

A meta-analysis of elective coronary revascularization vs. medical therapy alone

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A rigorous meta-analysis of randomized clinical trials (RCTs) that compared the effects of medical therapies alone with medical therapies plus revascularization in patients with stable ischemic heart disease

(SIHD) was presented at EuroPCR on May 18, 2021. The study concluded that adding revascularization was associated with a statistically important reduction in cardiovascular death associated with a statistically important reduction in spontaneous myocardial infarction (MI), providing a biologically plausible explanation for the observed benefit.

An international group of investigators performed a meta-analysis of RCTs conducted between 1979 and 2020. Strict entry criteria were established to assure the analysis was restricted to studies involving elective, deferrable treatments of patient with SIHD. This produced 25 RCTs with an enrolment of 19,806 patients. Event rates at the latest reported time point were studied. The analysis found that use of revascularization with [percutaneous coronary intervention](#) (PCI) or [coronary artery bypass](#) grafting surgery (CABG) was linked to a statistically important 21% reduction in late cardiovascular death. Furthermore, the magnitude of benefit appeared to increase over time. The rigorous statistical assessment concluded that an initial strategy of invasive care was superior to an initial strategy of conservative care and that this benefit became more evident with longer follow up. In fact, meta-regression techniques indicated that prior studies may have missed this finding principally because follow up wasn't long enough.

The research team performed multiple sensitivity analyses to determine how certain conditions influenced the results of the meta-analysis such as treatment in the context of a recent acute coronary syndrome, inclusion of patients requiring treatment of chronic total occlusions, or studies in which >30% of patients received CABG. Also, a few studies were judged to have a meaningful risk of bias. Exclusion of these studies did not alter the significance of the cardiovascular mortality risk reduction with an initial invasive strategy.

The meta-analysis also found that an initial invasive approach was

associated with a 24% reduction in spontaneous MI which had a larger impact on survival than peri-procedural MI; in fact, the meta-analysis found that peri-procedural MI in the RCTs did not impact reported cardiac death rates. Furthermore, the meta-analysis linked a survival advantage to lower spontaneous MI rates especially among patients with extensive disease. "This comprehensive analysis clearly defines a risk-reduction in cardiovascular mortality following coronary revascularization in patients with stable coronary artery disease that is directly related to both duration of follow-up and magnitude of risk reduction in spontaneous myocardial infarction. This mechanistically plausible benefit of revascularization is evident through multiple sensitivity analyses," said Dean Kereiakes, MD, FSCAI, medical director of the Christ Hospital Research Institute in Cincinnati, OH, and a co-author of the study.

An especially important observation from this report evolved from a meta-regression analysis which found that longer follow up was associated with increased observed benefit with an invasive strategy, and that differences in conclusions between RCTs could be explained largely by differences in follow up duration. While total MI rates may not appear to be different between treatment strategies in the short run, revascularization helps over a long timeline by more effectively lowering the risk of spontaneous MI; this observation may be overwhelmed by the effects of peri-procedural MI associated with undergoing revascularization if follow up is relatively short. According to Alexandra Lansky MD, FSCAI, director of the Heart and Vascular Clinical Research Program and the Cardiovascular Research Center at Yale and a co-author of the study. "For our patients with stable coronary artery disease on medical therapy, this means that 1 in 5 will realize a survival benefit about 5.5 years after revascularization and 1 in 4 will avoid a spontaneous heart attack. The two are related, and the survival benefit of revascularization increases with time. For our studies, this means we need long-term follow-up focused on cardiac death to see the benefit of

revascularization," Dr. Lansky continued.

This meta-analysis indicates that coronary revascularization with PCI or CABG provides a long-term cardiovascular survival advantage over an initial conservative approach in patients with [stable ischemic heart disease](#) by lowering rates of spontaneous MI, a new and exciting finding related to coronary [revascularization](#) including PCI. Prior studies may have missed this relationship primarily because patients were not followed long enough for the benefit to be seen.

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