CASE REPORT: LUPUS-LIKE IMMUNE COMPLEX GN AFTER COVID-19 INFECTION.

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Alhareth Azaizeh MD1, Dan Zhang MD2, Cindy Montero Granados MD3, Carmen Avila-Casado MD, PHD4.
Department of Anatomical Pathology, LMP, Toronto General Hospital, Toronto, ON, Canada.

Introduction.

Acute kidney injury is frequently present in severe acute respiratory syndrome coronavirus 2 infection (coronavirus disease 2019 [COVID-19])[1]. Lupus-like immune complex glomerulonephritis (GN) has been reported as an extremely rare complication of COVID-19 infection with only very few reported cases.[2,3]

Case Presentation.

We present a case report of a 67-year-old Asian male with a biopsy proven immune complex GN after COVID-19 virus infection. The patient had no documented medical history apart from a recent diagnosis of hypertension. He initially presented to the ER in January 2023 with cough, and shortness of breath with worsening pedal edema that had started in August 2022. The patient was diagnosed with COVID-19 infection following a positive SARS-CoV-2 PCR test. Initial lab investigations showed significant proteinuria concerning for nephrotic syndrome, low serum albumin and elevated creatinine with low GFR. The patients edema progressed into anasarca with ascites and a renal biopsy was taken due to worsening of renal function.

Pathologic Findings:

- Examination of H&E, PAS, HPS, Silver and Trichrome stained slides by light microscopy showed one core of renal cortex containing up to 30 glomeruli, three of which were globally sclerosed. The remaining glomeruli showed segmental increase in mesangial matrix and no increase in mesangial cellularity with no segmental scars. The glomerular capillaries were patent with areas of endocapillary hypercellularity and prominent endothelial cells. The glomerular capillary walls were diffusely thickened. The tubulointerstitium showed moderate-severe interstitial fibrosis and tubular atrophy with focal acute tubular injury. The vessels showed mild arteriolopathy and mild arterial sclerosis. (Figure1).
- Immunofluorescence microscopy showed an intense positive granular staining for IgG, IgM, IgA, C3, C1q, Kappa and Lambda with a membranous and mesangiocapillary pattern, "full-house" pattern, which is usually seen in lupus nephritis. (Figure2).
- Two glomeruli were examined ultrastructurally by electron microscopy showed numerous immune-type electron-dense deposits located at different levels of the glomerular basement membranes and to a lesser extent in para-mesangial, mesangial and subendothelial locations forming in several areas what is known as "tram-tracks". (Figure3).

Microscopic findings.

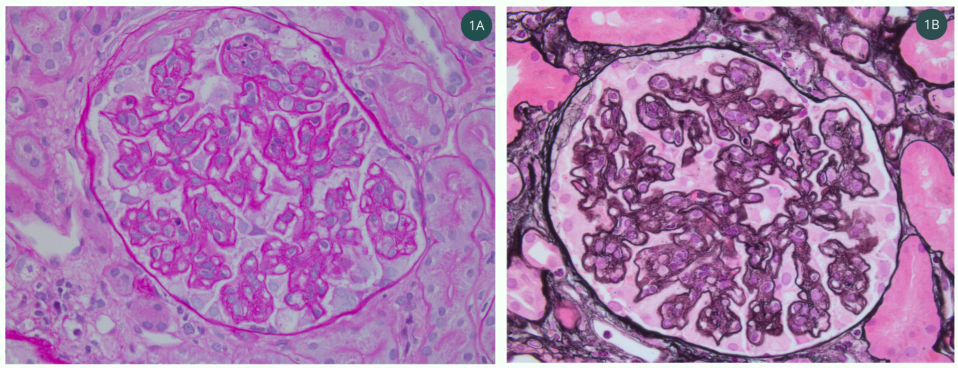

Figure1: Diffuse thickening of glomerular basement membranes with segmental double contours and focal endocapillary hypercellularity. 1A: PAS stain (40X). 1B: Silver stain (40X).

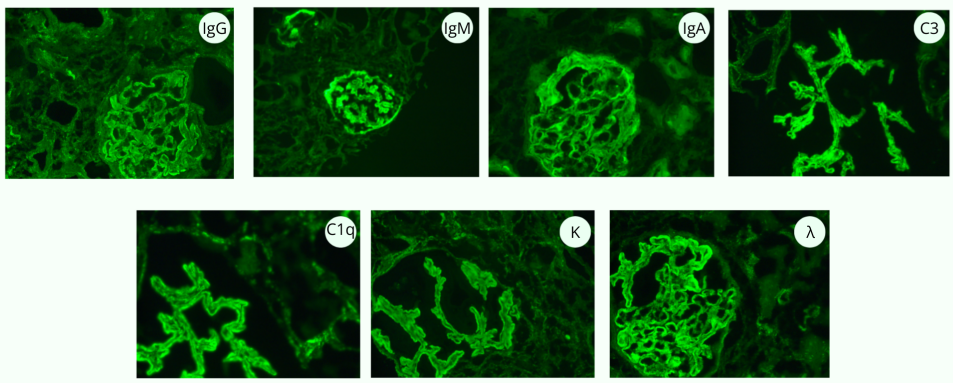

Figure2: There is intense positive granular staining for IgG, IgM, IgA, C3, C1q, Kappa and Lambda with a membranous and mesangiocapillary pattern, Deposits are also seen in peritubular and perivascular locations.

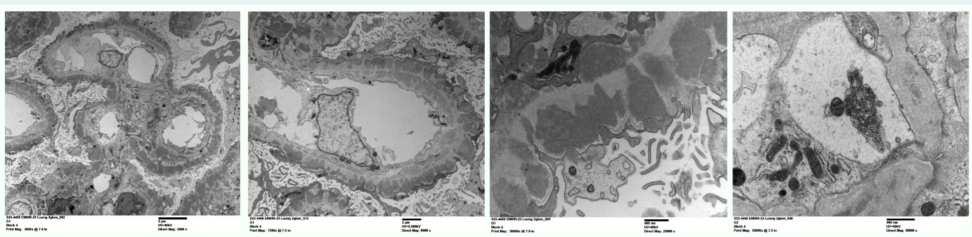

Figure3: Numerous immune-type electron-dense deposits located at different levels of the glomerular basement membranes and to a lesser extent in para-mesangial and subendothelial locations (1A,1B,1C) with areas of extensive remodeling and "tram-track" pattern ( ). Numerous tubuloreticular inclusions are seen in the endothelial cells of the glomerular capillaries (1D). The podocyte foot processes are diffusely effaced with areas of denudation and podocyte injury (1A, 1B, 1C). 1A: TEM, print mag: 3600x @ 7.0 in. 1B: TEM, print mag: 7200x @ 7.0 in. 1C: TEM, print mag: 30000x @ 7.0 in. 1D: TEM, print mag: 35000x @ 7.0 in.

Discussion.

There is limited research on the specific relationship between COVID-19 and SLE-like immune complex glomerulonephritis (ICGN) or flares of lupus nephritis.[2,3] However, there have been some reports suggesting that COVID-19 infection may trigger flares of SLE and lead to new-onset ICGN in some patients. SLE-like ICGN is a rare complication that occurs when immune complexes accumulate in the glomeruli of the kidneys, leading to inflammation and damage. Flares of lupus nephritis may also occur in some patients after COVID-19 infection.

In this patient, a new diagnosis of lupus nephritis, class IV/V, was eventually made after proper lab investigations given the fact that the patient fit the clinical criteria for the diagnosis of SLE, which raises the question weather the patient have had an undiagnosed SLE for a significant period of time prior to this presentation.

Conclusion.

This case report highlights the potential for immune complex GN or flares from previous conditions to occur in association with COVID-19 infection, even in patients without pre-existing renal disease. Clinicians should remain vigilant for the development of renal complications in COVID-19 patients and consider renal biopsy for those with unexplained proteinuria. Further research is needed to better understand the pathogenesis of immune complex GN in COVID-19 patients and develop effective preventive and therapeutic strategies.

References.

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