

patients without detectable viral loads or histories of opportunistic infections provide a better survival benefit over dialysis. Following transplantation, patient and graft survival are similar to the general transplant population despite frequent rejections.

Hepatitis B and C Typically, infected patients present with microscopic hematuria, nonnephrotic or nephrotic-range proteinuria, and hypertension. There is a close association between hepatitis B infection and polyarteritis nodosa, with vasculitis appearing generally in the first 6 months following infection. Renal manifestations include renal artery aneurysms, renal infarction, and ischemic scars. Alternatively, the hepatitis B carrier state can produce an MGN with predominant IgG1 deposition that is more common in children than adults or MPGN that is more common in adults than in children. Renal histology is indistinguishable from idiopathic MGN or MPGN. Viral antigens, most commonly HBeAG, are found in the renal deposits. Cryoglobulinemic glomerulonephritis has also been reported. Treatment is with antiviral agents. Children have a better prognosis than adults.

Up to 30% of patients with chronic hepatitis C infection have some renal manifestations. Patients often present with type II mixed cryoglobulinemia, nephrotic syndrome, microscopic hematuria, abnormal liver function tests, depressed C₃ levels, anti-hepatitis C virus (HCV) antibodies, and viral RNA in the blood. The renal lesions most commonly seen, in order of decreasing frequency, are cryoglobulinemic glomerulonephritis, MGN, and MPGN, but polyarteritis nodosa (PAN), IgA nephropathy, and FSGS have been reported. With the availability of direct-acting antivirals, which can achieve a viral remission in >95% of patients, the prevalence of glomerular disease in HCV patients should decline. These drugs are currently the treatment of choice for patients with HCV-related MPGN or PAN.

Other Viruses Other viral infections are occasionally associated with glomerular lesions, but cause and effect are not well established. These viral infections and their respective glomerular lesions include cytomegalovirus producing MPGN or FSGS; influenza and anti-GBM