
Supplementary information

**COVAN is the new HIVAN: the re-emergence
of collapsing glomerulopathy with
COVID-19**

In the format provided by the
authors and unedited

Supplementary Table 1 | Main conditions associated with collapsing glomerulopathy

	'Second hit'
<i>APOL1</i> -linked	<p>Viral entities</p> <ul style="list-style-type: none"> • HIV^{1,2} • CMV³ • PVB19⁴ • EBV⁵ • SARS-CoV-2⁶⁻¹⁰ <hr/> <p>Systemic diseases/conditions</p> <ul style="list-style-type: none"> • SLE¹¹ • HLH^{12,13} • Kidney allograft^{14,15} <hr/> <p>Medications</p> <ul style="list-style-type: none"> • Interferon¹⁶ <hr/> <p>Genetic disease</p> <ul style="list-style-type: none"> • STING-SAVI¹⁷ <hr/> <p>Underlying glomerulopathy</p> <ul style="list-style-type: none"> • PLA2R-MN¹⁸
Not <i>APOL1</i> -linked (ischemia, toxic effect)	<p>CNI-associated TMA Atheroembolic renal disease Biphosphonates</p>

APOL1, apolipoprotein L1; CMV, cytomegalovirus; CNI, calcineurin inhibitor; EBV, Epstein Barr virus, HIV, human immunodeficiency virus; HLH, hemophagocytic lymphohistiocytosis; IFN, interferon; PLA2R-MN, phospholipase A2 receptor-associated membranous nephropathy; PVB19, parvovirus B19, SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; SLE, systemic lupus erythematosus; STING-SAVI, stimulator of interferon genes-associated vasculopathy with onset in infancy; TMA, thrombotic nephropathy.

References

1. Kopp, J. B. *et al.* APOL1 Genetic Variants in Focal Segmental Glomerulosclerosis and HIV Associated Nephropathy. *J Am Soc Nephrol* **22**, 2129-2137, 2011.
2. Kasembeli, A. N. *et al.* APOL1 Risk Variants Are Strongly Associated with HIV-Associated Nephropathy in Black South Africans. *J Am Soc Nephrol* **26**, 2882-2890, 2015.
3. Grèze, C. *et al.* Collapsing focal segmental glomerulosclerosis induced by cytomegalovirus: A case report. *Nephrol Ther* **14**, 50-53, 2018.
4. Besse, W. *et al.* Collapsing glomerulopathy in a young woman with APOL1 risk alleles following acute parvovirus B19 infection: a case report investigation. *BMC Nephrol* **17**, 125, 2016.
5. Joshi, A. *et al.* Acute Epstein-Barr virus infection-associated collapsing glomerulopathy. *Clin Kidney J* **5**, 320-322, 2012.
6. Larsen, C. P. *et al.* Collapsing Glomerulopathy in a Patient With Coronavirus Disease 2019 (COVID-19). *Kidney Int Rep* **5**, 935-939, 2020.

7. Peleg, Y. *et al.* Acute Kidney Injury Due to Collapsing Glomerulopathy Following COVID-19 Infection. *Kidney Int Rep* **5**, 940-945, 2020.
8. Kissling, S. R. S. *et al.* Collapsing glomerulopathy in a COVID-19 patient. *Kidney Int* **98**, 228-231, 2020.
9. Gaillard, F, I. S. *et al.* Tubuloreticular inclusions in COVID-19-related collapsing glomerulopathy. *Kidney Int* **98**, 241, 2020.
10. Wu H, *et al.* Acute Kidney Injury and Collapsing Glomerulopathy Associated with COVID-19 and APOL1 High Risk Genotype. *J Am Soc Nephrol*, doi: <https://doi.org/10.1681/ASN.2020050558> (2020)
11. Larsen, C. P. *et al.* Apolipoprotein L1 risk variants associate with systemic lupus erythematosus-associated collapsing glomerulopathy. *J Am Soc Nephrol* **24**, 722-725, 2013.
12. Thauinat, O. *et al.* Nephrotic syndrome associated with hemphagocytic syndrome. *Kidney Int* **69**, 1892-1898, 2006.
13. Niang, A. *et al.* Collapsing Glomerulopathy and Haemophagocytic Syndrome Related to Malaria: A Case Report. *Nephrol Dial Transplant* **23**, 3359-3361, 2008.
14. Santoriello, D. *et al.* Donor APOL1 high-risk genotypes are associated with increased risk and inferior prognosis of de novo collapsing glomerulopathy in renal allografts. *Kidney Int* **94**, 1189-1198, 2018.
15. Shah P. B. *et al.* APOL1 Polymorphisms in a Deceased Donor and Early Presentation of Collapsing Glomerulopathy and Focal Segmental Glomerulosclerosis in Two Recipients. *Am J Transplant* **16**, 1923-1927, 2016.
16. Markowitz, G. S. *et al.* Treatment with IFN- α , β , or γ is associated with collapsing focal segmental glomerulosclerosis. *Clin J Am Soc Nephrol* **5**, 607-615, 2010.
17. Abid, Q. *et al.* APOL1-Associated Collapsing Focal Segmental Glomerulosclerosis in a Patient With Stimulator of Interferon Genes (STING)-Associated Vasculopathy With Onset in Infancy (SAVI). *Am J Kidney Dis* **75**, 287-290, 2020.
18. Larsen, C. P. *et al.* Histopathologic effect of APOL1 risk alleles in PLA2R-associated membranous glomerulopathy. *Am J Kidney Dis* **64**, 161-163, 2014.