Challenges in Retrospective Analysis of PCI Data in Critically Ill Patients

We read with great interest the paper by Mylotte et al. (1) in JACC: Cardiovascular Interventions, which reports the efficacy of multi-vessel primary percutaneous coronary intervention (MV-PCI) and compares it with that of culprit-only PCI in patients with ST-segment elevation myocardial infarction presenting with cardiogenic shock and resuscitated cardiac arrest. The investigators suggested that complete up-front revascularization with MV-PCI has the potential to improve outcomes in critically ill patients. However, a few issues regarding the interpretation of their data come to mind.

The study is limited by an obvious patient selection bias. Because the study was a retrospective analysis of prospectively collected data, all decisions regarding the PCI were solely at the discretion of the treating physician. The lesional and procedural factors such as lesion difficulty (included the infarct-related artery [IRA] and non-IRA), expected procedure time, and operator’s skill level have the potential to influence the results. For example, anatomically, the MV-PCI group may have included “PCI-favorable” cases, and this may have led to a better patient outcome compared with that for the culprit-only PCI group. Obviously, the patients with complex “PCI-unfavorable” lesions have a worse prognosis compared with that of patients with simple lesions (2). In the present study, the lesion complexity of the IRA and non-IRA between the 2 groups was not clear. Adjustment with variables that reflect lesion complexity (e.g., the prevalence of type-C or chronic total occlusion lesions) might be helpful (3). Additionally, the differences in the devices that were used for intervention during the more than 10-year period (1998 to 2010) may have affected the outcomes. These differences may have occurred because of various factors, including improvements in guidewire flexibility and the stent delivery system. It may be helpful to determine whether the favorable outcome in the MV-PCI group compared with that in the culprit-only PCI group was consistent during the time of the study. We believe that the clarification of these 2 points would further assist in validating this important study.

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REFERENCES


Reply

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We thank Dr. Endo and colleagues for their interest in our study (1). They correctly note that the absence of a pre-determined revascularization strategy in this nonrandomized analysis confers the potential for patient selection or treatment bias. This implies that when selecting patients for primary multivessel percutaneous coronary intervention (MV-PCI), the treating physicians may have cherry picked “better” cases for more complete revascularization. Although it is likely that a more complete upfront revascularization strategy was not performed in some patients due to perceived futility, clinical experience and prior observational studies suggest that it is higher-, rather than lower-risk patients that are more likely to be selected for more complete emergent revascularization (2,3). In our study, the baseline characteristics among the groups were well matched, and indeed, complex (left main and bifurcation) infarct-related artery (IRA) lesions were more common in patients undergoing MV-PCI than in those undergoing culprit-only PCI (CO-PCI). Furthermore, non-IRA chronic occlusions were equally pervasive in both groups. Dr. Endo correctly surmises that successful primary MV-PCI is determined by both anatomical complexity and physician experience. These factors should be considered when determining the appropriateness of primary MV-PCI.

Dr. Endo and colleagues also suggest that temporal changes in patient outcome may be expected in studies of extended length such as ours. We dichotomized the entire patient cohort (N = 266) according to the era of treatment: Group A: 1998 to 2004; and Group B: 2004 to 2010. The proportion of patients with multivessel disease (62.9% vs. 64.2%, p = 0.90) and treated with MV-PCI (24.5% vs. 25.2%, p = 0.99) was similar. In addition, there was no difference in the rates of PCI success over time (81.1% vs. 84.6%, p = 0.52). By contrast, thrombus aspiration (18.3% vs. 61.7%, p < 0.0001) and therapeutic hypothermia (10.5% vs. 24.4%, p = 0.003) were more frequently applied in the more recent cohort. Numerically, 6-month survival was higher in the contemporary cohort, though this was not statistically significant (30.8% vs. 39.0%, p = 0.96) due to small patient numbers. As previously stated, the inherent limitations