Recent studies have assessed the clinical question of whether percutaneous coronary intervention (PCI) improves clinical outcomes in patients with chronic coronary syndrome, compared with optimal medical therapies. These studies have shown that regardless of the left ventricular ejection fraction (LVEF), PCI does not reduce the mortality rate and only alleviates symptoms during the short–moderate term. In contrast, reperfusion with PCI improves clinical outcomes and reduces mortality rates during the long-term follow-up period in patients with acute myocardial infarction (AMI). One of the beneficial mechanisms of early PCI in patients with AMI is that myocardial reperfusion of the infarction-related artery reduces the infarct size, improves LVEF, and decreases the mechanical stress on the non-infarcted myocardium, resulting in the prevention of LV remodeling.

The annual number of hospitalized patients with AMI in Japan increases modestly according to data from the Japanese Registry of All Cardiac and Vascular Diseases.

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(Figure). However, the in-hospital mortality rate during the acute phase after the onset of AMI has remained stable. Therefore, the number of patients with AMI who survive to discharge may be increasing. Although the main reason for the increased incidence of heart failure (HF) in Japan may be patients with HF and preserved LVEF, an increased number of those with LV dysfunction after AMI may also be attributed to the future incidence of HF. Unfortunately, PCI in patients with AMI sometimes induces myocardial reperfusion injury to the coronary microcirculation, which extends the size of the myocardial infarct and the extent of cardiac dysfunction, limiting the beneficial effects of reperfusion therapy.8,9 Infarct size results not only from ischemia-induced injury but also reperfusion injury, so is a combination of these factors.8 Thus, a simple method to assess infarct size after PCI is warranted.

In this issue of the Journal, Hashimoto et al10 report that the presence of infarct cores (ICs) significantly and negatively predicts LV reverse remodeling in patients with AMI undergoing PCI. They evaluated cardiac magnetic resonance imaging (CMR) on day 7 post-PCI, a relatively early phase after the onset of AMI, and compared the findings with CMR ICs at 12-month follow-up. They suggest that early detection of ICs might detect LV remodeling and stratify patients with poor prognosis. A strength of their study is that contrast medium was not used. In the clinical setting, contrast CMR is used to evaluate the severity of LV damage and clinical prognosis in patients with AMI.11 However, gadolinium-based contrast agents are needed for contrast CMR, and they may be contraindicated in patients with chronic kidney disease. Non-contrast methods and procedures that do not affect renal function are useful because the prevalence of chronic kidney disease in patients requiring PCI is absolutely increasing.12

Scintigraphy and CMR are not performed in every institution to evaluate LV function after AMI. ECG, however, can be performed in almost every institution. ST resolution has traditionally been used to evaluate microvascular dysfunction after reperfusion in patients with AMI.13 Recent imaging modalities as well as angiographic findings provide additional information for assessing microcirculatory impairment. However, it is important to note the importance of ECG, particularly immediately after PCI.

To avoid reperfusion injury, pharmacological interventions in addition to PCI have been adopted to reduce myocardial infarct size and prevent future LV remodeling after AMI. A growing understanding of the mechanism underlying protective effects such as ischemic conditioning has been introduced to clinical practice and led to the development of new pharmacological treatments at the time of coronary reperfusion in patients with AMI.14 Various medical treatments have proven to be effective in preventing LV remodeling and future adverse cardiac events in patients with AMI. In addition, recent clinical trials have suggested that some types of medical therapies can improve clinical outcomes in patients with HF, including those who have suffered an AMI.15 However, treating patients not at risk may cause unnecessary and avoidable healthcare costs. Careful attention should be paid to patients stratified as high risk, for whom various types of care such as intensive medical treatment may be effective.

Disclosures
H.I. is a member of Circulation Journal’s Editorial Team.

IRB Information
Not applicable.

References