3.7. Treatment for ACS with Multivessel Disease without Cardiogenic Shock

Recommendations

Recommendation	Strength of recommendation	Certainty of evidence
In haemodynamically stable people with STEMI and MVD, perform PCI of suitable non-IRA(s).	Strong	High
Consider performing PCI of the non-IRA at the time of primary PCI or within 19 days of the index procedure.	Weak	Moderate
In people with STEMI and MVD, routine invasive physiology assessment (e.g. fractional flow reserve [FFR]) to evaluate non-IRA severity is not recommended.	Consensus	
In people with NSTEACS and non-complex MVD, consider routine PCI of non-IRA in the same setting.	Weak	Low
In people with NSTEACS and MVD, consider invasive physiology assessment (e.g. FFR) to evaluate non-IRA severity.	Weak	Low

Evidence supporting the recommendations

Treatment of MVD in STEMI

In people with STEMI, MVD and without cardiogenic shock, RCTs have shown a benefit of complete revascularisation over IRA-only PCI with a reduction in cardiac death, recurrent MI and repeat revascularisation [320,454–467].

The MULTISTARS-AMI trial recruited people with STEMI and MVD to undergo immediate (at the time of index procedure, n=418) versus staged (median 28 days, range 19–45 days after index procedure, n=422) PCI of the non-IRA. Immediate revascularisation was superior to staged PCI with lower death, non-fatal MI, stroke, unplanned ischaemia-driven revascularisation and heart failure hospitalisation (RR 0.52, 95% CI 0.38–0.72, p<0.001) [468]. This trial suggests that complete revascularisation during the index procedure is both safe and superior to outpatient staged PCI. It is unknown if immediate non-IRA PCI is superior to inpatient staged PCI (or PCI performed within 19 days).

It should be noted that only a third of people in these trials had triple-vessel disease. People with left main disease, chronic total occlusions or planned for surgical revascularisation were largely excluded. Therefore, in people with complex MVD, CABG may be the appropriate complete revascularisation strategy (section 3.8 Coronary Artery Bypass Graft Surgery in ACS).

Treatment of MVD in NSTEACS

While complete revascularisation in STEMI is beneficial, currently there has been no dedicated trial comparing complete revascularisation versus PCI of the IRA only in people with NSTEACS. NSTEACS presents unique clinical challenges for management of MVD, including difficulty identifying the IRA lesion and a heterogenous pathophysiology.

A meta-analysis of observational studies in people with NSTEACS (15 studies, n=171,279) found people who underwent multivessel revascularisation had higher short-term risk, but lower long-term MACE (OR 0.76, 95% CI 0.61–0.93), all-cause death (OR 0.83, 95% CI 0.71–0.97) and repeat revascularisation (OR 0.62, 95% CI 0.42–0.90) [469].

Invasive physiology to evaluate the non-IRA in STEMI or NSTEACS and MVD

Several RCTs have compared a physiology-guided approach (mostly using FFR) to an angiography-alone approach in people with STEMI and MVD. Meta-analyses have not shown an overall benefit of FFR-guided complete revascularisation in STEMI with MVD. Some have shown that angiography-guided complete revascularisation is associated with a lower risk of all-cause death and new MI compared with FFR-guided PCI [467,470,471]. The COMPLETE RCT demonstrated a clear benefit of complete revascularisation in people with STEMI and MVD, even without a physiology-guided approach in most cases [456]. Therefore, in people with STEMI and MVD, the decision to undertake PCI of the non-IRA can be based on angiographic severity alone.

In people with NSTEACS and MVD, physiology assessment may be of more value. Several RCTs have specifically compared a physiology-guided approach to an angiography-guided approach in treatment of the non-IRA. The overall evidence supports physiology or FFR as being reliable for non-IRA lesion estimation in NSTEACS and that FFR-guided PCI results in more people being treated medically, compared with angiography-guided PCI [472,473]. However, the results have been conflicting regarding outcomes. The FLOWER-MI trial (n=1,171) showed no difference in clinical outcomes of FFR-guided versus angiography-guided PCI of the non-IRA [474]. The FRAME-AMI trial showed a reduction in MACE with FFR-guided versus angiography-guided non-IRA PCI. However, a limitation was that the trial was terminated early due to slow recruitment, with only 43% (n=562) of the planned sample size enrolled [475].