# Acute Cellular Rejection in A Kidney Transplant Recipient Following Vaccination with Inactivated SARS-CoV-2 Vaccine

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SARS-CoV-2 vaccines are being administered worldwide. Most of the reported side effects are mild and self-limiting with few reported cases of severe adverse reactions. Here we report a case of acute cellular rejection in a kidney transplant recipient following vaccination with an inactivated SARS-CoV-2 vaccine. fifty- one years old man with autosomal dominant polycystic kidney disease, who had received a kidney transplantation from a living related donor, 3 years ago, presented with an impaired kidney function seven days after receiving the first dose of Sinovac's COVID-19 vaccine. Kidney transplant biopsy revealed acute cellular rejection. The allograft function completely recovered after treatment with steroids. The analysis and investigation of the complications and adverse reactions induced by anti-COVID-19 vaccines, could increase our understanding of the underlying pathogenesis.

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Case Report

## INTRODUCTION

The corona virus disease 2019 (COVID-19) pandemic involved millions of people worldwide and caused large number of deaths.[1]Hence, there was an urgent demand for developing vaccines, to control disease spread, especially in solid organ transplant recipients and immunodeficient patients due to an increased risk of mortality in this population group.[2]

As mass vaccinations for COVID-19 are being performed across the world, reports of adverse events are emerging.[3-5] Therefore, the need for prompt awareness regarding the potential complications of COVID-19 vaccines seems to be important.

We report a case of acute cellular rejection (ACR)in a kidney transplant recipient following inactivated SARS-CoV-2 vaccine, **the** CoronaVac.

## CASE REPORT

The patient was a fifty-one years old man with autosomal dominant polycystic kidney disease, who had received a kidney transplantation from a living related donor, 3 years ago. His maintenance immunosuppression was tacrolimus, mycophenolic acid, and low-dose steroid and his baseline serum creatinine level was 0.08 mmol/L anti–SARS-CoV-2 serology. He presented with an impaired kidney function on his routine follow up, seven days after receiving the first dose of Corona Vac.

On physical examination, his temperature was 37.7 °C without other clinical symptoms, and he had not used any medication other than his immunosuppressive treatment.

Laboratory examination showed leukocytosis of $12.5 \times 10^9$/L with normal platelet count, an elevated C reactive protein of 25 mg/L, and erythrocyte sedimentation rate of 52 mm/h. Serum creatinine was 0.67 mmol/L and blood urea nitrogen was 39.6 mmol/L. Urine analysis revealed proteinuria of 0.246 g/d, and leukocyturia, and the urine culture was negative.

Ultrasound revealed mild increased size and parenchymal echogenicity of the allograft. On

doppler sonography, the vascular resistance index was normal (resistance index of 0.84), proving no vascular cause for rejection.

Work-up was negative for donor-specific anti HLA antibody, calcineurin inhibitor (CNI) blood level was within target range, and cytomegalovirus, BK virus and COVID-19 PCR test results were all negative.

A kidney transplant biopsy was performed and stained with periodic acid schiff (PAS), hematoxylin and eosin (H&E) and Masson's trichrome, which showed ACR, scored according to the Banff 2019 classification as: i3, t1, v0, g0, ptc0, ti0, i-IFTA0, C4d0, cg0, mm0, ah0, cv0, ci0, ct0 on Masson's trichrome staining. (Figure 1 and 2).[6]

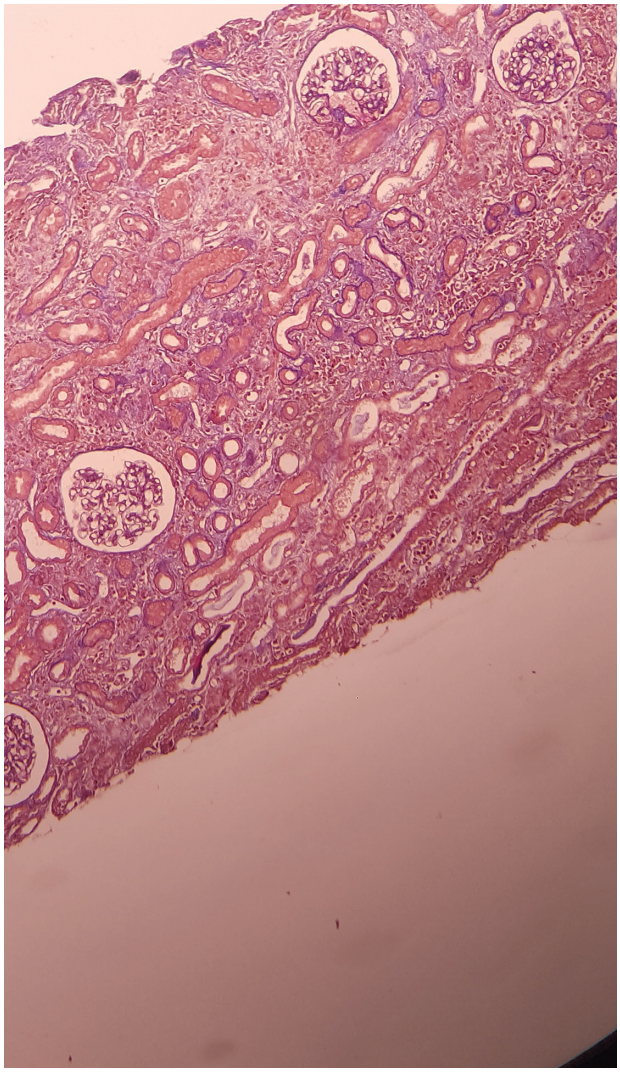

**Figure 1.** Kidney transplant biopsy stained with Masson's trichrome and scored according to the Banff 2019 classification as: i2, t2, v0, g0, ptc0, ti1, i-IFTA0, C4d0, cg0, mm0, ah0, cv0, ci0, ct0.

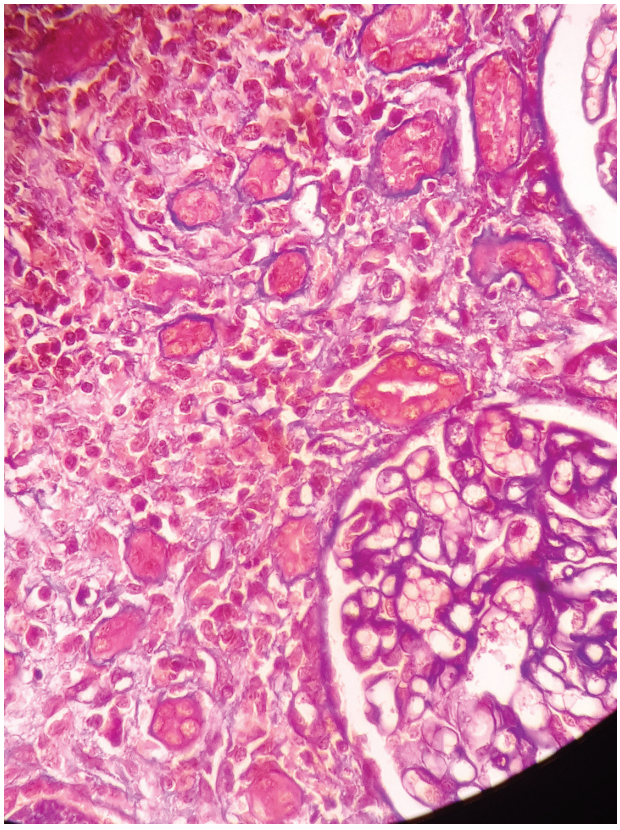

**Figure 2.** Figure 1 with Higher Magnification

Steroid therapy was initiated with three bolus doses of methyl prednisone, followed by 1 mg/kg/d of oral prednisolone, along with maintenance of a good state of hydration. Serum creatinine improved gradually from the sixth day of treatment and he attained his basal level of serum creatinine of 0.085 mmol/L within two months. Steroid was tapered to a dose of 10 mg/d over a period of six weeks.

## DISCUSSION

We describe a case of acute cellular rejection in a kidney transplant recipient after receiving the first dose of inactivated SARS-CoV-2 vaccine, **the** Corona Vac. In our patient the lack of other etiologies associated with interstitial nephritis, antibody mediated rejection, CNI toxicity or opportunistic viral infections, to explain the impaired kidney function and rapid response to treatment with corticosteroids, together with coincidence with the COVID-19 vaccination, might support a causal relationship between ACR and the recent vaccination.

The virus SARS-CoV-2 is known to have immunopathological effects on various organs,

including kidneys. Few studies have reported acute interstitial nephritis in histologic analysis of renal biopsies, following COVID-19.[7,8] Since SARS-CoV-2 antigens and vaccine proteins share structural similarities, and probably have the same mechanisms in activation of autoreactive T cells,[9]several renal complications have been described and expected after COVID-19 vaccination.[10-13]

Del Bello et al[14] described a case of acute cellular rejection after anti–SARS-CoV-2 mRNA vaccination in a kidney transplant recipient without any other clinical risk factors. Another case of steroid-resistant acute cellular rejection has been recently reported, in a liver transplant recipient, after anti–SARS-CoV-2 mRNA vaccination,[15] which suggests an immunomodulatory effect of the SARS-CoV-2 vaccination solid organ recipients.

To the best of our knowledge, this is the first case- report of a biopsy proven acute cellular rejection in a kidney transplant recipient that probably occurred after **receiving an** inactivated SARS-CoV-2 vaccine. The pathological findings in our case are relevant, even if it is always difficult to postulate a causal relationship.

## CONCLUSION

Despite the undeniable importance of COVID 19 vaccination, proper awareness regarding its adverse effects, is necessary. Accordingly, it is recommended that kidney function be monitored in all kidney transplant recipients, receiving anti–SARS-CoV-2 vaccination.

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