INTRODUCTION

It is no longer appropriate to regard hypertension as simply the presence of high blood pressure. Abnormalities of the cardiovascular system and of metabolic parameters are present as an integral part of the hypertension syndrome, and must be taken into account when understanding and treating this condition. Strategies designed to decrease blood pressure have been reasonably successful in protecting patients from strokes, heart failure and renal insufficiency (1-2). But coronary artery disease, which is probably the main cause of serious illness and death in hypertensive patients, has not been reduced to the same extent. This disappointing outcome has been attributed to our failure to adequately deal with the other risk factors that accompany high blood pressure.

The principal problems that comprise the syndrome of hypertension, and predispose to its atherosclerotic complications, are listed in Table 1. Most of these features of hypertension appear to be familial and are present very early in the course of hypertension, suggesting that they might be governed by common genetic influences. Regardless of etiology, treatment must on address all components of the syndrome.

THE BLOOD PRESSURE PROBLEM

There seems little doubt that sustained high blood pressure, or possibly marked fluctuations in blood pressure, can damage or disrupt the integrity of the endothelial lining of the arterial circulation. These changes, in turn, expose the constituents of the arterial wall to the effects of circulating vasoactive substances, lipids, and other factors that can produce
TABLE 1. **Susceptibility of Hypertensive Patients to Atherosclerosis and Coronary Events**

- Direct effects of high blood pressure on arterial walls, including the endothelial lining.

- Neuroendocrine mediations of hypertension, including norepinephrine and angiotensin II, can stimulate cellular proliferation within vascular walls.

- Structural arterial changes, reflected by decreased compliance, occur very early in hypertension.

- Relationships of hypertension with other atherosclerosis risk factors: lipid abnormalities; insulin resistance.

- Left ventricular hypertrophy, an independent risk factor, is highly prevalent in hypertension.

Proliferative changes and predispose to atheromatous lesions. These complex processes are discussed in depth elsewhere in this Volume, and will not be considered further here.

An important characteristic of blood pressure is its circadian pattern. Blood pressure tends to be at a plateau during the daytime hours, but then falls steadily during the evening to a nadir soon after midnight. During the early to mid-morning hours there is a sharp increase back to daytime values. This rapid rise in blood pressure, which is part of the arousal process, parallels the rapid increases in activity of the sympathetic nervous system as indicated by increases in plasma concentrations of catecholamines (3). This pattern of blood pressure appears to have clinical importance, for myocardial infarctions (4) and strokes (5) occur with their greatest frequency during these early to mid-morning hours. The close relationship between blood pressure itself and acute events has been highlighted in a recent study that employed simultaneous blood pressure and electrocardiographic monitoring (6). In patients with known coronary disease, episodes of myocardial ischemia were almost invariably preceded by increases in both systolic blood pressure and heart rate, suggesting that these hemodynamic factors play an important role in myocardial events. Accordingly, antihypertensive strategies must take into account the importance of controlling blood pressure throughout the 24-hour period. Special attention also must be focused on blood pressure control during the critical morning hours associated with the increased incidence of cardiovascular events.