

Solutions to [Nodular Glomerulosclerosis Anagrams](#)

1. **FIBRILLARY GLOMERULONEPHRITIS:** Fibrillary glomerulonephritis (GN) is characterized by the widespread deposition of randomly arranged, elongated, non-branching microfibrils in the mesangium and glomerular basement membrane. The diameters of the fibrils are approximately twice those of amyloid fibrils and are in the range of 12-30 nm. Light microscopy shows diverse histological patterns: membranoproliferative GN, mesangial proliferative GN, diffuse proliferative GN with endocapillary exudation, rarely crescentic sclerosing GN, or membranous thickening of the capillary tufts. The Congo Red stain is negative. Immunofluorescence microscopy in these patients is positive for immunoglobulin G (IgG), C3, and both kappa and lambda light chains. The deposits are either monotypic (predominantly IgG4) or oligotypic (containing both IgG1 and IgG4). The reported incidence of fibrillary GN in native kidney biopsies of adults lies in the range 0.8-1.5%. The proteinuria is frequently accompanied by gross or microscopic hematuria, hypertension, and decreased kidney function.

2. **THROMBOTIC MICROANGIOPATHY:** Thrombotic microangiopathy has been classically described with gemcitabine. Other anti-cancer agents such as mitomycin C, tyrosine kinase inhibitors, and anti-vascular endothelial growth factor drugs can also cause this injury. It appears to be dose-dependent toxicity that has an insidious onset. Affected patients typically present with slowly progressive kidney failure, new or exacerbated hypertension, but relatively bland urine sediment. A wide range of glomerular findings is seen in patients with thrombotic microangiopathy. In the acute phase, glomeruli may display intracapillary fibrin thrombi, endothelial swelling or necrosis, intravascular congestion, and red blood cell fragmentation. With time, the glomerular changes may evolve into a membranoproliferative pattern with mesangial interposition, double contours of the glomerular basement membrane, and prominent mesangiolysis, a finding that may be associated with aneurysmal dilatation of the capillary lumina. Immunofluorescence staining for fibrinogen identifies fibrin thrombi and lesser-intensity staining for IgM, C3, and C1q. Electron microscopy shows endothelial swelling, detachment from the underlying glomerular basement membrane, and mesangiolysis. Because the disease process is driven by endothelial injury and thrombus formation, immune complex deposits are not identified by immunofluorescence or electron microscopy.

3. CRYOGLOBULINEMIA: The prevalence of cryoglobulinemia is approximately 50% among patients with chronic hepatitis C infection and 15% among hepatitis B–positive patients. It increases with disease duration and the presence of cirrhosis. Major clinical manifestations of mixed cryoglobulinemia (type II) include palpable purpura, arthralgias, lymphadenopathy, hepatosplenomegaly, peripheral neuropathy, and hypocomplementemia (with the fall in C4 levels often being most prominent). Kidney disease occurs in 35 to 60% of patients with type II cryoglobulinemia, and is observed approximately 2 to 3 years after the onset of cryoglobulinemia. Manifestations of kidney disease include nephrotic or nephritic syndrome, chronic kidney disease, and acute kidney injury. Hepatitis C infection is classically associated with membranoproliferative GN in the presence of cryoglobulinemia. There are 3 additional histologic findings of cryoglobulin-induced kidney disease:

- Intraluminal thrombi composed of precipitated cryoglobulins on light microscopy.
- Diffuse IgM deposition in the capillary loops on immunofluorescence microscopy.
- Subendothelial deposits that often have a clear substructure with a characteristic “fingerprint,” or curvilinear pattern, on electron microscopy.

4. AMYLOIDOSIS: Amyloidosis is a group of diseases characterized by extracellular deposition of amyloid fibrils (abnormal proteins). Kidney involvement occurs in AL amyloidosis, characterized by the deposition of immunoglobulin light chains. The most common presentation of AL amyloidosis is heavy proteinuria, which is associated with glomerular deposits. Patients with vascular amyloidosis present with slowly progressive chronic kidney disease with little or no proteinuria. Less commonly, patients with tubular deposits present with tubular dysfunction such as distal (type 1) renal tubular acidosis, polyuria due to nephrogenic diabetes insipidus, and in rare cases, Fanconi syndrome. Light microscopy in renal amyloidosis typically reveals diffuse glomerular deposition of amorphous hyaline material, initially in the mesangium and then in the capillary loops mimicking nodular glomerulosclerosis. Immunofluorescence microscopy is typically positive for lambda or kappa light chains in presence of AL amyloid. Treatment depends on the underlying paraprotein-related disease. The classic finding is apple-green birefringence on examination of Congo-Red stain with polarized light.

A related eAJKD post can be found [here](#).