Evaluating the Effectiveness of Interleukin-6 Inhibition for Patients with Acute Myocardial Infarction

Faisal H. Almlkai
College of Medicine, Taif University, Ta'if, Saudi Arabia

Mohammed J. Almalki
College of Medicine, Taif University, Ta'if, Saudi Arabia

Abstract

Introduction: Acute myocardial infarction (AMI) remains a leading cause of mortality despite advances in reperfusion therapy. Ischemia-reperfusion injury contributes substantially to myocardial damage through inflammation. Interleukin-6 (IL-6), a central cytokine, is linked to infarct size and adverse outcomes. IL-6 inhibition may offer cardio-protection by attenuating inflammatory pathways.

Methods: This systematic review and meta-analysis was performed in accordance with PRISMA guidelines and prospectively registered in PROSPERO. A comprehensive search of PubMed, MEDLINE, Cochrane Library, and Google Scholar was conducted until June 2025 to identify randomized and prospective studies evaluating interleukin-6 inhibition in acute myocardial infarction. Two reviewers independently screened studies, extracted data, and assessed risk of bias. Outcomes included infarct size, biomarkers, major adverse cardiovascular events, and all-cause mortality.

Results: Three randomized controlled trials comprising 344 patients were included. All evaluated tocilizumab in STEMI or NSTEMI. Pooled analysis showed no significant difference between tocilizumab and placebo for recurrent myocardial infarction (RR=0.47, 95% CI: 0.07-3.05; I*=44%; p=0.43) or infection (RR=0.85, 95% CI: 0.29-2.53; 1*=0%; p=0.77). Mechanistic analyses demonstrated lower CRP exposure, transient reductions in NT-proBNP, and attenuated troponin release in the tocilizumab groups, supporting an early anti-inflammatory and cardioprotective effect. These benefits were most evident during hospitalization and in early presenters, but attenuated over time. Long-term outcomes, including ventricular remodeling, NT-proBNP at six months, and mortality, did not significantly differ between groups.

Conclusion: IL-6 inhibition with tocilizumab shows early anti-inflammatory and cardioprotective effects in acute myocardial infarction, but consistent clinical benefits remain unproven, necessitating larger trials to confirm efficacy and safety.