Inpatient Glycemic Management Strategies and Their Association with Clinical Outcomes in Hospitalized SARS-CoV-2 Patients

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Abstract : Introduction: Type 2 Diabetes is a well-established risk factor for severe SARS-CoV-2 infection. Uncontrolled hyperglycemia in patients with established or newly diagnosed diabetes is associated with poor outcomes, including increased mortality and hospital length of stay. Objectives: Our study aims to compare three different glycemic management strategies and their association with clinical outcomes in patients hospitalized for moderate to severe SARS-CoV-2 infection. Identifying optimal glycemic management strategies will improve the quality of patient care and improve their outcomes. Method: This is a retrospective observational study on patients hospitalized at Adventist Health White Memorial with severe SARS-CoV-2 infection from 11/1/2020 to 02/28/2021. The following inclusion criteria were used: positive SARS-CoV-2 PCR test, age >18 yrs old, diabetes or random glucose >200 mg/dL on admission, oxygen requirement >4L/min, and treatment with glucocorticoids. Our exclusion criteria included: ICU admission within 24 hours, discharge within five days, death within five days, and pregnancy. The patients were divided into three glycemic management groups: Group 1, managed solely by the Primary Team, Group 2, by Pharmacy; and Group 3, by Endocrinologist. Primary outcomes were average glucose on Day 5, change in glucose between Days 3 and 5, and average insulin dose on Day 5 among groups. Secondary outcomes would be upgraded to ICU, inpatient mortality, and hospital length of stay. For statistics, we used IBM® SPSS, version 28, 2022. Results: Most studied patients were Hispanic, older than 60, and obese (BMI >30). It was the first CV-19 surge with the Delta variant in an unvaccinated population. Mortality was markedly high (> 40%) with longer LOS (> 13 days) and a high ICU transfer rate (18%). Most patients had markedly elevated inflammatory markers (CRP, Ferritin, and D-Dimer). These, in combination with glucocorticoids, resulted in severe hyperglycemia that was difficult to control. Average glucose on Day 5 was not significantly different between groups primary vs. pharmacy vs. endocrine (220.5 ± 63.4 vs. 240.9 ± 71.1 vs. 208.6 ± 61.7 ; P = 0.105). Change in glucose from days 3 to 5 was not significantly different between groups but trended towards favoring the endocrinologist group (-26.6 ± 73.6 vs. 3.8 ± 69.5 vs. -32.2 ± 84.1; P= 0.052). TDD insulin was not significantly different between groups but trended towards higher TDD for the endocrinologist group (34.6 ± 26.1 vs. 35.2 ± 26.4 vs. 50.5 ± 50.9; P=0.054). The endocrinologist group used significantly more preprandial insulin compared to other groups (91.7% vs. 39.1% vs. 65.9% ; P < 0.001). The pharmacy used more basal insulin than other groups (95.1% vs. 79.5% vs. 79.2; P = 0.047). There were no differences among groups in the clinical outcomes: LOS, ICU upgrade, or mortality. Multivariate regression analysis controlled for age, sex, BMI, HbA1c level, renal function, liver function, CRP, d-dimer, and ferritin showed no difference in outcomes among groups. Conclusion: Given high-risk factors in our population, despite efforts from the glycemic management teams, it's unsurprising no differences in clinical outcomes in mortality and length of stay.

Keywords : glycemic management, strategies, hospitalized, SARS-CoV-2, outcomes
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