and renin levels
- Positive is aldo/renin ratio (ARR) >20-25
- Aldo>15; renin <1.0.
- Low renin hypertension is a separate topic
Stop meds to screen?

No!

- May get high false positive rate, but confirmatory tests required.
- The only medication that unequivocally affects RAAS axis is spironolactone.

Stopping antihypertensives problematic

- In one study, 6/50 had new AF, ICD firing, HTN crisis, or heart failure requiring admit
To confirm, a 24-hour urine for aldosterone is one option.

- On antihypertensives
- Concurrent sodium measurement

Young et al. Endocrinology 2003
Diagnose subtype

Subtype evaluation only needed if surgical cure is being considered (APA or PAH)

Young et al. Endocrinology 2003
Consider empiric spironolactone

- Profound BP lowering with addition of spironolactone in rHTN
  - At 6 months, reduction of 26.0/10.7(!)
  - <5% gynecomastia

- Spironolactone also effective in Obstructive Sleep Apnea

- Should be considered strongly as “fourth medication” to add to regimen
Take Home Tips

1) ABPM has limited but real clinical use
2) Consider using more chlorthalidone
3) Renal function determines diuretic choice
4) Think about Aldosteronism
   - Screen on meds with fasting aldo/renin
   - Consider empiric use of spironolactone
Thank you!

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Suggested Reading

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