Commentary: Older age, dialysis, mechanical ventilation, extracorporeal membranous oxygenation, and left ventricular device outcomes: No surprises here

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The largest growth in durable left ventricular assist device (LVAD) therapy has arisen in patients ineligible for heart transplantation who receive the LVAD for destination therapy or permanent use. Patients receiving destination therapy are older and have more comorbidities, such as diabetes, renal dysfunction, and frailty, and are less resilient to recover from major complications of the therapy or achieve satisfactory improvement in quality of life.^{1,2} This older population presents immense challenges to selecting appropriate candidates for this therapy. Although incredible advances in cardiac surgery have permitted the extension of cardiac surgical procedures, such as LVAD implantation, for an older population, an understanding of preoperative events and careful patient selection remain important components to achieving a successful outcome.³ Although age by itself should not be an exclusion to LVAD therapy, the road by which an elderly patient comes by to be considered for LVAD therapy can be an informative process.

In this issue of the *Journal*, Lindvall and colleagues⁴ reported on the outcomes of $15,021 \pm 1111$ patients who received a ventricular assist device (VAD) using a weighted sample from the National Inpatient Sample database from January 2010 to December 2014. When comparing outcomes for patients aged 18 to 65 years with those aged more than 65 years, in-hospital mortality increased from 17.2% to 48.2% when 1 or more high-risk interventions (cardiac surgery, prolonged mechanical ventilation, hemodialysis, or extracorporeal membranous oxygenation) preceded VAD placement among the older patients. In comparison, the in-hospital mortality in younger patients increased from 11.1% to 29.4% when 1 or more of these same procedures preceded VAD implant. The mortality difference associated with these procedures was 19% greater in

Durable LVAD therapy and the risk in elderly patients.

Central Message

Older age in conjunction with recent preoperative dialysis, mechanical ventilation, or ECMO portends worse prognosis after LVAD implantation.

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older patients compared with younger patients (95% confidence interval [CI], +9%-28%). In-hospital mortality among VAD recipients was associated with age more than 65 years (odds ratio [OR], 1.76; 95% CI, 1.29-2.40), female sex (OR, 1.27; 95% CI, 0.97-1.67), and at least 1 high-risk intervention preceding VAD (OR, 5.52; 95% CI, 4.27-7.13).

The results by Lindvall and colleagues⁴ are not surprising but reinforce the importance of critical preoperative events in determining outcomes after durable VAD implantation and provide useful prognostic information for an elderly population. The combination of older age, acuity of illness, and high comorbidity burden portend a poor prognosis. It is also noteworthy that mortality risk in the older population was less with elective admission than with admission through the emergency department. This raises the important question of whether acutely ill, elderly patients on extracorporeal membranous oxygenation, dialysis, or mechanical ventilation should receive a durable VAD, particularly in the setting of transplant ineligibility where complications such as renal failure or device infection cannot be resolved without transplantation. These data strongly support a greater emphasis on identifying suitable candidates for durable VAD therapy earlier in the course of their disease, particularly in the setting of older age.

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