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SARS-CoV-2 vaccination–associated collapsing glomerulopathy in a kidney transplant recipient



To the editor: A stable kidney transplant recipient (KTR) of 14 years received the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) ChAdOx1 (AZD1222) vaccine and, within a fortnight, presented with severe acute kidney injury (creatinine, 533 $\mu\text{mol/L}$; baseline, 125–187 $\mu\text{mol/L}$) and nephrotic range proteinuria (urine protein creatinine ratio, 2000 g/mol, with no hematuria). The allograft, her first, was from a deceased white donor, following kidney failure from IgA vasculitis, and was stable for many years (Figure 1a). Initial kidney biopsy showed glomerulomegaly, glomerulitis, podocyte enlargement with protein droplets, and collapse of the glomerular tufts along with glomerular and interstitial immune infiltrates (Banff score, i3 t0 v0 g3 ptc0 ci1 ct1 cv0 cg1b mm0 ah3 ti3 i-IFTA3) (Figure 1b and c); electron microscopy was unavailable. Immunofluorescence for Igs and C4d immunohistochemistry and antibodies against donor-specific human leukocyte antigen and angiotensin 2R1 were absent. Treatment response for suspected antibody-mediated rejection with methylprednisolone, i.v. Ig, and plasma exchange was poor. Repeated kidney biopsy showed the absence of immune cell infiltration and features consistent with collapsing glomerulopathy (CG) with acute tubular injury and mild glomerulitis (Banff score, i0 t1 v0 g1 ptc0 ci1 ct1 cv0 cg3 mm0 ah3 ti0 i-IFTA3; Figure 1d and e). Electron microscopy revealed the detachment of podocytes with extensive foot process effacement, microvillous hyperplasia, protein droplets in some podocytes, and normal glomerular basement membranes, with no evidence of immune complex deposition. Secondary causes of CG, including cytomegalovirus, BK polyomavirus, HIV, parvovirus, and SARS-CoV-2 infection, were excluded. The patient required hemodialysis at 3 months with persisting proteinuria (15 g/d). Further immunohistochemistry confirmed the following: (i) expression of Ki-67, a marker of glomerular expansion/proliferation in CG, detected in biopsy 1, with epithelial cell reactivity in Bowman's space (Figure 1f); (ii) reduced glomerular expression of synaptopodin and podocalyxin, evidence of podocyte dedifferentiation previously associated with CG, on biopsy 1 (Supplementary Figure S1); and (iii) significantly increased levels of inflammatory subpopulations on the initial biopsy to be significantly attenuated following intervention (Supplementary Figure S2).^{1,2} SARS-CoV-2 vaccination has been associated with many glomerular diseases, minimal change and membranous nephropathy, whereas SARS-CoV-2 infection has been associated with CG, including in a KTR.^{3–5} We

report the first case of a KTR developing CG after SARS-CoV-2 ChAdOx1 vaccination, with no identifiable cause besides temporal association with vaccination.

DISCLOSURE

All the authors declared no competing interests.

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SUPPLEMENTARY MATERIAL

[Supplementary File \(Word\)](#)

[Supplementary Methods.](#)

[Supplementary Results.](#)

[Supplementary Reference.](#)

Figure S1. Reduced expression of glomerular markers in kidney transplant recipient (KTR) biopsy tissue with collapsing glomerulopathy associated with SARS-CoV-2 vaccination.

Figure S2. Immune cell infiltration in kidney transplant recipient (KTR) biopsy tissue with collapsing glomerulopathy associated with SARS-CoV-2 vaccination.

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Julia Jefferis^{1,2}, Andrew J. Kassianos^{1,2,3}, Anca Grivei^{1,3}, Brian Doucet^{1,2}, Helen Healy^{1,2,3}, Leo Francis⁴, Saw Yu Mon^{1,2} and George T. John^{1,2}

¹Kidney Health Service, Royal Brisbane and Women's Hospital, Brisbane, Australia; ²Faculty of Medicine, University of Queensland, Brisbane, Australia;

³Conjoint Internal Medicine Laboratory, Chemical Pathology, Pathology Queensland, Brisbane, Australia; and ⁴Anatomical Pathology, Pathology Queensland, Health Support Queensland, Brisbane, Australia

Correspondence: George T. John, Kidney Health Service, Level 9 Ned Hanlon Building, Royal Brisbane and Women's Hospital, Butterfield St, Herston QLD 4029, Australia. E-mail: George.John@health.qld.gov.au

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