中文題目：施打完 COVID-19 疫苗後出現腎絲球腎炎：個案報告

英文題目：COVID-19 Vaccine Could Unmask Glomerulonephritis: A Case Report

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Introduction

In the era of coronavirus disease 2019 (COVID-19) pandemic, vaccination is one of the most effective ways of preventing disease spread as well as decreasing risk of getting severe disease. The safety and adverse events from COVID-19 vaccines are major concerns. It is increasing recognized that glomerulonephritis of various types can manifest clinically after the vaccination. Here we reported a case of acute glomerular disease occurring after COVID-19 vaccination.

Case Report

A 44-year-old woman presented to the clinic with fever, chills, headache, myalgia and tea-colored urine for 2 days shortly after receiving the first dose of Moderna® COVID-19 vaccine. On the third day after the vaccination, the blood tests showed: creatinine 0.78 mg/dL, creatine kinase 57 IU/L, hemoglobin 13.3 g/dL, platelet count 341 x 10^3/μL; the urinalysis revealed dipstick proteinuria and hematuria (Table 1). The urine albumin-to-creatinine ratio and protein-to-creatinine ratio were 270.39 mg/g and 600.77 mg/g, respectively. Increased bilateral renal echogenicity was found from the ultrasonography (Figure 1).

She had no underlying chronic medical illness. However, she had one episode of gross hematuria about one year ago; she was diagnosed as having glomerulonephritis, but pathological diagnosis was not made at that time. Symptoms resolved spontaneously within several months.

Based on clinical features and laboratory findings of hematuria and subnephrotic range proteinuria, we considered her to have undiagnosed immunoglobulin A (IgA) nephropathy; kidney biopsy might be considered for definite diagnosis. Nevertheless, given the fact that there was no renal insufficiency and that we expected it to be a benign clinical course, we only provided conservative treatment and did not perform tissue proof. The following laboratory tests showed gradual resolution of microscopic hematuria and proteinuria and no renal insufficiency, even at several days after repeated dose of Moderna® COVID-19 vaccine.

Discussion

This 44-year-old female patient developed gross hematuria after the administration of COVID-19 vaccine. There was a self-limited course of acute glomerulonephritis, without obvious complications or sequelae so far. There are increasing case reports and case series regarding flares of IgA nephropathy following the vaccination [1-3]. Based on histologic findings of endocapillary hypercellularity, fibrinoid necrosis with crescent formation, tubular atrophy and interstitial fibrosis, it is proposed that immune response to vaccination could evoke flares of underlying IgA nephropathy [1]. Furthermore, IgA nephropathy is considered a multi-hit disease, including the

influence of genetic and environmental factors. Vaccination might induce anti-glycan IgA1 production and cytokine release, which plays a major role in pathogenesis of IgA nephropathy [4, 5].

COVID-19 vaccination can also provoke other types of glomerular diseases. Anti-glomerular basement membrane disease, minimal change disease, membranous nephropathy and ANCA-associated vasculitis after the vaccination have been reported to date [5, 6].

Currently, there are no evidence-based recommendations about treatment of glomerulonephritis after COVID-19 vaccination, or a shift to alternative types of vaccines to prevent further disease flares. However, due to the relatively rare manifestation of glomerular disease unmasked by COVID-19 vaccines, a concern for glomerular disease should not be a reason to delay or defer vaccination during the COVID-19 outbreak worldwide.

Conclusion

Acute glomerulonephritis, including IgA nephropathy, is an uncommon adverse event following COVID-19 vaccination. Presence of hematuria and/or proteinuria after vaccine administration should raise suspicion of vaccination-related glomerular disease.

References

1. Kudose, S., et al., *Histologic correlates of gross hematuria following Moderna COVID-19 vaccine in patients with IgA nephropathy.* Kidney Int, 2021. 100(2): p. 468-469.
2. Negrea, L. and B.H. Rovin, *Gross hematuria following vaccination for severe acute respiratory syndrome coronavirus 2 in 2 patients with IgA nephropathy.* Kidney Int, 2021. 99(6): p. 1487.
3. Rahim, S.E.G., J.T. Lin, and J.C. Wang, *A case of gross hematuria and IgA nephropathy flare-up following SARS-CoV-2 vaccination.* Kidney Int, 2021. 100(1): p. 238.
4. Abramson, M., et al., *IgA Nephropathy After SARS-CoV-2 Vaccination.* Kidney Med, 2021.
5. Bomback, A.S., S. Kudose, and V.D. D'Agati, *De Novo and Relapsing Glomerular Diseases After COVID-19 Vaccination: What Do We Know So Far?* Am J Kidney Dis, 2021.
6. Tan, H.Z., et al., *Is COVID-19 vaccination unmasking glomerulonephritis?* Kidney Int, 2021. 100(2): p. 469-471.

Table 1. The laboratory tests with relation to timing of COVID-19 vaccination

Moderna®	**1st dose**		**2nd dose**
	3rd day	15th day	6th day
BUN (mg/dL)	10	6.8	7.1
Cre (mg/dL)	0.78	0.75	0.71
eGFR	84.89	88.82	94.62
AST/ALT (IU/L)	15/8		
UA (mg/dL)	3.9	4.5	3.4
CK (IU/L)	57	70	71
Urinalysis			
OB	3+	3+	2+
Protein	1+	-	-
Sp. Gr	> 1.030	1.015	< 1.005
RBC (/HPF)	> 100	50-99	20-29
WBC (/HPF)	6-9	6-9	0-5
UACR (mg/g)	270.39	83.93	
UPCR (mg/g)	600.77	195.76	98.00

ALT, alanine aminotransferase; AST, aspartate aminotransferase; BUN, blood urea nitrogen; CK, creatine kinase; Cre, creatinine; eGFR, estimated glomerular filtration rate; OB, occult blood; RBC, red blood cell; Sp. Gr, specific gravity; UA, uric acid; UACR, urine albumin-to-creatinine ratio; UPCR, urine protein-to-creatinine ratio; WBC, white blood cell.

Figure 1. Renal sonography for this patient