

Association Between Immunosuppressive Medications and COVID-19 Infection, Hospitalization, and Death in Noninfectious Uveitis Patients in the Era of COVID-19 Vaccinations

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BACKGROUND

- **Uveitis** inflammation of iris, ciliary body, and/or choroid. Can result in possible irreversible damage and vision loss.
- **Treatment** is with topical, local or systemic corticosteroids, and/or other immunosuppressive medications.
- **Systemic corticosteroids** were associated with greater risk of COVID-19 infection and severe illness in noninfectious uveitis patients in the era prior to widespread COVID-vaccination.
- Vaccination lowers the risk of severe COVID-19 outcomes but **the impact of immunosuppression in vaccinated patients is unclear.**

METHODS

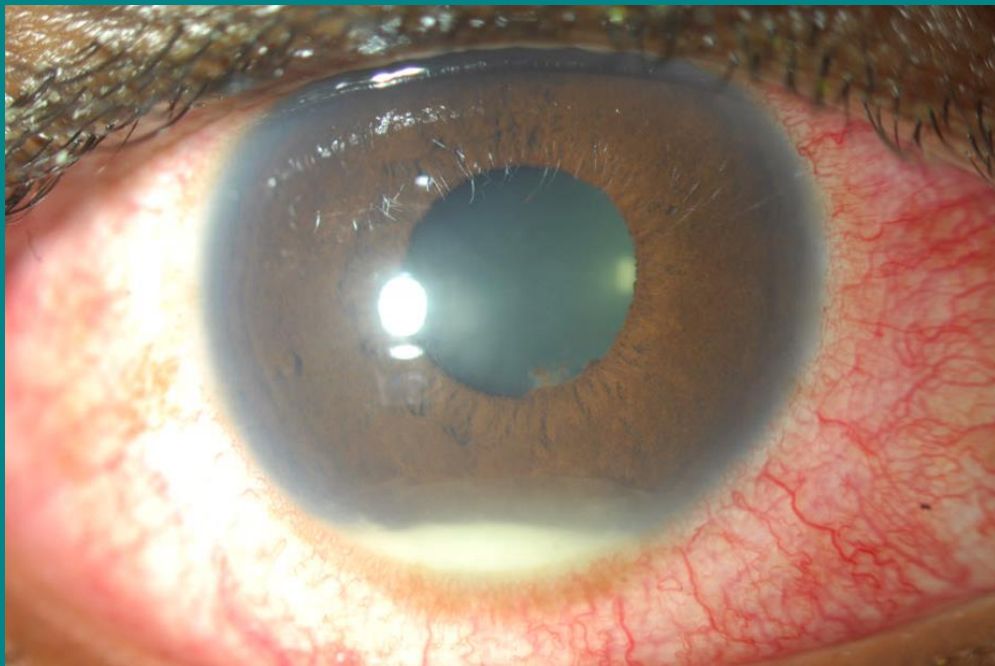
1. **Study Design:** Retrospective, observational cohort.
2. **Data Source:** US insurance claims data base with commercial insurance, Medicare Part D and Medicare Advantage from OptumLabs Data Warehouse (OLDW).
3. **Population:** Individuals with uveitis who were continuously enrolled in database for ≥365 days.
4. **Exposure:** Systemic corticosteroids and other immunosuppressive medications.
5. **Outcome:** COVID-19 infection, hospitalization, and death.

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Exposure to **systemic corticosteroids** was associated with a **3 to 4-fold increased risk of COVID-19** infection, hospitalization, and death in patients with noninfectious uveitis.



Source: Dr. Nisha Acharya’s Clinic, 2022

RESULTS

- 62,209 noninfectious uveitis patients were included in the overall cohort.
- 12,895 (20.7%) were exposed to systemic corticosteroids during the risk period.
- The incidence rate ratio of COVID-19 infection, hospitalization, and death were ~5, 5, and 6-times higher respectively in the group exposed to systemic corticosteroids compared to those not exposed.
- In adjusted models, exposure to systemic corticosteroids was associated with a ~4, 3, and 3-fold increased risk of COVID-19 infection, hospitalization, and death respectively.
- In unadjusted and adjusted models, record of at least one COVID-19 vaccination was associated with a decreased risk for infection, hospitalization, and death.
 - COVID-19 infection, adjusted HR 0.48 (95% CI0.46, 0.51; P <0.0001)
 - COVID-10 hospitalization adjusted HR 0.13 (95% CI, 0.101,0.17; P <0.0001)
 - COVID-10 death adjusted HR 0.19 (95% CI, 0.11, 0.35; P <0.0001)

- Among uveitis patients exposed to systemic corticosteroids who did not have record of vaccination the incidence rate ratio of COVID-19 infection, hospitalization, and death were ~2, 5, and 3-times higher respectively compared with those who were vaccinated.

DISCUSSION

- Systemic corticosteroid exposure continues to be associated with greater risk of COVID-19 outcomes in uveitis patients in an era of widespread COVID-19 vaccination.
- Those exposed to systemic corticosteroids who are not vaccinated have a greater risk of severe outcomes.
- Limiting exposure to systemic corticosteroids and use of alternative therapies may be prudent in patients with uveitis.
- COVID-19 vaccination should be strongly encouraged in patients taking immunosuppressive therapies.

Unadjusted and Adjusted Hazard Ratios Showing Associations Between Immunosuppressive Medication Exposure and COVID-19 Outcomes in NIU Patients

Immunosuppressive medication	Unadjusted HR (95% CI)	P-value ^a	Adjusted HR (95% CI)	P-value ^a
COVID-19 infection [†]				
Systemic corticosteroid	5.007 (4.62, 5.43)	<0.0001	4.52 (4.15, 4.92)	<0.0001
Systemic corticosteroid average daily dose (per 10 mg)	1.76 (1.72, 1.80)	<0.0001	1.03 (1.02, 1.04)	<0.0001
DMARDs	1.36 (1.21, 1.53)	<0.0001	0.81 (0.71, 0.92)	<0.002
TNF-α inhibitors	1.39 (1.20, 1.62)	<0.0001	1.19 (1.01, 1.39)	0.037
Other biologics	1.41 (1.07, 1.85)	0.015	1.02 (0.78, 1.35)	0.87
Other immunosuppressive drugs	1.095 (0.83, 1.44)	0.515	0.93 (0.71, 1.22)	0.61
COVID-19 hospitalization [†]				
Systemic corticosteroid	4.89 (3.96, 6.05)	<0.0001	3.45 (2.70, 4.41)	<0.0001
Systemic corticosteroid average daily dose (per 10 mg)	1.66 (1.57,1.77)	<0.0001	1.04 (1.01, 1.07)	0.011
DMARDs	1.76 (1.30, 2.39)	0.0003	1.26 (0.90, 1.78)	0.191
IL-6 inhibitors ^b	/	/	/	/
COVID-19 death [†]				
Systemic corticosteroid	5.48 (3.37, 8.92)	<0.0001	3.25 (1.85, 5.69)	<0.0001
Systemic corticosteroid average daily dose (per 10 mg)	1.77 (1.56, 2.009)	<0.0001	1.05 (0.999, 1.10)	0.092
IL-6 inhibitors ^b	/	/	/	/

^a P-values calculated from Cox proportional hazards models.
^b We were not able to estimate hazard ratio and corresponding p-value due to zero outcome event in the exposed group.
[†] To achieve robust estimates, immunosuppressive drug categories we are only included in the Cox proportional hazards models for each outcome if the number of patients exposed was zero or >11 .

Incidence of COVID-19 Outcomes per 1000 Person-Years by Vaccination Status of those Exposed to Systemic Corticosteroids

	Exposed to systemic corticosteroids						
	No COVID-19 vaccination			≥1 COVID-19 vaccination			Incidence rate ratio
	Number of Cases	Number of Person-Years	Incidence Rate	Number of Cases	Number of Person-Years	Incidence rate	
COVID-19 infection	591	780.5	757.2	206	574.8	358.4	2.11
COVID-19 hospitalization	87	829.2	104.9	12	619.7	19.4	5.41
COVID-19 death ^a	/	/	17.6	/	/	6.3	2.79

^a Values less than 11 are not presented to protect patient privacy. Only incidence rate was reported because the number of cases in the category is less than 11. The corresponding person-years are also not reported to prevent back calculation.



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