



# Cumulative Steroid Dose in Hospitalized Patients and COVID-19 Associated Pulmonary Aspergillosis



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## Background

- Severe COVID-19 elicits a hyperimmune response. Steroids may increase the risk of opportunistic infections.<sup>1</sup>
- COVID-19 associated pulmonary aspergillosis (CAPA) may arise as a complication.<sup>2</sup>
- The role of cumulative steroid dose in the development of CAPA is unclear.
- This study evaluates the relationship between cumulative steroid dose and the risk for CAPA.

## Methods

### Population

- 130 hospitalized patients with COVID-19 pneumonia.
- 42 patients with CAPA were matched to 82 controls by age and gender.

### Exposure

- Cumulative steroid dose.
  - Steroid dose was converted to dexamethasone equivalents (mg) according to potency and duration.
  - Cumulative dose was obtained in every patient from admission until discharge or diagnosis of CAPA.

### Outcome

- CAPA was defined according to 2020 ECMM/ISHAM.

### Statistical Analysis

- Mean cumulative dose was compared using t-test between cases and controls.
- We assessed the risk of CAPA by the continuous cumulative steroid dose using a logistic regression model.

## Results

Variable	No CAPA	CAPA	p-value
Age	62 ± 14	62 ± 14	0.93
Male	64 (73%)	30 (74%)	0.88
Obesity	38 (42%)	17 (85%)	< 0.001
Hypertension	43 (49%)	16 (100%)	< 0.001
Diabetes	33 (38%)	13 (100%)	< 0.001
Smoking history	9 (10%)	2 (100%)	< 0.001
Cumulative steroid dose	66 ± 75	251 ± 425	< 0.001

Table 1. Population characteristics by CAPA outcome

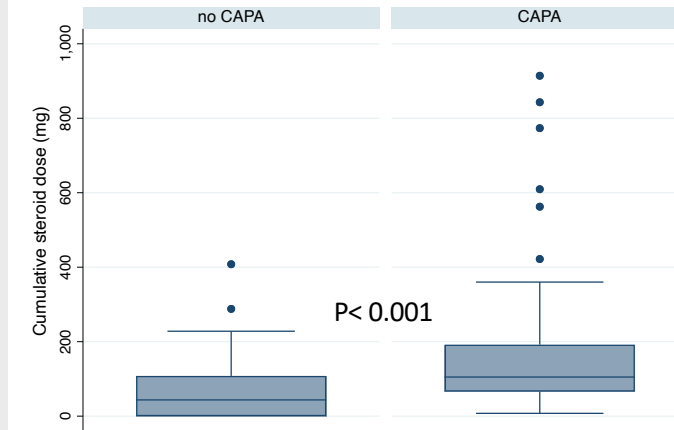


Figure 1. Cumulative steroid dose by CAPA status

- Patients who develop CAPA have a history of higher cumulative steroid dose during hospitalization.
- The risk for CAPA increases in a near-linear fashion as the cumulative steroid dose during hospitalization increases. (OR 1.008; 95% CI 1.003, 1.013, P< 0.001)

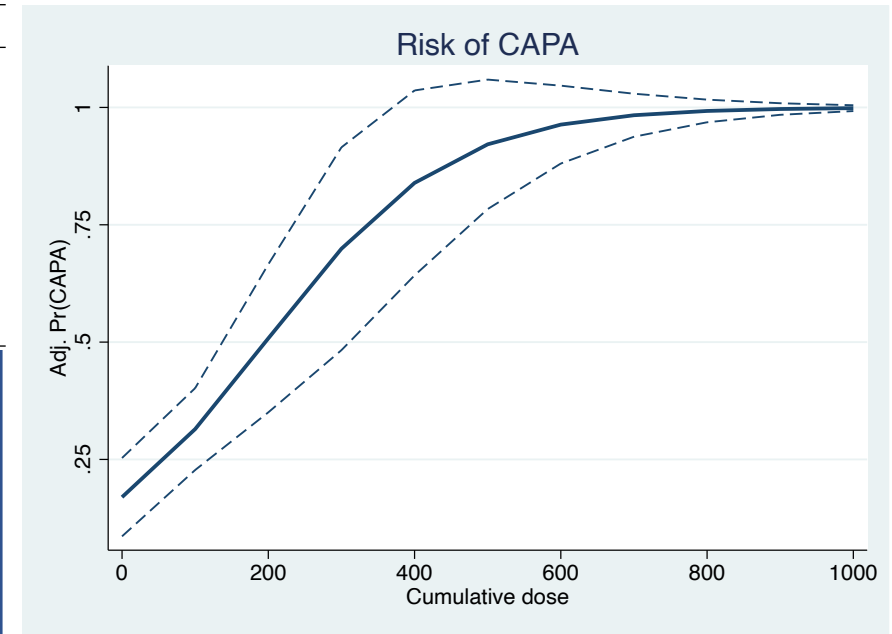
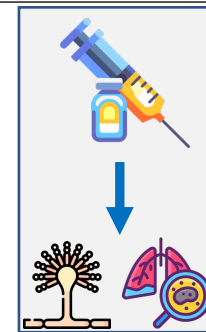


Figure 2. Cumulative dose (dexamethasone mg equivalents) and risk of CAPA



## Limitations

- This is a retrospective cohort study where data was obtained from chart review.
- Unmeasured confounders may be unaccounted for.
- Different steroid drugs were used, we accounted for this by standardizing by potency.

## Conclusions

- **Clinical suspicion of CAPA should increase in individuals with a high cumulative dose of steroids and clinical decline.**

References: <sup>1</sup>Tan, L et al. "Hyperinflammatory Immune Response and COVID-19: A Double-Edged Sword." *Frontiers in Immunology* 12 (2021); <sup>2</sup> Arastehfar, A et al. "COVID-19 Associated Pulmonary Aspergillosis (CAPA)—From Immunology to Treatment." *Journal of Fungi* 6 (2020).