

Editorial



The value of volume

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The association between procedural volume and outcomes has long been recognized; those patients operated on by high-volume surgeons and at high-volume hospitals have improved outcomes [1-3]. Although the volume-outcomes paradigm has been demonstrated for a wide variety of procedures, the magnitude of the effect is greatest for procedures associated with substantial morbidity and mortality such as high-risk oncologic surgeries and cardiovascular procedures [2,3].

Improved outcomes for high-volume surgeons and high-volume hospitals have also been demonstrated across a wide variety of gynecologic surgical procedures [1,4-10]. However, compared to high-risk oncologic and cardiovascular surgeries the magnitude of the improvement in outcomes is much more modest for gynecologic surgery [6]. For gynecologic procedures, the impact of volume on outcomes is greatest for women with gynecologic malignancies. The improved outcomes associated with high-volume centers include not only improved perioperative outcomes but also improved long-term survival. An analysis of over 100,000 women with ovarian cancer in the United States found that 5-year survival rose sequentially for patients treated at high-volume centers [4].

In this issue of the *Journal of Gynecologic Oncology*, Machida and colleagues [11] explored the association between hospital volume and outcomes for women with gynecologic cancer treated in Japan. In a cohort of 206,000 women recorded in the Japan Society of Obstetrics and Gynecology (JSOG) tumor registry the authors investigated the importance of treatment at high-volume centers for women with endometrial, cervical and ovarian cancer. Importantly, the authors included all subjects, including those treated surgically as well as women who received radiation or chemotherapy. The investigators noted an association between improved survival and treatment at high-volume centers for all three cancer types. Notably however, the improvements in survival were modest. For example, survival for endometrial cancer was 86.2% at low-volume centers compared to 87.8% at high-volume centers while survival for ovarian cancer was 66.6% vs. 68.8% at low versus high-volume facilities. The authors also found that the number of women receiving care at high-volume centers declined over time which they hypothesized was due to a larger number of facilities registering as JSOG centers.

There are a number of important issues to consider when examining studies of surgical volume and outcomes. First, the study examined hospital volume but not surgeon or provider volume. For gynecologic surgery, surgeon volume is an important predictor of outcomes [5,12]. Further, emerging data suggest that there are often disparities in access to high-volume surgeons even within high-volume hospitals [12]. Second, the study examined long-term outcomes. Treatment of gynecologic cancers is multidisciplinary and typical includes multiple providers over long periods of time. While volume studies capture the initial of phase care, measuring and quantifying the characteristics and quality of downstream care is more difficult but undoubtedly influences survival.

These data raise important policy questions as to how to optimize care for women with gynecologic cancers. For high-risk surgical procedures with strong volume-outcome relationships regionalization of care has been promoted [13]. In the U.S., such a strategy has been successful and associated with improved survival for high-risk operations such as esophagectomy and pancreaticoduodenectomy. However, regionalization of care may be challenging and of marginal value when the benefit of care at a high-volume center is modest. Further, regionalization is difficult to implement and often unpopular with patients and other stakeholders. A second strategy is to improve the quality of care at low-volume centers [14]. In some scenarios, initiatives to improve collaboration, align treatment with guideline-based recommendations and improve quality have been shown to be effective in mitigating volume-based disparities in outcomes [14]. Going forward, these data suggest that measuring and monitoring surgical volume have an important role in cancer control policies for gynecologic cancer.

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