Quality Assurance Project: Managing Hypertension

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High blood pressure is a major cause of morbidity and mortality in America. It is known that hypertension is a serious risk factor for cardiovascular disease events such as heart attack, stroke, heart failure, and kidney disease. It is the primary care practitioner who is entrusted to diagnose, treat and manage hypertension. Hypertension affects about 63.3 million adults in the United States, according to recent estimates from the National Health and Nutrition Examination Survey (NHANES) 1999-2002 data (Holland et al., 2008). This means that in the U.S., one in every four adults has hypertension. In their seventh report, the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC) (2003) has defined hypertension as a blood pressure of greater than 140/90 mmHg, or greater than 130/80 mmHg for people with diabetes mellitus, chronic kidney disease, heart failure or coronary artery disease. Individuals with a systolic blood pressure or 120-139 mmHg or a diastolic blood pressure of 80-89 mmHg are considered to have pre-hypertension (JNC, 2003). Another one-fourth of the population is estimated to be in this category (Rosendorff et al., 2007). Ultimately, this means that one-half of America's adults are in need of blood pressure management; this falls in the hands of the primary care practitioner.

One of the objectives of Healthy People 2010 is to increase the proportion of adults with high blood pressure whose blood pressure is controlled to 50% (U.S. Department of Health and Human Services, 2000). According to NHANES (Ostchega, Yoon, Hughes, & Louis, 2008), 64% of people who were taking anti-hypertensive medications had controlled blood pressures (measured as a systolic blood pressure below 140 mmHg and a diastolic blood pressure below 90 mmHg). These statistics indicate improvement; however, hypertension remains a public health concern in America.

The National Heart, Lung, and Blood Institute (NHLBI) coordinates the National High Blood Pressure Education Program (NHBPEP). An important function of the NHBPEP is to issue guidelines to increase awareness, prevention, treatment and control of hypertension. After the release of the JNC 6 guidelines in 1997, many large-scale clinical trials were published. This fact, along with the realization that clear guidelines were needed, prompted the appointment of the JNC 7 committee (Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [JNC], 2003). These updated recommendations were the result of a review of the relevant literature published from January 1997 through April 2003 (JNC, 2003). The JNC 7 report was reviewed by 33 national hypertension leaders and was approved by the NHBPEP (JNC, 2003). The JNC 7 report provides guidelines for the diagnosis, treatment, and management of hypertension. These recommendations were adapted for the standards of this quality assurance project in a family practice setting. This project focuses on the management of hypertension in previously diagnosed patients.

The goal of antihypertensive treatment is to reduce the risk of cardiovascular disease events. The target is to achieve a blood pressure below 140/90 mmHg, or less than 130/80 mmHg for patients with diabetes mellitus or chronic kidney disease. This blood pressure goal was adopted for this quality assurance project. In people ages 40 to 70 years, for each increment of 20 mmHg in systolic blood pressure or 10 mmHg in diastolic blood pressure, the risk of cardiovascular disease doubles ("Age-specific relevance of usual blood pressure", 2002). Clinical trials indicate that antihypertensive therapy has lowered the incidence of stroke by 35 to 40 percent, myocardial infarction by 20 to 25 percent and heart failure by more than 50 percent (Neal, MacMahon, & Chapman, 2000). In light of these findings, it is important that the practitioner adjusts treatment regimens in order to maintain a blood pressure at or below goal.

Most hypertensive patients require two or more antihypertensive medications to achieve a blood pressure at or below goal (JNC, 2003). This quality assurance project looks to identify whether medication regimens are adjusted if blood pressure is not controlled.

The JNC 7 (2003) recommends lifestyle modifications as a treatment of hypertension. Weight reduction should be addressed if a patient's BMI is above 25 kg/m^2. Obesity is can lead to obstructive sleep apnea which can be a causative factor of hypertension (Sarafidis & Bakris, 2008). In addition to high blood pressure, obesity is also associated with diabetes and hyperlipidemia, other risk factors for cardiovascular disease (Sarafidis & Bakris). For each decrease in weight by 22 pounds, the systolic blood pressure can decrease 5 to 20 mmHg (JNC, 2003). Physical activity consisting of aerobic exercise at least 30 minutes per day most days of the week should be encouraged. Increasing physical activity can reduce systolic blood pressure by 4 to 9 mmHg (JNC, 2003). Patients should be educated on the Dietary Approaches to Stop Hypertension (DASH) eating plan which is high in fruits and vegetables and low-fat dairy products as well as low saturated and total fat. Adoption of a DASH diet can decrease systolic blood pressure by 8 to 14 mmHg (JNC, 2003). Dietary sodium reduction should be stressed; the resultant reduction of systolic blood pressure is shown to be 2 to 8 mmHg (JNC, 2003). Patients should be informed of the importance of moderating alcohol consumption; two drinks per day for men and one drink per day for women. Moderating alcohol can reduce systolic blood pressure by 2 to 4 mmHg (JNC, 2003). Smoking cessation should also be stressed. It is imperative that the primary care provider discuss lifestyle modifications with hypertensive patients at each visit and this recommendation was included in this quality assurance project.

The JNC 7 guidelines (2003) recommend identifying other cardiovascular risk factors. These include dyslipidemia, diabetes mellitus, and renal insufficiency. It is also recommended

that the serum potassium and creatinine is monitored one to two times per year. This quality assurance project includes investigating if providers are ordering and assessing laboratory testing that includes a fasting lipid profile and basic metabolic panel.

Physical examination aims to identify the presence or absence of end organ damage. The recommendations of the JNC 7 (2003) include: examination of the optic fundi, auscultation for carotid, abdominal and femoral bruits, palpation of the thyroid gland, cardiac and respiratory assessments, abdominal examination for enlarged kidneys, masses and abnormal aortic pulsations, and palpation of lower extremities for edema and pulses. These assessment standards were included in this quality assurance project.

The JNC 7 guidelines identify compelling indications which, if present, require certain antihypertensive drug classes for management. This quality assurance project focuses on four main comorbidities: ischemic heart disease, heart failure and diabetes mellitus and chronic kidney disease. The first drug of choice for patients with stable angina pectoris is a beta blocker (BB), or a long acting calcium channel blocker can be used (JNC, 2003). For patients with unstable angina or a myocardial infarction (MI), a BB and an angiotensin converting enzyme inhibitor (ACE-I) should be used. For these patients with ischemic heart disease, low-dose aspirin (ASA) therapy is also recommended. The JNC 7 recommends that patients with heart failure be prescribed a BB and an ACE-I. Patients with diabetes and/or chronic kidney disease are recommended to receive an ACE-I or an ARB, as these have been shown to slow the progression of diabetic nephropathy and renal function deterioration and to reduce albuminuria (JNC).

Patients with hypertension should be followed up every month until target blood pressure goals are met, then every 3 to 6 months depending on comorbid conditions. These guidelines from the JNC 7 have been included in this quality assurance project.

Charts were selected for this quality assurance project in a family practice setting through a computerized search of ICD-9 codes. The ICD-9 code for hypertension was utilized to search for patients seen in the office over the previous 2 month interval. Ages ranged from 52 to 84 years. This provided a recent cross section of patients receiving care from various providers. Providers in this primary care setting consist of one physician and two nurse practitioners.

As a result of this audit, several recommendations are made for the practice. Of the charts that were audited, inadequate blood pressure control was found in 42% of the patients diagnosed with hypertension. Of these patients with uncontrolled hypertension, in only 40% of the cases was the medication regimen adjusted. The chart audit did identify that all patients with blood pressure readings above goal were scheduled for follow-up within one month. This chart audit did not identify if medications were adjusted at this follow-up visit if blood pressure readings remained above goal. A recommendation for the practice would be to perform of chart audit looking specifically at blood pressure management at the one month follow-up visit. Provider inertia is a well-documented problem with hypertension management (Sarafidis & Bakris, 2008). It is recommended that the practitioners adjust antihypertensive therapy to bring patient's blood pressure readings to at or below goal. A recommendation to achieve this outcome is to encourage providers to review the JNC 7 guidelines.

Body mass index was only documented in 50% of the audited charts. Of those in which BMI was documented and found to be above 25 kg/m^2, none had documentation regarding discussion of weight reduction. It is recommended that each patient's weight is measured with

each visit related to this chronic condition. This practice utilizes computerized charting, so BMI can automatically be calculated from the height and weight and placed in the chart. It is evident that increased weight can elevate blood pressure, as well as increase the risk of developing other disease processes. The benefits of weight reduction as it relates to the decrease of cardiovascular event risk should be discussed with patients and this education should be documented. The charting template used for hypertension follow up visits could be amended to include the documentation of this education in the plan.

Alcohol consumption and smoking cessation are the two lifestyle modification changes that are not being consistently addressed with each patient; 83% of charts did not include evidence of a discussion of alcohol moderation and 25% did not include evidence smoking cessation/avoidance education. The chart audit did not differentiate between those patients who admit to tobacco and alcohol use and those who do not. It is possible that the providers only discuss these lifestyle modifications in those patients who already use tobacco and/or drink alcohol. Regardless, the JNC 7 recommends discussing these lifestyle modifications with all patients. A possible solution to this problem would be to create a patient handout that discusses these lifestyle modifications to give to and discuss with each hypertensive patient during a routine visit. The charting template used for hypertension follow up visits could be amended to include the documentation of this education in the plan.

Overall, the chart audit indicates that this practice is properly managing the majority of patients with hypertension according to the JNC 7 guidelines. A particular strength of this practice is the pharmacologic management of the patient with compelling indications. Initiating the above recommendations and performing another chart audit in one year will evaluate the effectiveness of the recommended interventions.

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Management of Hypertension						
Standards	1	2	3	4	5	6
BP at goal? (<140/90 mmHg, or <130/80 if appropriate)						
○ If BP not at goal, was medication regimen adjusted?						
Documentation of BMI						
○ If BMI >25, documentation of discussing importance of weight reduction						
Documentation of patient education of lifestyle modification:						
• Diet						
• Exercise						
• ETOH						
• Smoking cessation/avoidance						
Labs ordered and assessed within the past 12 months						
• Basic Metabolic Panel						
• Fasting lipid profile						
Physical assessment						
• Optic fundi						
• Carotid, abdominal, femoral bruits						
• Palpation of thyroid gland						
• Respiratory						
• Cardiac						
• Lower extremity edema and pulses						
Pharmacologic management of patients with compelling indications: (if not otherwise contraindicated)						
• Angina with Beta blocker or calcium channel blocker and low-dose ASA						
• Unstable angina or myocardial infarction treated with Beta blocker and ACE-I and low dose ASA						
• HF treated with BB and ACE-I						
• Diabetes and/or CKD treated with ACE-I or ARB						
Is follow-up scheduled:						
• One month if BP not at target						
• 3-6 months if BP is at target						

Management of Hypertension						
Standards	1	2	3	4	5	6
BP at goal? (<140/90 mmHg, or <130/80 if appropriate)	Y	N	Y	Y	Y	N
○ If BP not at goal, was medication regimen adjusted?	n/a	Y	n/a	n/a	n/a	N
Documentation of BMI	Y	N	Y	Y	N	N
○ If BMI >25, documentation of discussing importance of weight reduction	n/a	n/a	N	N	n/a	n/a
Documentation of patient education of lifestyle modification:						
• Diet	Y	Y	Y	Y	Y	Y
• Exercise	Y	Y	Y	Y	Y	Y
• ETOH	N	N	N	N	N	N
• Smoking cessation/avoidance	Y	N	N	Y	Y	Y
Labs ordered and assessed within the past 12 months						
• Basic Metabolic Panel	Y	Y	Y	Y	Y	Y
• Fasting lipid profile	Y	Y	Y	Y	Y	Y
Physical assessment						
• Optic fundi	Y	Y	Y	Y	Y	Y
• Carotid, abdominal, femoral bruits	Y	Y	Y	Y	Y	Y
• Palpation of thyroid gland	Y	Y	Y	Y	Y	Y
• Respiratory	Y	Y	Y	Y	Y	Y
• Cardiac	Y	Y	Y	Y	Y	Y
• Lower extremity edema and pulses	Y	Y	Y	Y	Y	Y
Pharmacologic management of patients with compelling indications: (if not otherwise contraindicated)						
• Angina with Beta blocker or calcium channel blocker and low-dose ASA	Y	n/a	n/a	n/a	Y	n/a
• Unstable angina or myocardial infarction treated with Beta blocker and ACE-I and low dose ASA	n/a	Y	Y	n/a	n/a	Y
• HF treated with BB and ACE-I	n/a	Y	n/a	n/a	n/a	Y
• Diabetes and/or CKD treated with ACE-I or ARB	Y	Y	n/a	Y	n/a	Y
Is follow-up scheduled:						
• One month if BP not at target	n/a	Y	n/a	n/a	n/a	Y
• 3-6 months if BP is at target	Y	n/a	Y	Y	Y	n/a

Management of Hypertension						
Standards	7	8	9	10	11	12
BP at goal? (<140/90 mmHg, or <130/80 if appropriate)	N	N	Y	Y	Y	N
○ If BP not at goal, was medication regimen adjusted?	Y	Y	n/a	n/a	n/a	N
Documentation of BMI	Y	N	Y	Y	N	N
○ If BMI >25, documentation of discussing importance of weight reduction	N	n/a	n/a	N	n/a	n/a
Documentation of patient education of lifestyle modification:						
• Diet	Y	Y	Y	Y	Y	Y
• Exercise	Y	Y	Y	Y	Y	Y
• ETOH	N	Y	N	Y	N	N
• Smoking cessation/avoidance	Y	Y	N	Y	Y	Y
Labs ordered and assessed within the past 12 months						
• Basic Metabolic Panel	Y	Y	Y	Y	Y	Y
• Fasting lipid profile	Y	Y	Y	Y	Y	Y
Physical assessment						
• Optic fundi	Y	Y	Y	Y	Y	Y
• Carotid, abdominal, femoral bruits	Y	Y	Y	Y	Y	Y
• Palpation of thyroid gland	Y	Y	Y	Y	Y	Y
• Respiratory	Y	Y	Y	Y	Y	Y
• Cardiac	Y	Y	Y	Y	Y	Y
• Lower extremity edema and pulses	Y	Y	Y	Y	Y	Y
Pharmacologic management of patients with compelling indications: (if not otherwise contraindicated)						
• Angina with Beta blocker or calcium channel blocker and low-dose ASA	n/a	Y	n/a	n/a	n/a	n/a
• Unstable angina or myocardial infarction treated with Beta blocker and ACE-I and low dose ASA	n/a	n/a	Y	Y	n/a	Y
• HF treated with BB and ACE-I	n/a	n/a	y	n/a	n/a	n/a
• Diabetes and/or CKD treated with ACE-I or ARB	Y	n/a	Y	n/a	Y	Y
Is follow-up scheduled:						
• One month if BP not at target	Y	Y	n/a	n/a	n/a	Y
• 3-6 months if BP is at target	n/a	n/a	Y	Y	Y	n/a

Management of Hypertension		
Standards	% Documented/Met	% Not Documented/Not met
BP at goal? (<140/90 mmHg, or <130/80 if appropriate)	58	42
○ If BP not at goal, was medication regimen adjusted?	60	40
Documentation of BMI	50	50
○ If BMI >25, documentation of discussing importance of weight reduction	0	100
Documentation of patient education of lifestyle modification:		
• Diet	100	0
• Exercise	100	0
• ETOH	17	83
• Smoking cessation/avoidance	75	25
Labs ordered and assessed within the past 12 months		
• Basic Metabolic Panel	100	0
• Fasting lipid profile	100	0
Physical assessment		
• Optic fundi	100	0
• Carotid, abdominal, femoral bruits	100	0
• Palpation of thyroid gland	100	0
• Respiratory	100	0
• Cardiac	100	0
• Lower extremity edema and pulses	100	0
Pharmacologic management of patients with compelling indications: (if not otherwise contraindicated)		
• Angina with Beta blocker or calcium channel blocker and low-dose ASA	100	0
• Unstable angina or myocardial infarction treated with Beta blocker and ACE-I and low dose ASA	100	0
• HF treated with BB and ACE-I	100	0
• Diabetes and/or CKD treated with ACE-I or ARB	100	0
Is follow-up scheduled:		
• One month if BP not at target	100	0
• 3-6 months if BP is at target	100	0