Intracoronary Imaging Versus Coronary Angiography Guidance for Percutaneous Coronary Intervention: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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Background: Intracoronary imaging (ICI) facilitates stent implantation by characterizing lesion calcification, providing accurate vessel dimensions, and optimizing stent results. We sought to investigate the outcomes of ICI versus coronary angiography (CA) to guide percutaneous coronary intervention (PCI) with 2nd and 3rd-generation drug eluting stents.

Methods: A systematic search of PubMed, Medline, and Cochrane databases was conducted from their inception to July 16, 2022 for randomized controlled trials (RCTs) comparing ICI to CA. Outcomes of interest included target lesion revascularization (TLR), target vessel revascularization (TVR), major adverse cardiovascular events (MACE), myocardial infarction (MI), stent thrombosis (ST), and cardiac and all-cause mortality. A random effects model was used to calculate pooled incidence and relative risk (RR) with 95% confidence intervals (CIs).

Results: Nine RCTs with 5,879 patients met the inclusion criteria. The ICI and CA groups were similar in demographic and comorbidity characteristics. Compared to CA, patients in the ICI-guided PCI group had lower rates of TLR (RR 0.60, 95% CI 0.43-0.83, p=0.002), TVR (RR 0.72, 95% CI 0.51-1.00, p=0.05), MACE (RR 0.61, 95% CI 0.48-0.78, p<0.0001), and MI (RR 0.48, 95% CI 0.25-0.95, p=0.03). There were no significant differences in ST or cardiac or all-cause mortality between the two strategies.

Conclusion: ICI-guided PCI, compared with CA guidance alone, is associated with improved clinical outcomes, largely driven by lower repeat revascularization.

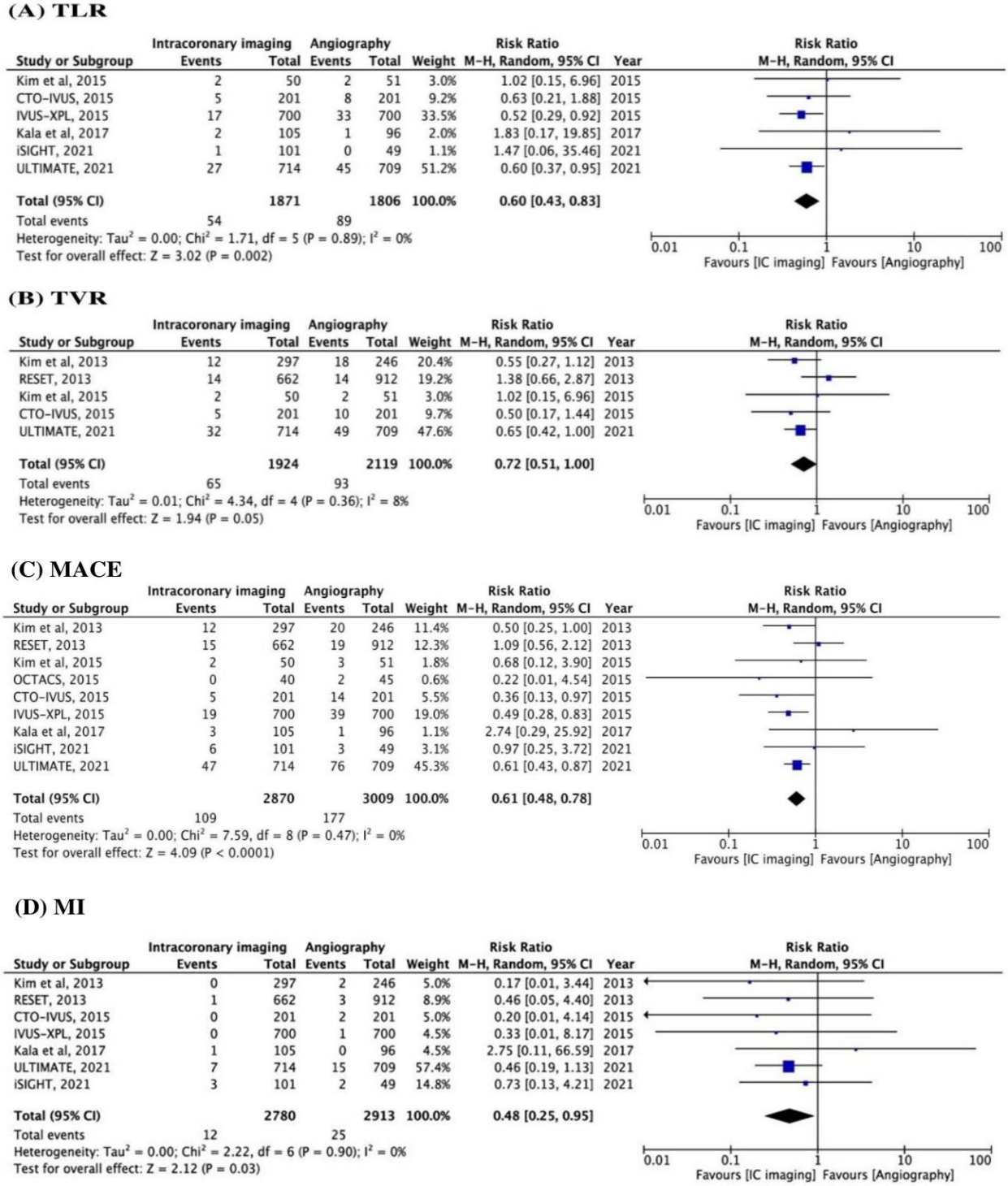

Figure 1. Forest plot of studies comparing outcomes; Legend: 1A: Target lesion revascularization, 1B: Target vessel revascularization, 1C: Major adverse cardiovascular events, 1D: Myocardial Infarction. Abbreviations: IC= Intracoronary.