

Role of Vitamin-D in Reducing Need for Supplemental Oxygen Among COVID-19 Patients

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Abstract : Introduction: This research focuses on exploring the beneficial effects if any, of Vitamin-D in reducing the need for supplemental oxygen among hospitalized COVID-19 patients. Two questions are investigated – Q1) Does having a healthy level of baseline Vitamin-D 25-OH (≥ 30 ng/ml) help, and Q2) does administering Vitamin-D therapy after-the-fact during inpatient hospitalization help? Methods/Study Design: This is a comprehensive, retrospective, observational study of all inpatients at RUHS from March through December 2020 who tested positive for COVID-19 based on real-time reverse transcriptase-polymerase chain reaction assay of nasal and pharyngeal swabs and rapid assay antigen test. To address Q1, we looked at all N1=182 patients whose baseline plasma Vitamin-D 25-OH was known and who needed supplemental oxygen. Of this, a total of 121 patients had a healthy Vitamin-D level of ≥ 30 ng/ml while the remaining 61 patients had low or borderline (≤ 29.9 ng/ml) level. Similarly, for Q2, we looked at a total of N2=893 patients who were given supplemental oxygen, of which 713 were not given Vitamin-D and 180 were given Vitamin-D therapy. The numerical value of the maximum amount of oxygen flow rate (dependent variable) administered was recorded for each patient. The mean values and associated standard deviations for each group were calculated. These two sets of independent data served as the basis for independent, two-sample t-Test statistical analysis. To be accommodative of any reasonable benefit of Vitamin-D, a p-value of 0.10 ($\alpha < 10\%$) was set as the cutoff point for statistical significance. Results: Given the large sample sizes, the calculated statistical power for both our studies exceeded the customary norm of 80% or better ($\beta < 0.2$). For Q1, the mean value for maximum oxygen flow rate for the group with healthy baseline level of Vitamin-D was 8.6 L/min vs. 12.6 L/min for those with low or borderline levels, yielding a p-value of 0.07 ($p < 0.10$) with the conclusion that those with a healthy level of baseline Vitamin-D needed statistically significant lower levels of supplemental oxygen. For Q2, the mean value for a maximum oxygen flow rate for those not administered Vitamin-D was 12.5 L/min vs. 12.8 L/min for those given Vitamin-D, yielding a p-value of 0.87 ($p > 0.10$). We therefore concluded that there was no statistically significant difference in the use of oxygen therapy between those who were or were not administered Vitamin-D after-the-fact in the hospital. Discussion/Conclusion: We found that patients who had healthy levels of Vitamin-D at baseline needed statistically significant lower levels of supplemental oxygen. Vitamin-D is well documented, including in a recent article in the Lancet, for its anti-inflammatory role as an adjuvant in the regulation of cytokines and immune cells. Interestingly, we found no statistically significant advantage for giving Vitamin-D to hospitalized patients. It may be a case of “too little too late”. A randomized clinical trial reported in JAMA also did not find any reduction in hospital stay of patients given Vitamin-D. Such conclusions come with a caveat that any delayed marginal benefits may not have materialized promptly in the presence of a significant inflammatory condition. Since Vitamin-D is a low-cost, low-risk option, it may still be useful on an inpatient basis until more definitive findings are established.

Keywords : COVID-19, vitamin-D, supplemental oxygen, vitamin-D in primary care

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