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# A Retrospective Cohort Study on the Relationship between Coronary Artery Bypass Grafting and COVID-19 Outcomes

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**ABSTRACT**

**Introduction:** The coronavirus disease 2019 (COVID-19) has been globally linked to high mortality and morbidity. In patients with COVID-19, individuals with underlying cardiovascular conditions are at increased risk for complications, severe symptoms, and worsening survival. Those who have undergone coronary artery bypass grafting (CABG), one of the most important indicators of cardiovascular conditions, may also experience severe outcomes from COVID-19. This study investigated the impact of previous CABG on the clinical outcomes of patients hospitalized with COVID-19.

**Methods and Materials:** We conducted this retrospective cohort study at Shahid Beheshti Hospital in Kashan, Iran, from February 2020 to February 2022. We included all COVID-19 patients with a history of CABG (n = 223) and a matched control group of non-CABG COVID-19 patients (n = 223), matched by age, sex, and history of hypertension and diabetes to minimize confounding bias. Data, including demographics, comorbid conditions, and outcomes, were extracted from medical records. The primary outcomes assessed were in-hospital mortality, hospital stay duration, the need for mechanical ventilation, and thromboembolic events. Statistical analyses were performed to compare the groups, including t-tests and chi-square tests.

**Results:** The mean age was 70.2 years (SD = 12 years), with a male predominance (71.3%), which was similar in both groups due to matching. The study revealed that patients with a history of CABG had significantly greater in-hospital mortality rates than non-CABG patients (17.5% vs. 7.2%; $p$ = 0.001). The need for mechanical ventilation was also more significant in the CABG group (7.6% vs. 2.7%; $p$ = 0.019). The average hospital stay was more extended for CABG patients (mean = 7.73; SD = 4.86 days) than for non-CABG patients (mean = 6.89, SD = 4.32 days), although this difference was not found to be statistically significant ($p$ = 0.055). No thromboembolic events occurred in either group. After matching, both groups had similar prevalence of diabetes (48.9%) and hypertension (54.3%). Other comorbid conditions, including heart failure (2.7% vs. 0.9%, $p$ = 0.154), chronic kidney disease (3.6% vs. 1.3%; $p$ = 0.127), history of malignancy (1.8% vs. 2.7%; $p$ = 0.522), cerebrovascular disease (1.8% vs. 0.4%; $p$ = 0.177), and chronic lung disease (2.2% vs. 1.8%; $p$ = 0.736), were slightly different between the CABG group and the non-CABG group. Still, the differences did not reach statistical significance.

**Conclusion and Discussion:** Patients with a history of CABG represent a particularly vulnerable population in the context of COVID-19, exhibiting increased mortality and an increased need for mechanical ventilation. These findings emphasize the need for targeted clinical strategies to manage and reduce risks in COVID-19 patients with prior CABG. Further research is required to explore the mechanisms underlying these associations and to develop specific management guidelines for this high-risk population.

*Keywords:* Coronary artery bypass, COVID-19, Hospital mortality



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