Knowledge of the epidemiology of cardiovascular disease (CVD) in hypertensive patients derives primarily from observation of populations composed largely of untreated subjects. Increasingly, however, individuals with elevated blood pressure are treated. An 18-year observational study of 8690 participants in a systematic hypertension control project reveals that cardiovascular events continue to be the principal morbid and mortal outcomes. Over time, the incidence of stroke and heart attack remained stable, whereas congestive heart failure (CHF), as a first event, increased tenfold after 10 years. Diabetes and evidence of vascular disease at entry predicted morbidity. Persisting cardiovascular morbidity in the face of satisfactory blood pressure control suggests the need for additional preventive intervention. Am J Hypertens 1998;11:874–876 © 1998 American Journal of Hypertension, Ltd.

KEY WORDS: Myocardial infarction, stroke, congestive heart failure, hypertensive patients.

The natural history of hypertension is well documented. However, that information is decreasingly relevant because most individuals with elevated pressures have been detected and, increasingly, are being treated and achieve blood pressure control. Thus, experience in treated patients, or clinical course, now provides more appropriate information. Happily, this widespread detection and intervention have been associated with a gratifying reduction in cardiovascular mortality. Nevertheless, throughout the world, myocardial infarction (MI) and stroke remain leading causes of morbidity and mortality.

Clinical trial data indicate that conventional antihypertensive therapy reduces stroke mortality almost exactly to the extent predicted by observational experience. The case with regard to MI is less satisfactory. At best, antihypertensive treatment in clinical trials has achieved only about half the reduction in coronary events predicted by epidemiologic data. Consistent with this data has been the evidence that MI, at least in the United States, is declining far less impressively than mortality. This suggests that the sharp drop in mortality may be due largely to better care for acute coronary disease than to prevention.

In contrast to long-term studies of hypertension, clinical trial data, which provide most information about the course of treated patients, is of the 4- to 5-year type. But therapy actually tends to begin in midlife and continue throughout life. Thus, clinical course is increasingly measured in decades rather than years. Not surprisingly, therefore, most data about the impact of long-term care on cardiovascular outcomes derive from observational studies.

MATERIALS AND METHODS

A systematic detection and treatment program serving union members and their spouses, established in 1973 in New York City, provided an opportunity to document the experience of treated patients. Participants were mostly uncomplicated patients with mild or moderate hypertension, treated according to a written
protocol. Drug therapy has generally followed JNC guidelines. Changing patterns of drug use have not affected blood pressure control, persistence in care, or consumption of clinical resources. Nurses, supervised by physicians, are the primary providers of care. Persistence in care is excellent, with 10% annual attrition from all causes. The union benefit scheme ensures both equal access to care and complete verification of morbidity data.

RESULTS

Some 8690 participants were followed for up to 18 years. At entry, the study population was middle-aged, included more men than women, and had a racial/ethnic composition roughly similar to that of New York City. Mean duration of follow-up was 5.6 years, with a range of 1 to 18 years. Ultimate blood pressure control was generally achieved within 6 months and sustained throughout treatment. There were 468 (morbid/mortal: 286/182) first cardiovascular events during follow-up (183/99 MI, 73/20 strokes, 30/0 onsets of congestive heart failure [CHF], and 63 other fatal cardiovascular disease [CVD] events).

At inclusion, characteristics associated with subsequent MI, stroke, and CHF varied according to the event (Table 1). Only pulse pressure, reflecting blood pressure, was independently associated with MI and CHF. By contrast, diabetes was independently associated with all cardiovascular events. The pattern of events changed over time (Figure 1). The rate of MI and stroke remained stable in this aging population, whereas CHF, rare for the first 10 years, increased by a tenfold factor thereafter, to become the second most common cardiovascular outcome. Obesity was also independently associated with CHF. Several historical factors (history of stroke, MI, or diabetes) plus age and pulse pressure ≥ 60 mm Hg, made it possible to stratify the group into four discrete levels of risk. Thus, for example, the very high risk group of patients included those with one historical marker, an age at entry > 55 years, and pulse pressure > 60 mm Hg. They had an annual event rate of about 3.5%. By contrast, those with no historical markers, aged < 55 years, and a pulse pressure < 60 mm Hg had an annual event rate of 0.4%.

DISCUSSION

These data demonstrate that blood pressure control is feasible and can be sustained. Myocardial infarction and stroke remained the major adverse events. However, despite an aging population, the rate of these events remained stable over time, suggesting that prolonged blood pressure control may enhance cardio-protection and improve the outcome observed in short-term clinical trials. Because blood pressure was largely controlled in the population under study, additional preventive strategies, beyond conventional blood pressure control, will be required to further reduce untoward cardiovascular events in controlled hypertensive patients. From our data, it is now possible to stratify, by readily available means, the primary prevention cohort and identify the subgroup of successfully treated hypertensive patients for which new and more vigorous interventions are justified.

REFERENCES


