

Hypertension CQI Project

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Outline

- Review the epidemiology, definitions, risk factors, complications, and treatment of hypertension.
- Review the evidence behind therapeutic inertia in treating uncontrolled HTN.
- Discuss case samples of patients seen in Same Day Clinic with uncontrolled HTN.
- Discuss common reasons that HTN is not treated in UNC Internal Medicine Same Day Clinic patients.
- Develop recommendations for improving and optimizing care of patients with HTN seen in SDC.
- Increase awareness of uncontrolled HTN among residents and attendings and the need for medication intervention.

Epidemiology

- Hypertension (HTN) affects over 30% of the US population over the age of 18.
- It effects 50% of adults over the age of 65.
- This translates into over 60 million hypertensive adults in the US.
- The number of people with hypertension is likely to grow as the population ages.
- Currently, over 122 million people in the US are overweight or obese and the rise in obesity will increase the number of hypertensive individuals.
- 90% of adults have a lifetime risk of HTN.

Epidemiology

- The treatment of HTN is the most common reason for physician office visits of non-pregnant adults in the US for use of prescription drugs.
- Control of HTN is far from adequate.
- Data from NHANES show that only 34% of people with HTN have their BP under control, defined as below 140/90.
- Uncontrolled HTN is the number one risk factor for heart attack and stroke.
- Every 20 mmHg increase in SBP over 115 doubles the risk of cardiovascular and cerebrovascular disease.
- Approximately 60% of cerebrovascular disease and 50% of ischemic heart disease is attributable directly to HTN.

Definitions

- Normal BP:
 - Systolic Blood Pressure (SBP) < 120 mmHg and Diastolic Blood Pressure (DBP) < 80 mmHg
- Prehypertension:
 - SBP 120-139 and/or DBP 80-89
- HTN:
 - Stage 1: SBP 140-159 or DBP 90-99
 - Stage 2: SBP \geq 160 or DBP \geq 100
- The higher value determines the severity of the hypertension.

Risk Factors for Essential HTN

- Family history
- African American race
- High sodium intake
- Excess alcohol intake
- Weight gain
- Obesity
- Dyslipidemia
- Hostile attitude
- Time urgency/impatience
- Over 90% of patients with HTN have essential HTN.

Causes of Secondary HTN

- Primary renal disease
- Oral contraceptives
- Pheochromocytoma
- Primary hyperaldosteronism
- Renovascular disease
- Cushing's syndrome
- Thyroid/parathyroid disease
- Sleep apnea
- Coarctation of the aorta

Diagnosis

- History
- Physical Exam
- Serial blood pressure measurements
- Laboratory testing:
 - Hematocrit
 - Urinalysis
 - Routine blood chemistries
 - Estimated glomerular filtration rate
 - Fasting lipid profile
 - Electrocardiogram
- Additional testing may be indicated in certain settings:
 - Microalbumin in patients with diabetes mellitus to screen for early nephropathy
 - Limited echocardiography to detect left ventricular hypertrophy
 - Radiographic testing for renovascular hypertension

Complications of Uncontrolled HTN

- Premature cardiovascular disease
- Heart failure
- Left ventricular hypertrophy
 - Heart failure
 - Ventricular arrhythmias
 - Death after myocardial infarction
 - Sudden cardiac death
- Ischemic stroke
- Intracerebral hemorrhage
- Chronic renal insufficiency/end-stage renal disease
- Blindness
- Erectile dysfunction
- Acute, life-threatening emergency
- The higher the blood pressure, the more likely the complications from it.

Benefits of Treatment

- In clinical trials, anti-hypertensive therapy has been associated with mean reductions of:
 - 35 to 40% in stroke incidence
 - 20 to 25% of myocardial infarctions
 - >50% percent of heart failure
- It is estimated that control of HTN to below 140/90 mmHg could prevent:
 - 19% of CHD events in men
 - 31% of CHD events in women
- Optimal control of BP to below 130/80 mmHg could prevent:
 - 37% of CHD events in men
 - 56% of CHD events in women
- Treating Stage 1 HTN can prevent 1 death for every 11 patients treated.

Ageing

- SBP is a greater predictor of risk of heart disease than DBP in patients over the age of 50.
- Most patients over 65 years old have isolated systolic HTN.
- Because they start at such higher overall cardiovascular risk, short term reductions in BP in elderly patients provide greater benefits than those observed in younger patients.

Initial Treatment

- Usually begins with nonpharmacologic therapy, including:
 - Moderate dietary sodium restriction
 - 2-14 mmHg reduction in BP
 - Weight reduction in the obese
 - 5-20 mmHg reduction per 10 kg loss
 - Avoidance of excess alcohol intake
 - 2-4 mmHg reduction in BP
 - Regular aerobic exercise
 - 4-9 mmHg reduction in BP

Drug Treatment

- For initial therapy in uncomplicated HTN, a low-dose thiazide diuretic is recommended unless there is a specific indication for a drug from another class.
- If low-dose thiazide monotherapy fails to attain goal BP in patients with uncomplicated HTN, other medications can be sequentially added or substituted:
 - Angiotensive converting enzyme inhibitor (ACEI)
 - Angiotensin II receptor blocker (ARB)
 - Beta blocker
 - Calcium channel blocker
- Most patients will require more than one agent to adequately control their HTN.

Inadequate Treatment

- Poor control of HTN is defined as failure to meet recommended BP goals.
- Barriers to controlling HTN include patient factors (e.g. non-adherence to medications) and healthcare provider factors (e.g. the environment where care is delivered).
- Quality improvement measures have focused increasing attention on provider factors, particularly “therapeutic inertia:”
 - The failure to start new drugs or increase the dose in patients with an abnormal clinical measurement.

Evidence

- Observational studies in the U.S. have found that therapeutic inertia is common in HTN, DM, and hypercholesterolemia.
- Therapeutic inertia is associated with poor control of risk factors that cause long term health problems.

Evidence

- Data from the 2003-04 NHANES showed that only 1/3 to 1/2 of patients with HTN reached BP goals.
- The rate would be even lower if the study had applied recent recommendations by the JNC 7 to reduce BP to less than 130/80 in high risk patients.
- This study is evidence of the gap between treatment guidelines and actual practice.

Evidence

- A recent large US study showed that a third of patients with persistent BP \geq 160/100 mmHg had no change in treatment or spontaneous return to lower BP over six months.
- A landmark randomized trial, The hypertension detection and follow-up program, showed that an explicit program of treatment intensification produces substantial lowering of BP and reduces all cause mortality.

SDC Case 1

- 62 yo WF w/ h/o anxiety and HTN presents with left breast and arm pain, which has been present for the past couple of months, but has not gotten better or worse.
- Meds: Lotrel 5/20 mg qday, Xanax 0.25 mg bid prn, Tylenol 500 mg qday.
- VS: BP: 187/94, P 77, O2 sat 98% RA

SDC Case 2

- 34 yo WF w/ HTN, depression, and anxiety presents with a 4 day h/o vaginal discharge.
- Meds: HCTZ 25 mg qd, Ambien 5 mg qhs prn, Clonazepam 0.5 mg bid prn.
- VS: Wt. 57.4 kg, BMI 19.5, BP 155/95, P 64, O2 sat 97% RA

Case 3

- 39 yo WF w/ h/o palpitations, HTN, and stress incontinence presents for recent proteinuria in the setting of a UTI.
- Meds: None
- VS: BP 146/96, P 77, T 36.9

CQI Model for Improvement

Fundamental Questions for Improvement

What are we trying to accomplish?

■ Aim

How will we know that changes are an improvement?

■ Measures

What changes can we make that will result in an improvement?

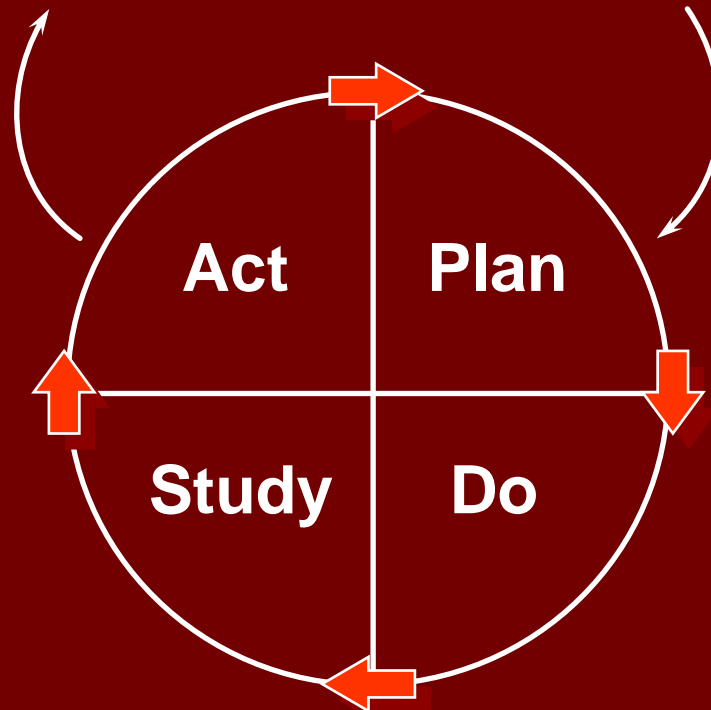
■ Changes/Evidence-based strategies

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?



PDSA: Plan-Do-Study-Act Cycles for Testing Change

■ Plan

- What's your aim for this cycle?
- Predictions/Hypothesis
- Develop your plan to test the change:
Who? What? When? Where?
- What will your measures be?

■ Do

- Perform your test/change
- Collect data

PDSA: Plan-Do-Study-Act Cycles for Testing Change

■ Study:

- Analyze your data (quantitative and qualitative).
- Did the results fit your predictions?
- Did you encounter problems?
- What did you learn?

■ Act:

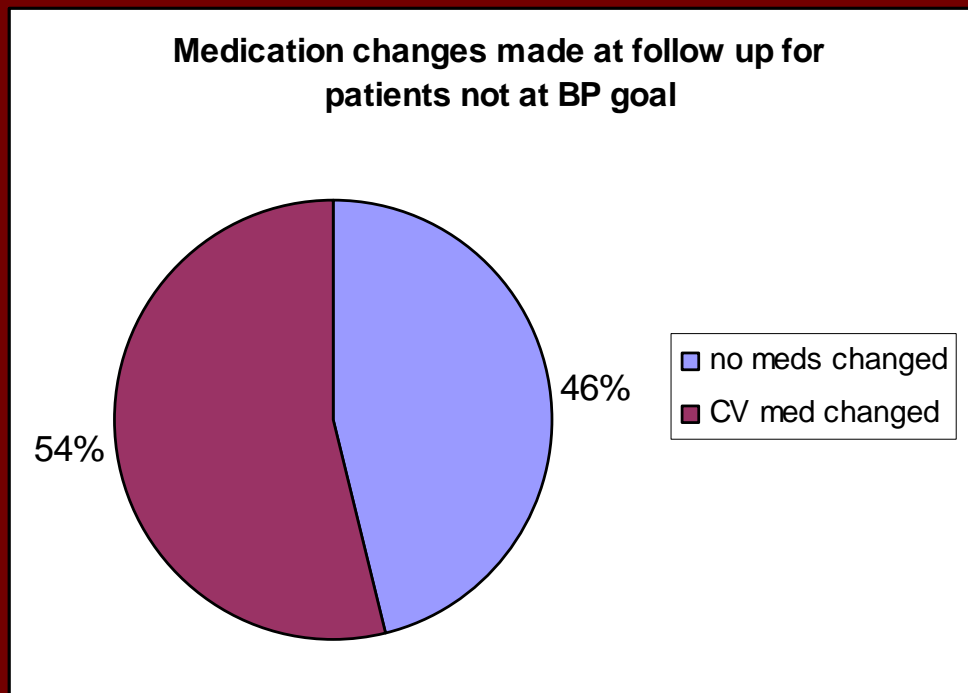
- Should you expand size/scope of test or are you ready to implement the change?
- If not, what changes are needed for next PDSA cycle.

Plan: Objective

- To identify common reasons that patients with uncontrolled hypertension do not receive medication intervention in Same Day Clinic (SDC).

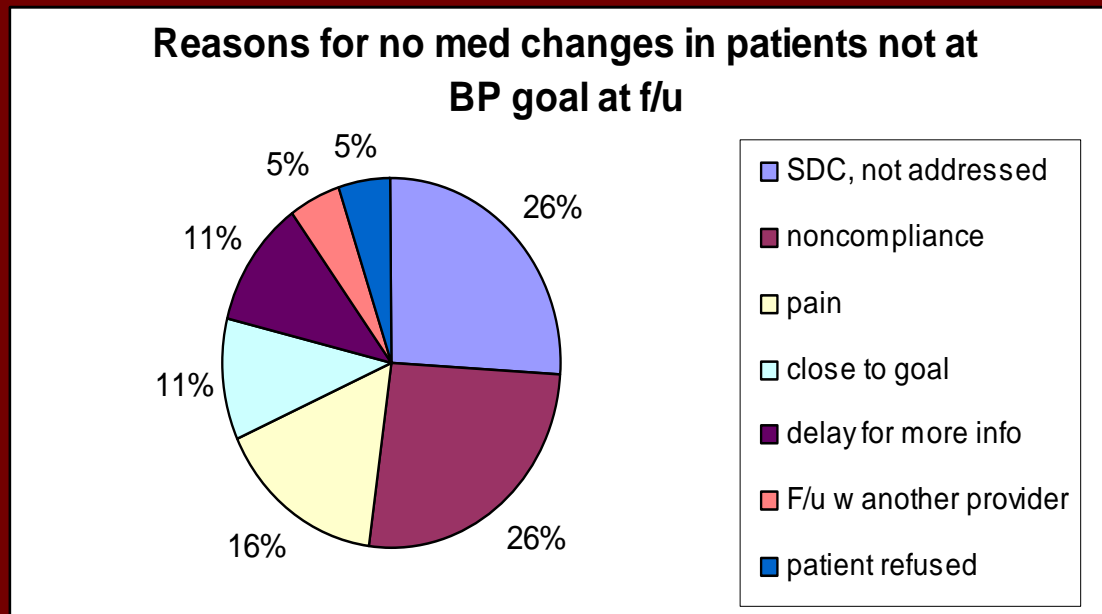
Background

- Control of HTN by residents has previously been evaluated.
- The Resident Hypertension CQI Review of 2006-2007 found that 19 of 41 patients (46%) with blood pressure (BP) readings above goal at follow-up visits for HTN did not receive a medication intervention to improve their BP control.



Background

- It was found that one of the leading causes for which no medical intervention was made in patients with BP above goal was that patients were seen in SDC and did not have their BP addressed.



Questions to Address

- 1. What percentage of patients seen in SDC with uncontrolled HTN receive a medication intervention?
- 2. What are the common reasons that uncontrolled HTN is not treated in SDC?
- 3. What changes can we make to increase the percentage of patients with uncontrolled HTN seen in SDC whose BP is addressed and appropriately treated to improve BP control?

Predictions

- Following our intervention, resident and attending physicians will become more aware of uncontrolled HTN and the need to treat it in patients seen in SDC.
- We predict that in the next phase of the project, the percentage of patients with $SBP \geq 160$ and/or $DBP \geq 95$ in SDC who receive appropriate medication intervention for elevated BP will increase.

Plan for Test

- **Who:** Patients seen in the SDC.
- **What:** Perform a chart review of SDC patients to see if those with uncontrolled HTN, defined as SBP \geq 160 and/or DBP \geq 95, receive a medication intervention intended to improve BP control.
- **When:** From 10/30/07 through 11/30/07.
- **How:** Identify common reasons for not intervening on uncontrolled HTN. Then, develop a plan to address uncontrolled HTN in patients seen in SDC with the objective of increasing the percentage of those receiving appropriate medication treatment.
- **Where:** ACC Internal Medicine SDC.

Plan for Data Collection

- **Who:** Jennifer Pagliei, MD, PGY-3 (project leader), Nicole Twiddy, RN, Annie Whitney, MS, Robb Malone, Pharm. D, CPP
- **What:** Chart review to determine:
 - 1. If uncontrolled HTN, defined as SBP \geq 160 and/or DBP \geq 95, was addressed at visit.
 - 2. If addressed, did the physician recommend titration of existing BP medications or addition of a new BP medication if adherence to current BP medications was confirmed?
 - 3. If BP medications were not titrated or added, did the physician cite a reason (e.g. pain) for not intervening to improve BP control?
 - 4. Did the physician insure appropriate follow-up for patients in whom a medication intervention was not made?
- **When:** From 10/30/07 through 11/30/07.
- **How:** Review SDC notes in patients with uncontrolled HTN.
- **How long:** One month.

Do: Carry out the Test

- Every patient seen in SDC during the study period from 10/30/07 through 11/30/07 had their BP recorded.
- Everyday, patients with $SBP \geq 160$ or $DBP \geq 95$ were identified.
- A chart review of these patients' was then performed to evaluate whether the physician seeing the patient addressed their elevated BP and whether they performed a medication intervention on it.

Collect Data

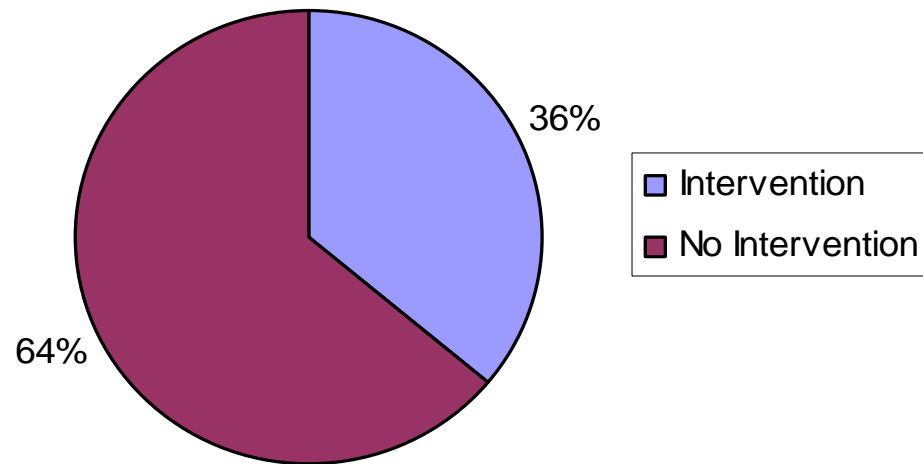
- BP data was easily acquired through the physician work room sign up sheet and HTN log in SDC.
- Assessment of intervention was more time-consuming and required review of SDC notes to determine:
 - (1.) Whether HTN had been identified as uncontrolled.
 - (2.) Whether a BP medication had been titrated or added.
 - (3.) What reasons were given for not titrating or adding a BP medication.

Study: Analyze Data

- During the time period from 10/30/07 to 11/30/07, there were 87 patients identified in SDC who had $SBP \geq 160$ and/or $DBP \geq 95$.
- Over 22 days this averaged to nearly 4 patients per day who met study entry criteria.
- Chart review showed that 31 of the patients (36%), received a medication intervention to improve their BP, while 56 (64%) did not.

Medication Intervention

Medical Intervention of Elevated BP in SDC

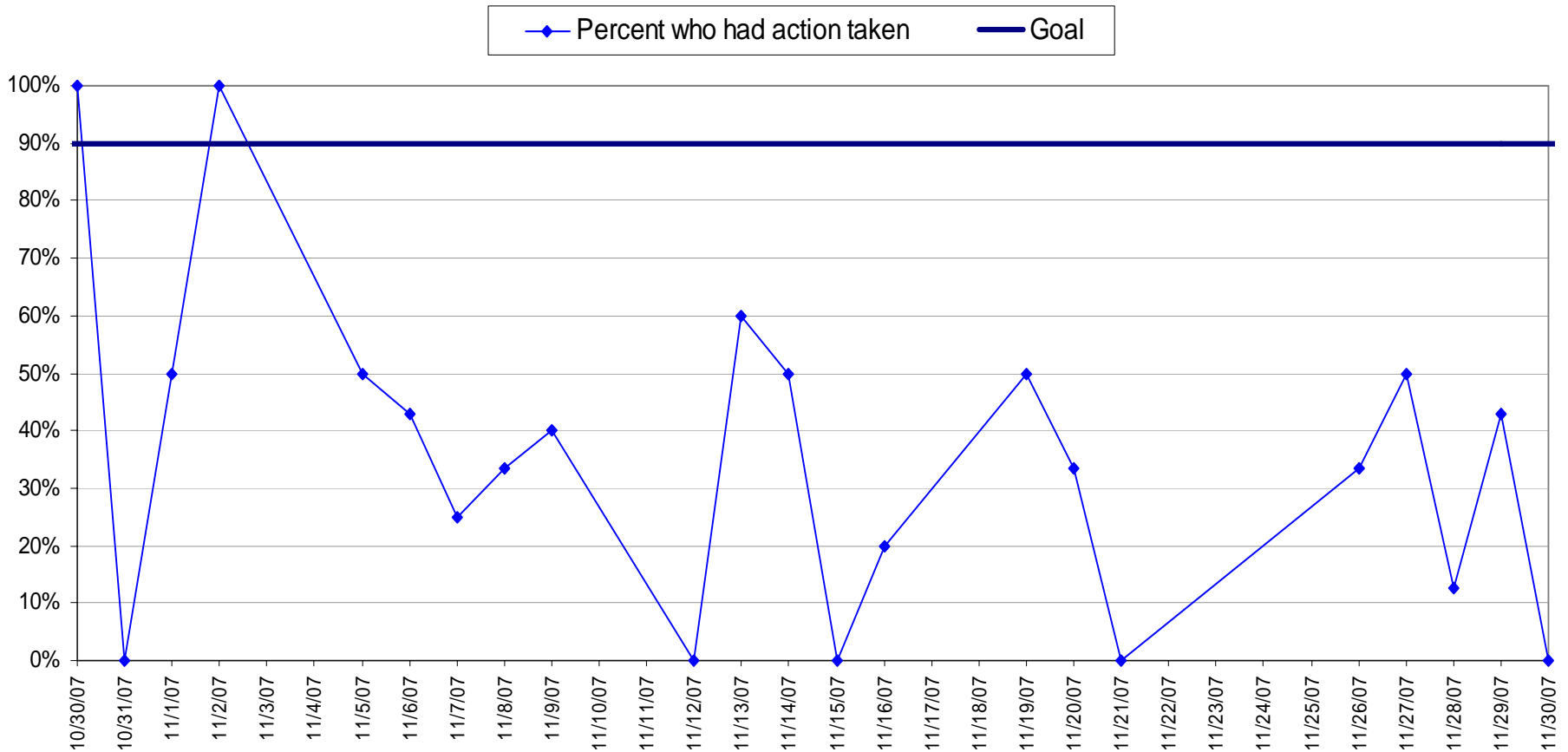


Findings

- There was substantial daily variation in the percentage of patients receiving BP medication intervention.
- It exceeded 50% on only three of the 22 days studied and 90% on only two of the 22 days studied.

Daily Percentage of Patients Receiving Medication Intervention

Percent with Elevated BP and Action Taken

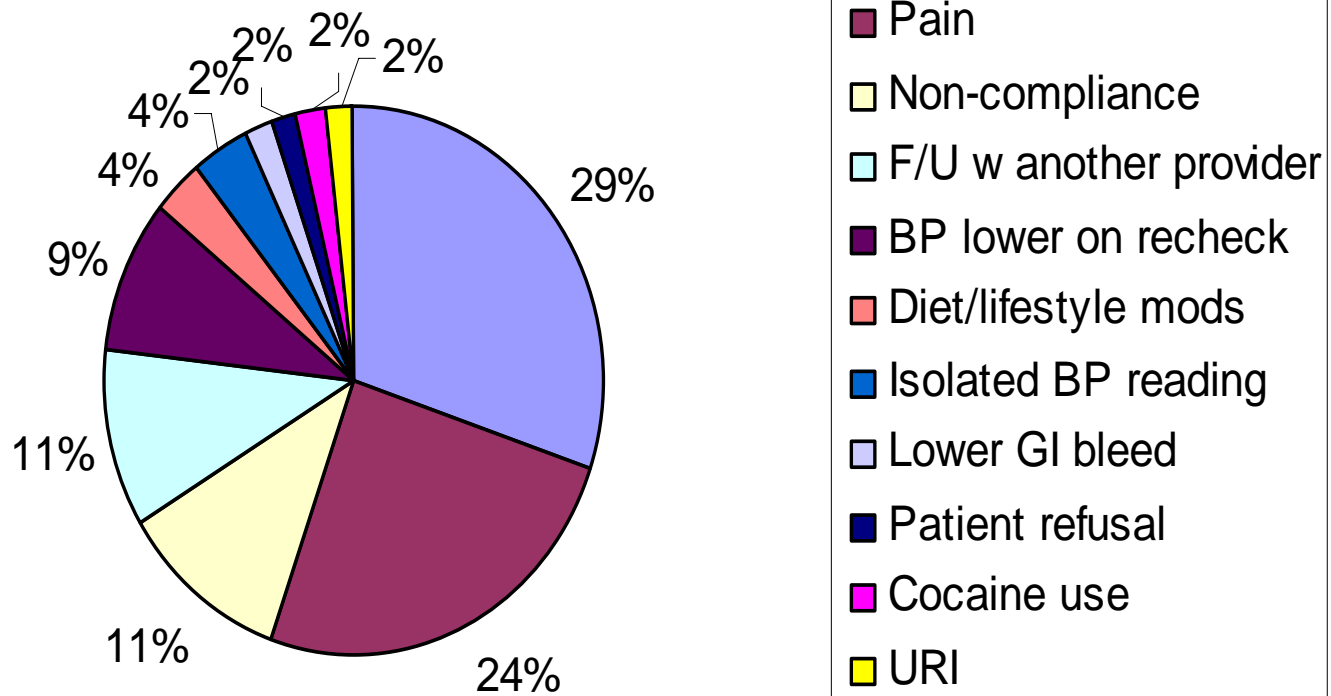


Findings

- Several reasons were identified for non-intervention in the 56 patients (64%) who did not have a BP medication titrated or added despite uncontrolled HTN.
- The reasons included pain, patient non-compliance, “follow-up” with another provider, a decrease in BP on recheck, recommendation of diet and lifestyle changes, an anomalous/isolated elevated BP reading, patient refusal to alter medications, cocaine use, lower GI bleed, and URI.
- Most commonly, though, the elevated BP was not addressed at all by the physician seeing the patient (29% of cases).

Reasons for lack of Medication Intervention

Reasons for no medical intervention of elevated blood pressure



“Follow-up”

- “Follow-up” with the patient’s PCP or another provider is often cited as a reason for not performing a medication intervention on a patient’s BP (11%).
- However, in the six patients who were told to follow-up with their primary care physician or another provider for their elevated BP, only 2 of them had an appointment scheduled.

Act: Document what was Learned

- Based on an assessment of the initial patient population, it is apparent that data collection through chart reviews is a valuable practice.
- Only 34% of the patients identified in SDC as having uncontrolled HTN based on our criteria had a medication intervention performed by the physician seeing them.
- There is a large percentage of patients being seen in SDC with significantly elevated BP on whom opportunities for medication intervention are being missed.
- Thus, there is significant room for improvement in BP management by physicians seeing patients in the SDC.

Changes for Next Cycle

- We need to increase awareness of HTN by physicians in SDC.
- We have created an algorithm for physicians to use to aide them in managing uncontrolled HTN in patients seen in SDC.
- We plan to educate the physicians seeing patients in SDC to make a routine practice of using this algorithm on all patients that are identified as having uncontrolled HTN according to our criteria.

Goals

- Based on the findings of our initial intervention, our goal is to increase awareness of HTN in SDC.
- We want to increase the percentage of patients identified as having uncontrolled HTN on whom a medication intervention is performed by a physician to over 75%.

Pitfalls

- Does the concept of “follow-up” equate euphemistically with “fall through the cracks (or chasm)” of continuity (Dr. Chelminski).
- Should our study inclusion criteria be changed to meet the JNC 7 criteria for stage 2 HTN, which is classified as $SBP \geq 160$ and/or $DBP \geq 100$ so that patients with isolated diastolic HTN are more readily identified and treated.

Return to Cases

- Case 1: 62 yo WF w/ anxiety and HTN who presented with left breast and arm pain for months and a BP of 187/94 on lotrel.
 - “HTN – BP elevated today. Currently in pain and already being followed by a PCP for this. So will make no changes today.”
 - Of note, BP at visit one month prior was 185/95.
- Case 2: 34 yo WF w/ depression, anxiety, and HTN who presented with a 4 day h/o vaginal discharge and BP of 155/95 on HCTZ.
 - No mention of HTN.
- Case 3: 39 yo WF w/ h/o palpitations, HTN, and stress incontinence who presented for recent proteinuria in the setting of a UTI with BP of 146/96 on no meds.
 - “HTN – BP elevated today. Patient to return to clinic in 3 months for recheck of BP.”
 - No follow-up appointment was made.

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