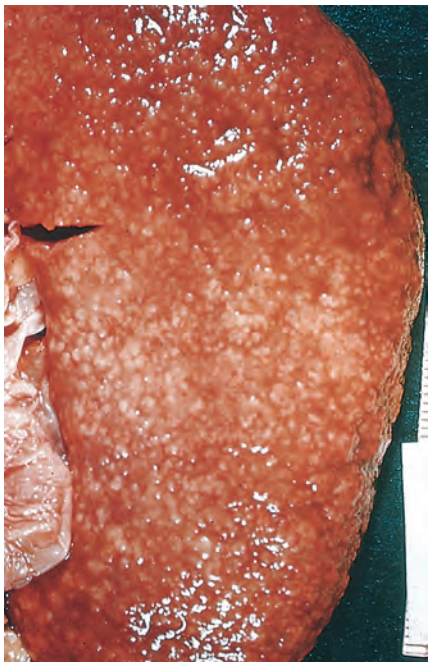

Figure 20-36 Close-up of the gross appearance of the cortical surface in benign nephrosclerosis illustrating the fine, leathery granularity of the surface.

alterations. The latter include collapse of the GBM, deposition of collagen within Bowman space, periglomerular fibrosis, and total sclerosis of glomeruli. When the ischemic changes are pronounced and affect large areas of parenchyma, they can produce wedge shaped infarcts or regional scars with histologic alterations that may resemble those in renal ablation injury, mentioned earlier.

Clinical Features. It is unusual for uncomplicated nephrosclerosis to cause renal insufficiency or uremia. However, three groups of hypertensive patients with nephrosclerosis are at increased risk of developing renal failure: people of African descent, people with severe blood pressure elevations, and persons with a second underlying disease, especially diabetes. In these groups renal insufficiency may supervene after prolonged hypertension, but rapid renal failure results from the development of the malignant or accelerated phase of hypertension, discussed next.

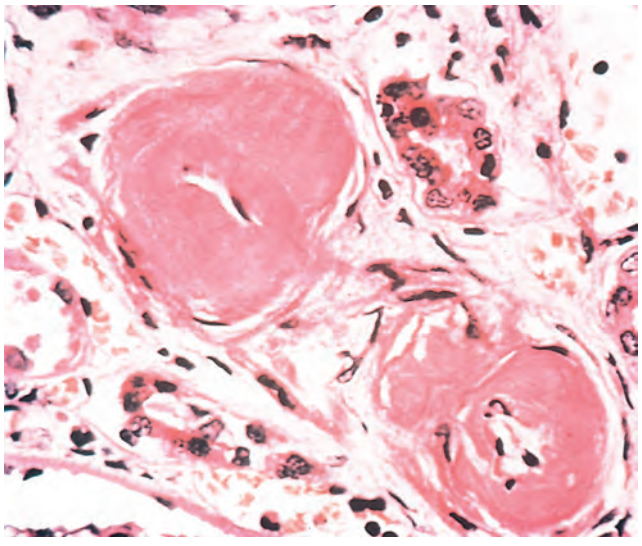

Figure 20-37 Hyaline arteriolosclerosis. High-power view of two arterioles with hyaline deposition, marked thickening of the walls, and a narrowed lumen. (Courtesy Dr. M.A. Venkatachalam, Department of Pathology, University of Texas Health Sciences Center, San Antonio, Tex.)

Malignant Nephrosclerosis

Malignant nephrosclerosis is a renal vascular disorder associated with malignant or accelerated hypertension. It occasionally develops suddenly in previously normotensive individuals but more often is superimposed on preexisting essential hypertension, secondary forms of hypertension, or an underlying chronic renal disease, particularly glomerulonephritis or reflux nephropathy. It is also a frequent cause of renal failure in individuals with systemic sclerosis. Malignant hypertension is relatively uncommon, occurring in 1% to 5% of all people with elevated blood pressure. In its pure form it usually affects younger individuals, and occurs more often in men and in blacks.

Pathogenesis. **The fundamental lesion in malignant nephrosclerosis is vascular injury.** The initial insult seems to be some form of vascular damage to the kidneys that might result from a variety of disorders, including long-standing hypertension, arteritis, or a coagulopathy, alone or in combination. The initiating event injures endothelium and results in increased permeability of the small vessels to fibrinogen and other plasma proteins, focal death of cells of the vascular wall, and platelet deposition. This can lead to *fibrinoid necrosis* of arterioles and small arteries, with activation of platelets and coagulation factors causing intravascular thrombosis. Mitogenic factors from platelets (e.g., PDGF), plasma, and other cells cause hyperplasia of intimal smooth muscle of vessels, resulting in the hyperplastic arteriolosclerosis that is typical of malignant hypertension and responsible for further narrowing of the lumens. The kidneys become markedly ischemic. With severe involvement of the renal afferent arterioles, the renin-angiotensin system receives a powerful stimulus; indeed, **patients with malignant hypertension have markedly elevated levels of plasma renin**. This sets up a self-perpetuating cycle in which angiotensin II causes intrarenal vasoconstriction, and the attendant renal ischemia perpetuates renin secretion.

MORPHOLOGY

The kidney size varies depending on the duration and severity of the hypertensive disease. Small, pinpoint **petechial hemorrhages** may appear on the cortical surface from rupture of arterioles or glomerular capillaries, giving the kidney a peculiar "flea-bitten" appearance.

Two histologic alterations characterize blood vessels in malignant hypertension (Fig. 20-38):

- **Fibrinoid necrosis of arterioles.** In this form of necrosis, cytologic detail is lost and the vessel wall takes on a smudgy eosinophilc appearance due to fibrin deposition. Inflammation is usually not seen or is minimal. Sometimes the glomeruli become necrotic and infiltrated with neutrophils, and the glomerular capillaries may thrombose.