

Editorial

Improving Outcomes with Lung Cancer Surgery: Selective Referral or Quality Improvement?

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The first evidence that procedure volume and other hospital attributes contribute to the outcomes of major surgery recently turned 50 years old.¹ In cancer surgery, the relative importance of hospital factors varies widely according to which procedure and which outcome is being addressed.² Nonetheless, a large body of literature documents the importance of hospital procedure volume as a determinant of both operative mortality and, more recently, late survival after a wide range of cancer procedures.^{3,4} Although this literature is less consistent, teaching hospitals may also have better outcomes for some procedures above and beyond that corresponding to their higher volumes.

In this context, results from the analysis by Cheung et al. herein are not surprising.⁵ Among patients undergoing surgery for lung cancer in Florida, 30- and 90-day mortality rates at teaching hospitals and high-volume centers were only half as high as at other hospitals. Despite comparable case mix among the hospital groups, median survival after surgery at teaching hospitals and high-volume hospitals was almost 6 months greater. Given limitations in their data, the study does not provide insights regarding potential mechanisms underlying disparities in hospital outcomes; for example, the study did not explore the role of surgeon volumes and specialty, factors previously found to mediate hospital volume–outcome relationships in lung cancer surgery.⁶ It also did not examine differences in process of care that could explain better outcomes at teaching hospitals

and high-volume centers, such as greater adoption of new technology, including video-assisted resection techniques. Regardless of underlying mechanisms, however, there seems to be little doubt that lung cancer patients can improve their odds considerably by choosing the right hospital for surgery.

Cheung et al. join a chorus of advocates for concentration of complex cancer procedures in selected facilities. This goal might be achieved by patient education and public reporting of hospital volume, teaching status, and, where available, outcomes. Selective contracting by payers is a more direct and likely more effective approach to effecting evidence-based referral for complex surgical care; for example, the Leapfrog Group, a large purchaser coalition, has an evidence-based referral program for several complex procedures, including pancreatectomy and esophagectomy, based primarily on minimum volume standards.⁷ Private payers nationwide are increasingly implementing centers-of-excellence programs for cardiac surgery and bariatric surgery, models that could be readily extended to cancer care.

As an approach to improving outcomes of cancer surgery, selective referral based on simple structural measures (e.g., volume, teaching status) has several advantages. Such measures can be obtained readily and inexpensively. They tend to be relatively stable quality indicators. Volume in particular seems to be as useful in forecasting future hospital outcomes as it is in describing historical performance.⁸ Finally, if targeted at relatively infrequent procedures and if the bar is not set too high, selective referral would be practical from a policy perspective; for example, access and patient travel time for pancreatectomy and esophagectomy would be affected negligibly if every one of the almost 1,000 very low-volume hospitals

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carrying out these procedures in the USA were prohibited from performing them.⁹

However, as a tool for improving patient outcomes, selective referral has important limitations; for example, selective referral policies for more common cancer procedures could have significant impact on capacity at teaching hospitals and high-volume centers. It could also weaken relationships between the surgical and nonsurgical components of multidisciplinary cancer care and hinder coordination of care, including adjuvant therapy. Moreover, selective referral would not eliminate variation in outcomes across hospitals. Volume, teaching status, and other structural variables identify groups of hospitals with superior outcomes, but are unreliable in predicting performance for individual centers. Some high-volume hospitals have poor outcomes, while some low-volume centers may have excellent results. Thus, selective referral initiatives would paradoxically result in the transfer of some patients to hospitals with worse outcomes.

For this reason, selective referral should be implemented thoughtfully. First, it should target uncommon, high procedures for which outcomes vary widely across hospitals (e.g., pancreatectomy and esophagectomy), but not more ubiquitous procedures associated with little performance variation (e.g., colectomy). Where lung resection falls on this spectrum is a matter of debate. Second, the bar should not be set too high. In contrast to those simply targeting very low-volume hospitals, policies aimed at restricting surgery to a small number of teaching hospitals or high-volume centers would be impractical for large parts of the country.¹⁰ Finally, selective referral should be based on measures which optimally discriminate performance among providers. Composite measures that account for both structural variables and outcomes likely perform better in this regard than individual quality indicators.¹¹

Although pressures to concentrate high-risk surgical procedures in selected facilities are not likely to abate, we should continue to develop strategies for improving the quality of cancer surgery in all settings. Success in this regard will require broader dissemination of quality measurement and feedback tools, such as the American College of Surgeons' National Surgical Quality Improvement Program.¹² A better understanding of mechanisms underlying variation in outcomes across hospitals would also be invaluable.

Which types of complications explain excess deaths at some hospitals? Are they medical (e.g., pulmonary embolism) or surgical (anastomotic leaks) in nature? Are there measurable differences in processes of care between hospitals with good and bad outcomes? Answers to such questions will be essential for optimizing the safety of high-risk cancer surgery.

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