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Commentary

Early Revascularization for Cardiogenic Shock in the Elderly — Has the Moment of Doubt Passed?

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The observational study by Amin et al¹ in this issue of the *Journal* is another important addition to the evidence base on the benefit of early revascularization in elderly patients with acute myocardial infarction (MI) complicated by cardiogenic shock (CS). The authors studied 310 consecutive patients admitted with MI and CS at two centers. Survival was compared among treatment groups and further stratified by age. Early revascularization was associated with a significant survival benefit in younger patients as well as in the 80 patients aged ≥ 75 years, even after adjusting for confounders. The elderly patient group had a higher proportion of women and a lower proportion of patients with ST-elevation MI. Stent utilization was lower in elderly patients — 16.3% versus 33.9%.

The results of registry studies, including the present report, are complementary to randomized trial data and on the whole have strengthened the case for early revascularization in patients with MI and CS, including the elderly. The SHOCK trial randomized 302 patients to early revascularization or initial

medical stabilization.² The median time from MI to CS onset was 5 hours, and the median time from MI to randomization was 11 hours in the early revascularization group. Early revascularization was associated with a trend toward decreased mortality at 30 days and a statistically significant absolute mortality reduction of 13% at 6 months, sustained at 1 and 6 years.^{3,4} There were 56 patients aged ≥ 75 years: 24 in the early revascularization cohort and 32 in the medical therapy group. At 6 months and 1 year, an age/treatment interaction was noted, with no significant difference in mortality between treatment groups in the subset of patients aged ≥ 75 years. However, at 6 years, no age/treatment interaction was noted, suggesting that elderly patients also benefit from early revascularization. The apparent lack of benefit of revascularization among elderly patients at the 6-month and 1-year analyses may be attributed to the small number of patients and chance differences between treatment groups. Indeed, among patients aged ≥ 75 years, those randomized to medical therapy had a higher ejection fraction and better hemodynamic response to intra-aortic balloon pump (IABP) therapy, indicators of lower mortality.⁵ The low mortality rate in medically treated elderly patients (unexpectedly similar to younger patients) potentially diluted the mortality reduction achieved by early revascularization.

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The SHOCK Registry of nonrandomized patients included 277 patients aged ≥ 75 years with MI and CS due predominantly to left ventricular (LV) systolic dysfunction.⁶ Of these, 44 (15.9%) were treated with early revascularization and 233 had late or no revascularization at the discretion of the treating physician. There was a significant reduction in 30-day mortality with early revascularization in patients aged < 75 years (45% versus 61%; $p = 0.002$), as well as in patients aged ≥ 75 years (48% versus 81%; $p = 0.0003$). The clear demonstration of benefit of early revascularization for elderly patients with CS in the SHOCK registry may be attributed to larger patient numbers and improved statistical power. It is also possible that selection of patients for early revascularization by treating clinicians contributed to better outcomes. However, it is difficult to derive definite selection criteria that predict benefit from early revascularization from the various CS registries. Moreover, registries have shown low rates of utilization of early revascularization for elderly patients with CS. Given the high mortality rate in medically treated patients with CS, there may be good reason to offer early revascularization to a larger proportion of elderly CS patients.

In this regard, encouraging results have been reported in a single-center registry of "all-comers" treated with primary percutaneous coronary intervention (PCI) within 6 hours of MI onset.⁷ This primary PCI cohort included 280 consecutive patients with CS, of whom 104 (37%) were ≥ 75 years of age. This clearly reflects the contemporary challenge of dealing with the increasing proportion of elderly patients with CS. Even in this elderly cohort with CS, PCI success was achieved in 92%, which compared favorably with 97% in younger patients, likely reflecting extensive use of stents (80%). Moreover, the use of stents has previously been shown to be associated with improved outcomes in patients with CS.⁸ Mortality at 6 months was 56% in these elderly, unselected patients. These data are encouraging and suggest that a strategy of routine primary PCI in "all-comers" with CS is feasible, even in elderly patients, with the caveat that reperfusion is achieved within a few hours after MI onset.

Only about a third of patients with CS have shock at initial presentation. Efforts to shorten MI onset-to-reperfusion time can improve myocardial salvage, abort the development of shock and improve outcomes in patients who present with CS. Short reperfusion time has been shown to be associated with ST resolution

(which in turn is associated with better microvascular perfusion), and is a powerful predictor of survival after MI.⁹ Only 50% of patients with CS achieved ST resolution despite short reperfusion times and a patent epicardial artery,⁷ highlighting the need to develop strategies to improve microvascular perfusion (e.g., thrombus aspiration).

The role of circulatory support during primary PCI for CS also needs to be better defined. The authors of the present study noted an association between IABP use and higher mortality, most likely reflecting selection bias (IABP used in only 26%, presumably the sickest cohort). It will be interesting to see how the Impella device compares with IABP in patients with CS, however, use of the Impella device may be limited by more challenging vascular anatomy in the elderly.

In conclusion, on the basis of burgeoning clinical data, elderly patients with MI complicated by CS due predominantly to LV systolic dysfunction should be considered for early revascularization in the absence of specific contraindications. Achieving short times to reperfusion may be the key to improving outcomes in this sickest subset of MI patients.

Yes, the moment of doubt has passed!

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