IMPACT OF INTRA-AORTIC BALLOON PUMP ON THE EARLY POSTOPERATIVE OUTCOME IN PATIENTS WHO UNDERWENT CORONARY ARTERY BYPASS SURGERY FOR SEVERE CORONARY ARTERY DISEASE WITH REDUCED LEFT VENTRICULAR EJECTION FRACTION: A META-ANALYSIS

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ABSTRACT

Background: Patients undergoing coronary artery bypass grafting (CABG) with reduced left ventricular ejection fraction (LVEF) are at high risk for postoperative mortality and complications. The use of an intra-aortic balloon pump (IABP) as a prophylactic intervention in this population remains a subject of clinical debate. This study aimed to evaluate the effect of IABP on early postoperative outcomes—specifically, mortality and complications (low cardiac output syndrome (LCOS), myocardial infarction (MI), acute kidney injury (AKI) and cerebrovascular accident (CVA) or stroke)—through a meta-analysis of published studies.

Methods: A systematic search identified 1,399 studies, of which 7 met the inclusion criteria. Eligible studies involved CABG patients with reduced LVEF, comparing outcomes between those who received preoperative IABP and those who did not. A random-effects meta-analysis was performed to calculate pooled odds ratios (OR) and 95% confidence intervals (CI) for early mortality and complications. Funnel plot analysis, Egger's test, trim-and-fill analysis, subgroup analysis by country income level, and leave-one-out sensitivity analysis were conducted to assess robustness and potential bias.

Results: IABP use was significantly associated with reduced early postoperative mortality (OR = 0.40, 95% CI: 0.23–0.71, p = 0.0019), and risk of postoperative LCOS (OR = 0.29, 95% CI: 0.16–0.53, p < 0.0001) and MI (OR = 0.53, 95% CI: 0.29–0.98, p = 0.0446). The statistically insignificant pooled effects for AKI and stroke are OR = 0.69 (95% CI: 0.27–1.79, p = 0.4501) and OR = 1.39 (95% CI: 0.32–6.00, p = 0.6586), respectively. No major publication bias was detected using funnel plot analysis and Egger's test for mortality. Leave-one-out analysis for both outcomes confirmed the stability of the results. Subgroup analysis for mortality showed consistent treatment effects across both first-world and developing countries. Trim-and-fill analysis for mortality slightly attenuated the effect (adjusted OR: 0.43), but results remained statistically significant.

Conclusion: Prophylactic IABP use in high-risk CABG patients with reduced LVEF significantly reduces early postoperative mortality and complications. These findings are robust across multiple sensitivity analyses and appear generalizable across diverse healthcare settings. IABP should be considered as a beneficial adjunct in the perioperative care of this high-risk population.