Megaphone message: Discouraging low-volume mitral surgery

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Reporting outcomes research from giant datasets is like using a megaphone: Volume grabs attention whether the message is clear and important, or just white noise. Vassileva and colleagues¹ have substantial experience working with one of the biggest megaphones in outcomes research—the Medicare patient database—used in their most recent report to determine whether older patients undergoing mitral surgery at low-volume centers achieve the same outcomes as patients at high-volume centers.¹ Wide variations in mitral repair rates have been documented in the United States and elsewhere,²⁻⁶ despite the established benefits of mitral repair over replacement in terms of early and late mortality, morbidity, and quality of life.⁷ How does this latest analysis clarify optimal surgical referral (Figure 1)?

Medicare is a federal insurance program providing health insurance for Americans aged 65 years and older, and younger patients with chronic disabilities. From millions of inpatient hospitalizations between 1999 and 2009, Vassileva and colleagues¹ identify 127,079 patients who underwent mitral valve surgery, analyzing relationships among institution volume, mitral repair rates, and mortality. The authors find that 29% of hospitals perform less than 5 mitral operations in Medicare patients annually, that low institutional volume is associated with worse repair rates and mortality, and that replacement is an independent predictor of worse survival in older patients. The authors conclude that their findings support minimum volume thresholds for mitral surgery.

This message is clear and confirms earlier data reporting inverse relationships between hospital volume and surgical mortality for high-risk surgical procedures.⁸ On the basis of similar findings, the Leapfrog Group—a consortium of large healthcare purchasers—established minimum volume standards for several surgical procedures for which the

A patient with mitral valve disease that requires surgery would ideally be operated on in a center with:

- 1) A low annual volume of mitral surgery?
- 2) A high annual volume of mitral surgery?

FIGURE 1. Should institutional mitral surgery volume have a role in surgical referral?

relationship between volume and mortality was particularly strong, and private payers and professional organizations in the United States have followed suit.⁸ Mitral repair is not one of these procedures, despite data from clinical⁴⁻⁶ and administrative databases¹⁻³ identifying low surgeon and institution volumes as predictors of low repair rates and decreased patient survival. In Vassileva and colleagues' previous analysis² of the same dataset, which excluded concomitant coronary and aortic procedures, the strongest predictor of mitral repair was institution volume, with patients at least 60% more likely to undergo repair at institutions performing more than 40 mitral operations per year.

What does the present study add to these data? The answer may be volume at the expense of clarity, because the Medicare database was not designed with clinical outcomes research in mind. Built for administrative and billing purposes, the Medicare database does not reliably distinguish between symptomatic and asymptomatic patients; mitral stenosis and regurgitation; ischemic and degenerative valve disease; normal left ventricles and impaired ones; presence and absence of pulmonary hypertension; severe coronary disease and nonobstructive disease; isolated annuloplasty and complex reconstructions; or a competent repair and an incompetent one. The desirability, feasibility, and durability of mitral repair depend on most of these missing data points, which also affect patient mortality and event-free survival.^{7,9-12} The authors sum up the problem in their 2013 *Circulation* article from the same database, "...we have avoided a direct comparison between mitral repair and replacement because we did not feel we could properly account for the variety of biases in an administrative data source."² What has changed? Nothing, in fact, the authors now include concomitant aortic and coronary procedures, making their study population even more heterogeneous and the biases even more difficult to control for. The chances are that low-volume mitral surgery is probably not the best option for a significant proportion of patients with mitral valve disease, but there is simply not enough information in this study to know for sure.

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To really know for sure, we need a dataset providing information on valve dysfunction and cause, such as the UK mandatory adult cardiac surgical database, which includes basic morphologic data. An analysis of more than 5000 mitral operations in the UK 2008 database report suggests that the relationship between institution volume and mitral repair rates is not an entirely straightforward one.⁶ In patients with degenerative mitral regurgitation, in whom reparability should be well more than 90%,^{7,13-15} repair rates at high-volume centers were as low as 36%, and only 3 high-volume centers had repair rates greater than 85%. The report concludes, “The unpleasant reality, therefore, is that some patients, by virtue of the hospital they go to...will be less likely to survive surgery, less likely to be alive at 5 years and more likely to have a stroke, because of higher use of valve replacement in those centers.”⁶

Systematically targeting referral of simple mitral disease cases to local surgeons experienced in valve surgery and complex mitral disease cases to reference centers with surgeons possessing specific expertise in mitral repair could help to address the unacceptable variations in care.^{6,9,16-19} However, there are major barriers to implementing such an approach,²⁰ not the least of which is disagreement as to appropriate volume thresholds.¹⁶⁻¹⁸ In the United States, such decisions may be informed by the new iteration of the Society of Thoracic Surgeons database, which has been redesigned to include detailed information on valve dysfunction, cause, lesion, and repair techniques. Until then, Vassileva and colleagues¹ should be congratulated for broadcasting their high-volume message to occasional mitral surgeons and low-volume mitral centers everywhere.

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