Efficacy of Colchicine in Improving Outcomes in Coronary Artery Disease: A Systematic Review and Meta-Analysis

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Background: Inflammation plays a pivotal role in coronary artery disease (CAD), and colchicine has been extensively studied in this context. Objectives: Colchicine, a potent anti-inflammatory drug, inhibits microtubule growth. This study analyzes its impact and efficacy on outcomes in CAD patients.

Methods: We conducted a systematic review and meta-analysis comparing colchicine to standard therapy in CAD. A comprehensive search was performed in PubMed/MEDLINE, Embase, and Cochrane Central Register of Controlled Trials from inception through August 8, 2024. Excluded were animal studies, case reports, reviews, editorials, and letters. The primary outcome was Major Adverse Cardiovascular Events (MACE), defined as a composite of cardiovascular death, acute myocardial infarction (MI), ischemic stroke, and ischemia-driven revascularization. Secondary outcomes included individual components of MACE, acute coronary syndrome (ACS), and all-cause mortality. Risk ratios (RR) and confidence intervals (CI) were calculated using a random-effects model, with $p < 0.05$ considered statistically significant. Heterogeneity was assessed using the Higgins I^2 index.

Results: Five randomized controlled trials (RCTs) involving 11,843 patients were included. MACE incidence was significantly lower with colchicine versus standard therapy (4.94% vs. 7.32%, RR 0.59, 95% CI 0.43–0.79, $p = 0.0004$, $I^2 = 67\%$). Stroke (0.4% vs. 0.89%, RR 0.46, 95% CI 0.27–0.77, $p = 0.003$, $I^2 = 4\%$) and ACS (1.2% vs. 4.09%, RR 0.30, 95% CI 0.20–0.45, $p < 0.00001$, $I^2 = 27\%$) rates were also lower in the colchicine group. However, no significant differences were observed in MI (3.02% vs. 3.95%, RR 0.72, 95% CI 0.51–1.02, $p = 0.06$, $I^2 = 42\%$), cardiovascular death (0.83% vs. 0.92%, RR 0.90, 95% CI 0.60–1.34, $p = 0.60$, $I^2 = 0\%$), and all-cause mortality (2.26% vs. 1.89%, RR 1.22, 95% CI 0.82–1.82, $p = 0.32$, $I^2 = 35\%$) between groups.

Conclusion: Colchicine, when added to standard therapy, significantly reduces the risk of major cardiovascular events, ACS, and stroke in CAD patients. It did not significantly affect MI, cardiovascular

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death, or all-cause mortality. Colchicine shows promise as an adjunct therapy in CAD, but further RCTs with larger samples are needed to confirm these findings.

Keywords: Colchicine, Coronary Artery Disease, Mortality, MACE

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