



## The mRNA COVID-19 vaccination increases the risk of retinal vascular occlusion | 1

Retinal vascular occlusion (RVO) is the second most prevalent cause of visual loss related to retinal vascular diseases, after diabetic retinopathy. Risk factors include diabetes, hypertension, obesity, and coronary artery disease. The causes are vasospasm, vasculitis, reduced arterial perfusion, and thromboembolism of retinal arteries. In this retrospective cohort study, Taiwanese researchers investigated the risk of RVO after the vaccination with messenger RNA (mRNA) COVID-19 vaccines.

BNT162b2 (Pfizer-BioNTech) and mRNA 1273 (Moderna) vaccines were the first mRNA-based vaccines ever approved. In both vaccines, the mRNA sequence determines the structure and assembly of the immunogen, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike (S) glycoprotein. The mRNA vaccine may trigger an immune response, resulting in systemic inflammation, in which vasculitis and hypercoagulable states may promote cardiovascular and cerebrovascular events. A recent autopsy report described a patient who died three weeks after receiving the third dose of the COVID-19 vaccine with multifocal necrotizing encephalitis, mild myocarditis, and endothelitis. The immunohistochemical analysis detected the S1 subunit of the SARS-CoV-2 S protein, but not the N protein, within the foci of inflammation in endothelial cells of the small blood vessels, the brain, and the heart.

<https://discovermednews.com/autopsy-report-necrotizing-encephalitis-myocarditis-endothelitis-after-anti-sarscov2-vaccination/>

Importantly, it seems that RVO results from the prolonged presence of SARS-CoV-2 S protein. According to the results of an animal study that investigated the possible ocular transmission and tropism of SARS-CoV-2 for cells lining the blood-retinal barrier, the presence of SARS-CoV-2 S protein thirty days after the intravitreal injection led to microaneurysms, retinal atrophy, and RVO. The authors stated that these findings of long-term retinal vascular pathologies observed after prolonged presence of the S antigen could be related to certain symptoms registered in post-COVID patients.

<https://discovermednews.com/retinal-inflammation-after-intranasal-infection-with-sars-cov-2/>



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### ***About the Study and Results***

This retrospective large-scale cohort study that investigated the association between RVO and mRNA vaccination against COVID-19 included 6,755,737 individuals. The authors used data from the global TriNetX network. Participants were divided into two cohorts, the vaccinated group which included 883,177 individuals, and the unvaccinated group with 5,871,737 participants. The exclusion criteria for both groups were: diagnosis of RVO six months before the index date, and therapy with antiplatelet drugs, anticoagulants, or contraceptives four weeks before the index date. The research team appropriately matched the baseline characteristics of both cohorts before analysis.

Cox multivariate analysis showed an increased risk of RVO in the first two weeks after the mRNA COVID vaccination that persisted for twelve weeks. The cumulative incidence of RVO was significantly higher in the vaccinated cohort than in the unvaccinated cohort at twelve weeks and two years after the vaccination. Within the two years after the mRNA COVID vaccination, the overall risk of all forms of RVO was 2.19 times higher in the vaccinated than in the unvaccinated cohort.

### ***Conclusion***

According to the authors, a molecular mimicry of the SARS-CoV-2 S glycoprotein, which shares sequence homology with human proteins, may play a central role in RVO. Although it is difficult to establish a definitive association between RVO and vaccination because of



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limited evidence and the low frequency of this disease, this study underscores the need for further research.

The authors also suggested that ophthalmologists should consider retinal vascular occlusion in vulnerable patients after vaccinations with mRNA 1273 COVID vaccines.

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### *Journal Reference*

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