HYPERTENSION

The three main causes of death resulting from unchecked hypertension (high blood pressure) are myocardial infarction (heart attack), congestive heart failure, and cerebral vascular accident (stroke).

**Brain disease** (Encephalopathy)

**BRAIN**

Hypertension can cause a cerebral vascular accident (stroke). Strokes are the result of either a hemorrhage (bleeding) within the brain or infarction (lack of blood flow resulting in irreversible damage or necrosis). When there is reduced oxygen flow to the tissues, this is known as a transient ischemic attack (TIA). Symptoms of a TIA include temporary left or right-sided weakness and slurred speech or visual problems which can resolve over time. Because the arteries in the brain may be sclerosed (hardened), the brain tissue receives less oxygen which can result in vascular dementia (deterioration of mental faculties including memory, reasoning and personality).

**Heart disease** (Cardiopathy)

**HEART**

Hypertension facilitates congestive heart failure. Left ventricular hypertrophy (increased muscle mass) occurs because the left ventricle has to work harder due to a consistently higher blood pressure. Atherosclerotic complications (hardening of the arteries) lead to coronary artery disease.

Angina (chest pain) is a consequence of ischemia (lack of oxygen to the heart). A myocardial infarction (heart attack) occurs when lack of blood flow and oxygen to a portion of the heart results in irreversible damage or necrosis.
HYPERTENSION

**Noninflammatory disease of the retina**
(Retinopathy)

- Hemorrhage
- Retinal edema
- Retina
- Hard exudates (lipoprotein deposits)
- Narrow, tortuous arterioles with abnormal light reflexes (silver/copper wiring appearance)
- Cotton wool patches (infarcted nerve fibers)

**Eye**
Hypertension causes various changes in the retina (the sensory membrane of the eye). Flame-shaped hemorrhages develop, and an accumulation of lipoprotein deposits causes hard exudates. Retinal edema (swelling) occurs, causing a thick, cloudy, grayish fluid to leak into the middle retinal layers. Nerve fibers become infarcted (damaged because of lack of blood flow) and develop into cotton wool patches. Arterioles (branches of arteries before they become capillaries) also become more narrowed and tortuous, causing abnormal light reflexes (objects may have a copper or silver wire appearance).

**Arteries**
Hypertension can lead to atherosclerosis (hardening of the arteries). This condition is marked by plaque (fatty deposits and calcification) which collects in the inner lining (tunica intima), causing the artery to lose elasticity and obstruct the flow of blood. Atherosclerosis can cause arterial dissection (rupture of artery wall) and coronary artery disease, which may lead to harmful blood clots.

**Hardening of the Kidney**
(Nephrosclerosis)

- Arteriosclerosis
- Ischemia
- Nephron
- Tunic intima
- Blood clot
- Tunic media
- Tunic adventitia
- Granular pitted surface
- Microscopic hematuria
- Narrowed lumen

**Kidney**
Hypertension causes renal arteriosclerosis (hardening of the arteries in the kidney), which after time causes nephrosclerosis (hardening of the kidney). Nephrosclerosis is the direct result of ischemia (lack of blood flow) due to narrowed lumen (opening or space) of the blood vessels, and is a leading cause of chronic renal failure. A nephrosclerotic kidney may be reduced in size with a granular pitted surface. Microscopically, the closure of the small arteries destroys entire nephrons (the functioning unit that creates the urine), and may lead to hematuria (blood in the urine).