JACC State-of-the-Art Review: Impact of Percutaneous Coronary Intervention on Outcomes in Patients with Heart Failure

Take-home Messages:

- Coronary artery disease (CAD) remains the most common cause of heart failure in the United States, accounting for nearly two-thirds of cases. Coronary artery bypass grafting

(CABG) has long been the mainstay of treatment for patients with multivessel CAD and reduced ejection fraction (EF). But in this contemporary era of percutaneous coronary intervention (PCI), newer PCI optimization strategies are available — newer-generation drug-eluting stents, antiplatelet therapy, percutaneous mechanical circulatory support devices,

and the use of intravascular imaging studies.

- The underutilization of coronary angiography in patients hospitalized with acute heart failure correlates with low rates of revascularization with PCI in these patients. Coronary angiography is performed in only 10% to 15% of patients during the index hospitalization, and <20% of patients undergo coronary angiography

within 90 days of their hospitalization. Rates of revascularization with PCI are even lower (<5% within the index hospitalization).

- Patients hospitalized with acute heart failure should undergo coronary angiography after diuresis. In patients with evidence of triple-vessel disease, the optimal management strategy (eg, performing viability studies or fractional flow reserve assessments to

determine the need for revascularization or medical therapy alone) is unclear as more randomized trial data are needed.

- Observational studies have demonstrated that PCI is certainly feasible in patients with moderately to severely reduced EF.
- Randomized controlled trials (eg, BARI 2D, FREEDOM) that compared PCI with CABG or with medical therapy in patients with

stable CAD typically have excluded patients with severely reduced EF (or included only small number of heart failure patients).

- Observational studies and propensity score analyses that compare PCI with CABG in patients with heart failure with reduced ejection fraction (HFrEF) yield conflicting results, with a majority of studies suggesting greater long-term

benefit with CABG than with PCI.

- There is also a lack of randomized data comparing PCI with medical therapy in patients with HFrEF. Observational studies have demonstrated that >50% patients with severely reduced EF experience varying degrees of improvement in EF after PCI, with greater improvements being correlated with

treatment of a greater number of vessels.

- The REVIVED-BCIS2 trial, which aims to provide randomized data about the efficacy and safety of PCI in HFrEF patients, is currently underway. Investigators will compare a PCI strategy with optimal medical therapy *vs* medical therapy alone in ≈700 patients with EF ≤35%.
- Studies looking at the use of mechanical support devices in PCI patients with shock

found no mortality benefit (mainly because of the heterogeneity in, eg, the definition of shock, systems of care for shock, and the timing of mechanical support implementation). Outside the setting of shock, mechanical support devices were found to have no effect on infarct size or mortality in patients with acute coronary syndrome undergoing PCI.

- Upcoming randomized controlled trials (eg, STEMI-

DTU) will compare outcomes (eg, infarct size, mortality) in patients with ST-segment-elevation myocardial infarction undergoing PCI with Impella mechanical support.

Reference

1. **Parikh PB, Bhatt DL, Bhasin V, et al.** Impact of percutaneous coronary intervention on outcomes in patients with heart failure: JACC State-of-the-Art

Review.*J Am Coll Cardiol*. 2021;77(19):2432-2447.