The optimal strategy for the management of patients with stable ischaemic heart disease (SIHD) has been a matter of considerable debate over the past two decades. Without question, during this time period, there have been profound technological evolutions in revascularization (both catheter based and surgical) as well as the development of increasingly effective pharmacological therapies, notably the class of agents that are widely regarded as disease-modifying interventions (statins, inhibitors of the renin–angiotensin–aldosterone system, and thienopyridines), as well as more time-honoured treatments such as aspirin and anti-ischaemic agents (beta-blockers, calcium antagonists, nitrates, ranolazine, and ivabradine). Against this backdrop of improving pharmacological approaches, clinicians who care for patients with SIHD frequently confront the decision of whether the initial management should be optimal medical therapy (OMT) alone, or OMT combined with revascularization.¹

When revascularization is considered, both coronary artery bypass graft (CABG) surgery and percutaneous coronary intervention (PCI) are potential options. In general, certain core diagnostic principles guide therapeutic decision-making as to the best treatment options that need to be individualized. In general, these include the patient’s clinical presentation, the severity and magnitude of ischaemia, the extent and distribution of coronary anatomical disease, and the presence of both cardiac and non-cardiac medical conditions and co-morbidities.

One of the core tenets of management has been the premise that revascularization directed at flow-limiting coronary stenoses will more effectively treat regional myocardial ischaemia and, in turn, will preserve left ventricular (LV) ejection fraction (EF). Clearly, primary PCI for acute ST-segment elevation myocardial infarction (MI) improves both clinical outcomes and LVEF.² Whether revascularization imparts similar, salutary outcomes in SIHD patients is less clear. The results of several prospective randomized trials³–⁸ which rigorously compared ‘hard’ clinical endpoints of death and MI in SIHD patients, who had undergone either revascularization or OMT, have failed to show superiority of either management strategy. Nonetheless, the prevailing clinical practice has tended to favour a ‘revascularization-first’ approach as compared with an ‘OMT-first’ management paradigm, especially in SIHD patients with multivessel coronary artery disease (CAD) who are believed to be at greater risk for clinical events and subsequent decreases in LVEF without revascularization. While reduced LVEF is known to be a powerful prognostic predictor of adverse clinical outcomes,⁹ it remains unclear whether SIHD patients who receive revascularization are more likely to experience preserved LV systolic function as compared with those who receive OMT alone.

Garzillo and co-workers¹⁰ have now evaluated the long-term findings of serial LVEF in SIHD patients with multivessel CAD at baseline and at 10 years following randomization to PCI, CABG, or OMT using transthoracic echocardiography (TTE). In this post-hoc analysis of the second Medicine, Angioplasty, or Surgery Study (MASS II) Trial, the authors challenge the widely held treatment assumption that myocardial revascularization, presumably directed at addressing segmental ischaemic myocardium, is more effective than OMT in preserving LVEF. The patient population consisted of 611 subjects with multivessel CAD of whom 422 were alive at 10 years and from which 350 enrollees had serial TTE studies who initially had largely preserved LVEF (mean of 0.61 ± 0.09, re-
Overall, the rate of subsequent revascularization and total mortality were not significantly different among treatment strategies (LVEF of 0.56 ± 0.11, 0.55 ± 0.11, 0.55 ± 0.12, P = 0.675, respectively) and declined minimally in all three groups (reduction in LVEF, negative 7.2 ± 17.13, 9.08 ± 18.77, 7.54 ± 22.74, respectively). There was no statistically significant difference in the decline in LVEF between OMT and revascularization in this SIHD population with multivessel CAD (Figure 1). There was a greater reduction in LVEF among patients with acute MI both at baseline and during the study follow-up period.10

Of note, this post-hoc analysis has several notable limitations, which should be highlighted. As noted above, MASS II was a single-centre trial in a small sample of SIHD patients assigned to one of three treatment strategies. Secondly, this post-hoc analysis included only 350 patients who had LVEF measurements over the follow-up period and hence there may be a significant Type II error that makes the interpretation of these findings less reliable and robust. Thirdly, the strict inclusion criteria and the interval during which patients were enrolled in MASS II between 1995 and 2000 (which antedated the advent of drug-eluting stents and contemporary, multifaceted OMT) may limit the ability to generalize these results to current clinical practice. Fourthly, patients who died at any time point before the 10-year follow-up were excluded, which introduces the potential for selection bias, as patients with lower EF might have died before the 10-year follow-up evaluation. Finally, the 17% of patients lost to follow-up also had a higher prevalence of diabetes mellitus, and could have contributed to potential selection bias. Of the various factors assessed in this post-hoc analysis, the most revealing finding was the observation that an MI before (or after) randomization appeared to be associated, as expected, with a decrement in follow-up LVEF as assessed by TTE.10

Further study is warranted in a larger patient population with SIHD to explore this issue of which initial treatment strategy will optimally impact the preservation of LV systolic function. The NIH-funded International Study of Comparative Health Effectiveness with Medical and Invasive Approaches (ISCHEMIA) Trial (ClinicalTrials.gov identifier: NCT01471522) will study the rate of cardiovascular mortality or non-fatal MI during long-term (projected 4-year mean follow-up) myocardial revascularization (principally using PCI with drug-eluting stents) as compared with OMT in 8000 subjects enrolled from ~400 sites in 29 countries. The ISCHEMIA trial will obtain baseline LV systolic function data and allow for long-term follow-up of patients with SIHD and thereby better inform clinical decision-making as to the impact of revascularization or OMT on LV systolic function, in addition to the primary endpoint.14

In summary, this long-term follow-up of the MASS II trial demonstrates that, among surviving participants without an antecedent MI, there was only a modest decline in EF over the ensuing 10 years with no evidence of any treatment effect or differences among those who were treated with PCI, CABG, or OMT. Clearly, these data suggest that, in SIHD patients with multivessel CAD and preserved LV systolic function at baseline, there appears to be no measurable difference in LVEF with or without revascularization. Equally importantly, these data reaffirm earlier trials in SIHD patients, which demonstrate that an initial management strategy of OMT with deferred revascularization, if needed, is associated with similar clinical outcomes (i.e. death or MI) as compared with those who undergo revascularization, and the present study extends these observations to the endpoint of LV systolic function. We concur strongly with the authors’ conclusion that ‘aggressive medical therapy and lifestyle modifications with comprehensive risk factor control are valuable and should not be underestimated in the treatment of patients with stable multivessel CAD.’10 As such, the findings from this analysis marshal additional scientific information that optimal medical therapy should be
regarded as the foundation of treatment and first-line therapy in the majority of SIHD patients.

**Conflict of interest:** none declared.

**References**


