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## Research Article

# Individualized High Dose Intravenous Anakinra Treatment is Safe and Effective in Patients with COVID-19 Associated Cytokine Storm Accompanying Cancer: A Retrospective Matched Study

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## ARTICLE INFO

## Article history:

Received: 15 September, 2022

Accepted: 25 September, 2022

Published: 24 September, 2022

## ABSTRACT

**Background:** Severe COVID-19 course is associated with higher inflammatory state (cytokine storm) due to the excessive release of pro-inflammatory cytokines. Some preliminary results showed higher disease severity as well as mortality in patients with COVID-19 accompanying cancer. In this study, we aimed to evaluate the high dose intravenous anakinra treatment response and outcome in patients with severe and critically ill COVID-19 accompanying cancer.

**Method:** This observational retrospective study was carried out at a tertiary referral center between 01.09.2021 and 01.02.2022 in Turkey. The study population consisted of two groups as follows; the patients receiving high dose intravenous anakinra (anakinra group) and the patients treated with standard of care (SoC, control group). Anakinra was started in patients who did not respond to steroid therapy at least two days or concomitantly with steroids in patients with higher risk and/or critical illness at admission.

**Results:** Data of 146 patients in anakinra and 114 patients in control group were analyzed. Median  $\pm$  interquartile range (IQR) patient age was 71 (25) years, duration of hospitalization were 11 (12) days in anakinra group and 65.5 (23) years and 9 (7.3) days in control group, respectively. Fifty-seven (39 %) and 68 (59.6 %) patients had severe, 89 (61 %) and 46 (40.4 %) had critical disease in anakinra and control group, respectively. Overall, ICU admission was in 58 (39.7 %) and 25 (22 %), intubation was in 52 (35.6 %) and 13 (11.4 %) patients, 54 (37 %) and 27 (23.7 %) patients died in anakinra and control group, respectively. Malignancy frequency was 11 % (n=16) in anakinra group and 7 % (n=8) in the control group. In survival analysis, significantly lower survival rate was observed in patients with malignancy than those without in control group (Log-Rank: p=0.002) and patients with malignancy in control group compared to anakinra group (Log-Rank: p=0.013); but did not differ between patients with and without malignancy in anakinra group (Log-Rank: p=0.9).

**Conclusion:** In our study, mortality was higher in patients with malignancy compared to those without control but not in anakinra group and also higher in patients receiving anakinra compared to SoC. Our study indicates that intravenous high dose anakinra treatment is safe and effective in patients with COVID-19 associated cytokine storm accompanying cancer.

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