Commentary: Can and should the National Inpatient Sample be used to evaluate trends in ventricular assist device use and outcomes?

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Left ventricular assist devices (LVADs) are used to preserve and extend life as well as enhance the quality of life for patients with heart failure refractory to guideline-directed medical therapy. Evaluation of LVAD outcomes is immensely important for assessing and improving quality, undertaking research, and shared decision-making.

In 1979, Luft and colleagues reported a significant volume-outcome relationship (ie, higher volume equating to lower mortality) for inpatient surgical procedures, including cardiac surgery. Similar relationships have been confirmed across other procedures, contributing to the establishment of volume thresholds by Leapfrog and the Centers for Medicare and Medicaid Services and institutional pledges to avoid undertaking low-volume operations. Studies focusing on volume-outcome relationships often leverage administrative claims data sets because of the efficiency of evaluating regional and national trends in health care practices and outcomes.

In this issue, Sanaiha and colleagues have evaluated national trends in the use of 23,972 LVADs and the associated mortality between 2008 and 2016 within an all-payer inpatient claims database, the National Inpatient Sample (NIS). The NIS is one of many commonly used claims databases enabling the estimation of health care utilization, outcomes, and expenditures. There was a 3-fold increased use of LVADs nationally (P for trend <.001), with a concomitant mortality reduction (2008, 12.0% vs 2016, 9.2%; P < .001). Although low-volume hospitals had higher adjusted mortality than did high-volume hospitals (adjusted odds ratio, 1.66), this finding was only significant in 2008 and 2009.

Several points are noteworthy. First, the NIS analyses are complex, in part because of periodic changes in sampling frames and design noted by Sanaiha and colleagues. Importantly, the change in sampling frame (1) may explain why Sanaiha and colleagues report 835 LVAD hospitals, a number far greater than in previous reports, and (2) undermines hospital volume estimates beyond 2012, because NIS data do not include all hospitalizations for a specific hospital. Second, procedure codes in the NIS are unable to distinguish LVAD exchanges from primary implants, which may misclassify hospital LVAD volume estimates. Third, given the sole reliance on administrative codes, there is a risk of important unmeasured confounding (eg, lack of data concerning the indication for the LVAD or the patient’s Intermacs profile). Fourth, Sanaiha and colleagues were unable to assess a volume-outcome relationship beyond hospital discharge. Evaluating volume-outcome relationships beyond the discharge period is warranted, given distinct reported phases of mortality.

Can and should the NIS be used to evaluate trends in LVAD use and outcomes? The answer to the first question is yes, as has been done for other cardiovascular procedures. Nonetheless, researchers must adhere to methodologic standards for analyzing the NIS, which are publicly available. The answer to the second question is more nuanced. The evaluation of this patient population is complex, and incorporating clinically based databases may address the limitations of administrative claims.
Previous volume-outcome evaluations have been undertaken solely with Intermacs data. Importantly, the findings by Sanaiha and colleagues confirm significant progress in the field of mechanical circulatory support and highlight the need to evaluate determinants of quality.

References