Commentary: What Matters More: Method of Revascularization or Completeness?

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Central Message (193 / 200 characters with spaces)

Future guidelines take note! For patients with LVEF ≤35%, CABG provides more complete revascularization than PCI (93% vs 20%) and superior survival with lower rates of MI or revascularization.

Central Picture and Central Picture Legend (88 / 90 characters with spaces)

Long-term outcomes for PCI vs CABG (blue); adjusted for complete revascularization (red)

The 2021 coronary revascularization and the 2023 chronic coronary disease guidelines have highlighted important differences between surgeon and cardiologist interpretations of the revascularization literature.[1, 2] One issue is the age of the available data leading to de-emphasis of prior clinical trials and reliance on new trials peripherally related to coronary artery bypass grafting (CABG). While the recommendations downgraded earlier randomized trials of CABG vs medical therapy, beginning new trials in this area is not feasible. Therefore, studies such as this one by Alzahrani et al. are important to update the literature with contemporary CABG outcomes.[3] Further, emphasis on the ISCHEMIA trial rather than prior percutaneous coronary intervention (PCI) vs CABG trials suggests equivalence between the revascularization strategies.[4] This overall equivalency is not supported by the data either in terms of revascularization quality or long-term outcomes.

This analysis by Alzahrani and colleagues is an important contribution analyzing revascularization strategies for ischemic cardiomyopathy patients. Although the
recommendation for CABG in this cohort did not receive a downgrade like those with moderate or better ventricular dysfunction, the data supporting the recommendation is largely derived from medical therapy versus CABG (STITCH) and not by direct comparison to PCI making it at risk of being de-emphasized in upcoming guidelines.[5] This study utilized a cohort of 5,988 patients in the state of New Jersey with an ejection fraction of ≤35% who underwent CABG (3,673, 61.3%) or PCI (2,315, 38.6%) for multivessel coronary disease between 2007-2018. The linkage between clinical and administrative datasets allows for a rich analysis. The median follow-up time was 5.2 years (range: 0-13 years), so the long-term effects may be underestimated as the 10-year timeframe is often where the CABG and PCI treatment curves tend to diverge. Finally, the authors performed propensity matching leading to well-balanced groups for the analysis.

The first important finding relates to revascularization quality. While CABG was able to achieve complete revascularization in 93% of cases, PCI was only able to so in 20% of cases. This is a stark difference considering the impact completeness of revascularization has on major adverse cardiovascular events (MACE). For CABG, post-hoc (1-year angiography) defined complete revascularization in the Veterans Affairs Randomized On/Off Bypass (ROOBY) trial lead to lower rates of MACE (OR 0.44, 95% CI 0.33-0.58; p<0.01).[6] This effect may be more pronounced for PCI as shown in Second Medicine, Angioplasty, or Surgery Study (MASS II). Complete revascularization was associated with higher survival free of cardiovascular mortality (90.6% vs 84.4%, p=0.04), but this was mainly driven by the PCI cohort (p=0.05).[7] Given these effects it is important for the heart team to consider completeness of revascularization with each strategy when deciding on a recommendation. Secondly, the outcomes with CABG were superior to PCI in this ischemic cardiomyopathy group. With real world completeness of revascularization, CABG provides
superior survival and lower rates of myocardial infarction (MI) or revascularization (Figure). These effect sizes are large for MI and revascularization with hazard ratios of 2.4 and 2.2 respectively. The effect on mortality is also clinically very meaningful with a hazard ratio of 1.4.

The authors chose to also emphasize their analysis where they included completeness of revascularization in the propensity score. The result was complete revascularization in the CABG group decreased from 93% to 55% (and inversely PCI increased from 20% to 55%). This data would be reasonable to consider when a heart team believes the multi-vessel coronary disease could be similarly treated with CABG and PCI, typically seen with low complexity lesions. Both low rates of complete revascularization and low complexity of disease will underestimate the benefit of CABG as it is performed in practice. However, even considering these limitations, CABG had lower rates of myocardial infarction or revascularization (Figure). Further, these effect sizes are still large with hazard ratios of 1.9 and 1.6 and consideration of CABG over PCI for these reasons is reasonable, even if PCI for a patient is thought to lead to complete revascularization. However, for high-risk surgical candidates it would also be reasonable to consider PCI should a good result be possible.

These two factors, completeness of revascularization and long-term outcomes, both favor CABG over PCI for this cohort. The nuances of the results related to completeness of revascularization are important for heart teams to consider as they make multidisciplinary recommendations. In summary, this data provides further evidence for the superiority of CABG in patients with severe left ventricular dysfunction and support keeping the current Class 1 recommendation in the guidelines.

REFERENCES


