Prevalence, Treatment, and Control of Chest Pain Syndromes and Associated Risk Factors in Hypertensive Patients

Katharine H. Hendrix, Susan Mayhan, Daniel T. Lackland, and Brent M. Egan

Background: Prevalence of chest pain syndromes (CPS)—chest pain, angina pectoris, chronic angina, and pre-infarction angina/intermediate coronary syndrome (ICS)—among hypertensive patients and medical management of these disorders in primary care are not well defined.

Methods: The Hypertension Initiative primary care database with 72,508 hypertensives was analyzed to characterize prevalence and management of CPS. Patients with more than one CPS were categorized by the most severe diagnosis.

Results: Eleven percent of hypertensives had a CPS. Of these patients, 66% (5284) were diagnosed with chest pain only, 15% (1204) with angina, and 19% (1508) with ICS. More men than women were diagnosed with angina (18% *v* 4%) and ICS (21% *v* 10%). More women than men were diagnosed with chest pain only (86% *v* 61%). African Americans received more chest pain diagnoses (71% *v* 62%), similar angina diagnoses (14% *v* 16%), and slightly fewer ICS diagnoses (15% *v* 22%) than whites. Most striking, women and African Americans with CPS received fewer medications than men and whites, both overall and within diagnostic categories. Prescription rates differed more by gender (male/female) than by ethnic group (white/African American) for angiotensin-converting enzyme inhibitor, diuretics, aspirin, statins, and nitrates. Hypertensives with CPS received more medications and achieved better risk factor control than non-CPS hypertensives, but the majority remained above goal levels.

Conclusions: Primary care physicians treat cardiovascular risk factors relatively aggressively in hypertensives with CPS. However, substantial numbers of these patients do not reach goal levels. Demographic differences in treatment represent opportunities to reduce disparities. Am J Hypertens 2005;18:1026–1032 © 2005 American Journal of Hypertension, Ltd.

Key Words: Hypertension, chest pain, cardiovascular risk, disparity.

Coronary heart disease is the single leading cause of death in both men and women in the United States.[1] Chronic angina is the most common manifestation of this disease and affects an estimated 6,800,000 American adults.[1] Although ~30% of patients with sudden onset angina experience spontaneous remission or become asymptomatic with treatment, 7% have a nonfatal myocardial infarction (MI) in the first year and 4% die.[2] Patients with chronic angina, compared to an age-matched cohort, are at threefold increased risk of developing unstable angina, MI, or sudden cardiac death within 2 years of presentation.[3,4] Even with standard therapy, patients experience an average of two episodes of chest pain per week and 62% describe their quality of life as fair or poor.[5]

Studies find demographic differences in the diagnosis and treatment of patients with coronary heart disease.[2, 6–10] One study found ethnicity and gender influence how primary care physicians manage chest pain patients with African Americans and women receiving the fewest treatments and interventions.[11] Although angina is reportedly more common in women than men (4.3% *v* 2.7%),[1,11,12] chest pain among women may not be fully investigated leaving their angina undiagnosed for longer periods.[2,11]

Case identification in primary care is generally difficult as, after examination, many patients presenting with chest pain do not meet diagnostic criteria for ischemic heart disease.[13,14] Failure to adequately diagnose angina among women is particularly alarming, as chest pain more often precedes MI in women than in men and the fatality rate for acute MI in women is greater than in men (32% *v* 27%).[2,11,15]

Recent data from the prospective, randomized, multicenter Trial of Invasive Versus Medical Therapy in Elderly patients found significantly worse outcomes among women than men with chronic angina.[16] In the 6-month outcome period, more women experienced MI than men (11% *v* 7%) and both death from all causes and death from MI were higher in women than in men (9.9% *v* 3.5% and 19% *v* 9%).[16] This study also found that antiangina therapy in patients ≥75 years old was similarly effective for reducing chest pain and improving quality of life in men and women.[16]

Most previous studies have focused only on patients with angina (angina pectoris or chronic angina). This research included other chest pain syndrome (CPS) diagnoses such as chest pain and acute coronary syndrome. These broader criteria capture a larger patient pool, possibly more accurately representing patients at high risk for adverse cardiovascular events. Because some chest pain diagnoses do not arise from cardiovascular causes, patients within each diagnostic category are compared by gender and ethnicity to illuminate differences in treatment and cardiovascular risk factor control by diagnostic group.

The prevalence and primary care management of CPS (ie, chest pain, angina pectoris, chronic angina, and intermediate coronary syndrome [ICS] or preinfarction angina) among hypertensive patients is not well studied. The purpose of the current study is to address this gap in the literature and to examine the potential impact of demographic factors on cardiovascular risk factor treatment and control.

Methods
Primary Care Sites

At the time of this study, the Hypertension Initiative database contained information on 72,508 patients with high blood pressure (BP) receiving health care at ~50 primary care practices from more than 200 providers in the Southeastern United States.[17,18] Records were entered into the database through electronic medical record (EMR) download or, in sites without electronic medical record systems, by manual data entry of report cards completed at hypertensive patients' appointments (~20% of records in the dataset). No records from paper card entries were included in this analysis as detailed diagnosis data are not available from them. Patients with hypertension were identified upon download of each practice's EMR into the Hypertension Initiative database by computerized queries for ICD-9 diagnosis codes for hypertension and confirmed by searching text diagnosis fields and problem lists for terms such as hypertension, HTN, high blood pressure, and HBP.

All data monitoring and review procedures were approved by the Office for Research Protection and Integrity at the Medical University of South Carolina to ensure patient confidentiality safeguards were in place and that the study complied with the Health Insurance Portability and Accountability Act.

Study Population

The population of hypertensive patients with documented diagnoses of chest pain or angina (angina pectoris and chronic angina) or ICS (including preinfarction angina) was identified by querying the database for records with ICD-9 codes and for text/written diagnosis terms. For this study, patients were assigned to the "Chest Pain" group if a computerized search of their electronic medical record found: 1) one of three ICD-9 codes specific to chest pain (ie, 786.50, 786.51, 786.59); or 2) the more general ICD-9 code for chest pain (786.5) with cardiac origin, confirmed by a text field search.

Patients were assigned to the "Angina" group if a computerized search of their electronic medical record found one of four ICD-9 codes pertaining to angina (ie, 413, 413.0, 413.1, or 413.9). A confirmatory text field search for terms containing the word "angina" was also conducted. We note that although the three-digit code (413) is technically invalid, it does appear in "real-world" primary care records downloaded into the Hypertension Initiative database.

Finally, patients were assigned to the "ICS" group if a computerized search of their electronic medical record found ICD-9 code 411.1. A text field search was conducted for terms indicating severe, unstable, or progressively worsening angina represented by the ICS category including: acute coronary syndrome, unstable angina, preinfarction angina, and acute MI. Although "Intermediate Coronary Syndrome" is no longer used by cardiologists, for purposes of this study ICS was chosen to refer to an array of conditions representing greater cardiovascular compromise than garden-variety angina. Thus, patients at highest risk for serious events were included in the ICS category. The term acute coronary syndrome (ACS) was not used because this term carries more narrow diagnostic criteria than was intended for the category.

Patients with multiple diagnoses were categorized by the most severe (ie, ICS was more severe than angina, which was more severe than chest pain). For example, patients in the Chest Pain category had only a diagnosis of chest pain, whereas patients categorized as Angina had either been diagnosed with angina only or chest pain and angina.

Diabetes mellitus and dyslipidemia magnify cardiovascular risk and impact treatment and outcomes among hypertensive patients. Patients with these co-morbid conditions were analyzed for differences between those with