Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care
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Case 2: Pathology

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Membranoproliferative glomerulonephritis (MPGN) is no longer classified as a distinct disease entity but rather as a specific morphological pattern of glomerular injury, which modern nephropathology divides into complement-mediated and immune complex-mediated pathways based on immunofluorescence (IF) findings. In immune complex-mediated MPGN (IC-MPGN), the driving mechanism is chronic antigenemia leading to the deposition of immunoglobulins, which can be distinguished from C3 glomerulopathy by the prominent presence of Igs on IF. Under light microscopy, the classic "busy" glomerulus is characterized by diffuse endocapillary hypercellularity, mesangial cell proliferation, and matrix expansion that results in a distinct lobular accentuation of the glomerular tuft. The diagnostic hallmark on light microscopy is the "tram-track" or double-contour appearance of the capillary walls, best visualized on Jones silver or PAS stains, which reflects mesangial cell interposition into the subendothelial space and the subsequent synthesis of a new basement membrane. Immunofluorescence is the critical diagnostic branching point, demonstrating bright, granular deposition of immunoglobulins (typically IgG, IgM, or IgA) along with C3 and often C1q mapping the peripheral capillary loops and mesangium. It is mandatory for pathologists to evaluate kappa and lambda light chains during IF; monoclonal restriction signals an underlying plasma cell dyscrasia, whereas polyclonal staining points to autoimmune or infectious etiologies. Electron microscopy confirms the diagnosis by revealing discrete, electron-dense deposits localized primarily in the subendothelial space and mesangium, alongside ultrastructural evidence of cellular interposition and occasional subepithelial "humps." When signing out a biopsy with an IC-MPGN pattern, the pathologist must direct the clinical team to investigate underlying secondary causes, which heavily include chronic infections like Hepatitis C and B, systemic autoimmune diseases such as Lupus Nephritis, and

monoclonal gammopathies, as addressing the root etiology is paramount for patient management.

Keywords: Membranoproliferative glomerulonephritis, Immune Complex, Full House