



Disparities in Gastric Cancer: Can we do better?

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Previous studies have shown significant disparities in the management of various malignancies, including breast, colorectal, cervical, prostate, and gastric cancers, among patients in the US.^{1–3} Worse oncologic and survival outcomes have been shown among patients of racial minorities, those residing in rural communities, of lower socioeconomic status, and those receiving care in nonacademic centers.^{4,5} These disparities have been attributed to a multitude of factors, including healthcare accessibility, health literacy, travel distance to care, and financial limitations, all of which contribute to delays in diagnosis and/or advanced disease at presentation.³

In this issue of *Annals of Surgical Oncology*, Banerjee et al. analyze the impact of Commission on Cancer facility types on outcomes in patients with gastric cancer.⁶ Their analysis of the National Cancer Database (NCDB) from 2004 to 2015 demonstrated that treatment at academic/research programs (ARPs) was associated with a significantly longer survival compared with treatment at nonacademic programs (NAPs). The magnitude of this survival difference was large (approximately 6 months) and persisted when high-volume centers were also analyzed alone.

In exploring the reasons for this difference in stage II and III disease, the authors found that adherence to quality benchmarks was better at ARPs than NAPs. These metrics included surgical mortality, nodal harvest, margin positivity rate, and use of perioperative chemotherapy. Over the course of the decade analyzed, these investigators found an increasing proportion of patients with more complex

middle-stage (II and III) disease being treated at ARPs. Superficially, this appears comforting—patients with more advanced, but still potentially curable, disease are finding their way to centers with greater experience and expertise, and these centers are employing the more complex, multidisciplinary care that evidence-based guidelines recommend. So far, so good; however, a closer look at these data should make us concerned. Specifically, rather than comparing ARPs versus NAPs, when we look at these performance metrics from a global perspective, the figures are startling and disappointing. Regardless of facility type, surgical mortality for a gastrectomy (not broken down by distal or total) is 3–4%, less than 30% of cases had at least 15 nodes examined, approximately one in seven cases had a positive margin, and less than one-third of patients received perioperative chemotherapy. These data are consistent with other recent publications that together indicate that the central problem is perhaps less to do with whether a patient gets treated at an ARP or an NAP, but how well ALL facilities are doing with adhering to our own national guidelines.^{7,8} As Zhao et al.⁹ specifically point out, adherence with operative standards for gastrectomy, as defined by the ability to achieve R0 resection and having more than 16 lymph nodes examined, is quite poor in the US. Banerjee et al.⁶ make it clear that achieving these benchmarks remains a struggle, no matter which institution a patient is treated at.

Cancer care should be provided by experienced practitioners who can institute a comprehensive, multidisciplinary approach to patient management. Gastric cancer, in particular, should be managed by not only skilled surgeons but also by knowledgeable medical oncologists as well as advanced gastroenterologists/interventional endoscopists. Although technical aspects in the management of the disease, as previously mentioned, can be handled by advanced general surgeons, nutritional management, rapid recognition, and treatment of complications and

chemotherapeutic care are difficult to provide in nonacademic centers. However, as the data in the article demonstrate, these perioperative principles/guidelines may not be provided in academic centers either and may reflect the need for improvements across the board. Nonetheless, based on prior studies, we have found that higher-volume centers do have better outcomes when compared with low-volume centers for complex malignancies.¹⁰ The treatment of uncommon or rare malignancies is riddled with intricacies and subtleties, which are oftentimes best managed by those seeing higher numbers of these cancers. Therefore, centralization of low-volume cancers and high-risk surgical procedures has been continually studied to determine if improvements in cancer care can be achieved by steering patients toward hospitals or providers with the most experience.¹¹

However, while centralization of cancer care may lead to improvements in oncologic outcomes, as well as achieve longer follow-up periods, access to these institutions can be out of reach for some. It is easy for surgeons at academic institutions to advise referring physicians to send patients to them for further management, but the reality for patients living in remote or remote regions is that travel to and from academic centers is challenging and often logistically impossible. One way to improve delivery of care is where there is a ‘hub and spoke’ organizational model of hospitals. As Sheetz et al. noted, “greater centralization of complex cancer surgery within existing hospital systems was associated with better outcomes. As hospitals affiliate in response to broader financial and organization pressures, these systems may also present unique opportunities to improve the quality of high-risk cancer care.”¹¹ There has been a significant trend toward hospital mergers and consolidation of smaller nonacademic centers into larger academic practices, which has created new opportunities for hospital systems to organize care around the most experienced practitioners. The hub-and-spoke organization design, as defined by Elrod et al., arranges service delivery resources into a network consisting of a central institution (hub) that offers a full array of services, complemented by secondary establishments (spokes) that offer more limited service selections, routing patients needing more intensive services to the hub for management.¹² This may make the tools needed to manage gastric cancer patients more readily available to the ‘spokes’ of the wheel to improve oncologic care for patients unable to access the main academic hub.

Additionally, if it is financially unreasonable for some patients to receive care in major academic centers, how can we make care at nonacademic centers equivalent to that seen in higher-volume hospitals, or, based on the staggering data seen, make improvements in gastric cancer care universally? Several studies have shown improved oncologic outcomes in various malignancies when adherence to

National Comprehensive Cancer Network (NCCN) guidelines is upheld.^{13,14} Additionally, in hospital centers where a hub and spoke organizational model has been implemented, access to specialized tumor boards is readily available to those practicing at nonacademic institutions. This allows cases to be discussed in a multidisciplinary setting where surgical and nonsurgical treatment plans can be created. Working as an inter-hospital or inter-institutional team may not only ease decision making in complex cases but also enhance education for surgeons, both at the main academic center hub as well as their partners at the nonacademic practices.

Overall, all physicians caring for gastric cancer patients must improve the management of this complex patient population, and surgeons, regardless of whether they practice in an ARP or NAP, should strive to adhere to the quality metrics set forth for gastrectomies. Progress has been made but implementation of quality care lags behind the evidence. The article by Banerjee et al.⁶ has raised some interesting questions regarding where gastric cancer should be managed, but it is not as simple as sending all patients with this disease process to academic centers. We do agree that increasing access to high-volume centers, whether that be directly or via a hub-and-spoke hospital model, may increase adherence to surgical standards for gastrectomies, and may also improve the perioperative management of these complex cancers, with stricter adherence to NCCN guidelines, but improvements in education for all, and access to multidisciplinary tumor boards, may enhance delivery of care to patients treated at both NAPs and ARPs.

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REFERENCES

1. Moss JL, Liu B, Feuer EJ. Urban/rural differences in breast and cervical cancer incidence: the mediating roles of socioeconomic status and provider density. *Womens Health Issues*. 2017;27(6):683–691.
2. Rana N, Gosain R, Lemini R, et al. Socio-demographic disparities in gastric adenocarcinoma: a population-based study. *Cancers (Basel)*. 2020;12(1):157.
3. Raman V, Adam MA, Turner MC, et al. Disparity of colon cancer outcomes in rural America: making the case to travel the extra mile. *J Gastrointest Surg*. 2019;23:2285–2293.
4. Henley SJ, Anderson RN, Richardson LC et al. Invasive cancer incidence, 2004–2013, and deaths, 2006–2015, in nonmetropolitan and metropolitan counties—United States. *MMWR Surveill Summ*. 2017;66(14):1–13.
5. Unger JM, Moseley A, Hershman DL. Geographic distribution and survival outcomes for rural patients with cancer treated in clinical trials. *JAMA Network Open*. 2018;1(4):e181235.
6. Banerjee S, Zhao B, Sicklick J et al. Commission on cancer facility type is associated with overall survival in patients with gastric adenocarcinoma in the United States. *Ann Surg Oncol*. 2021.<https://doi.org/10.1245/s10434-020-09422-5>.

7. Villanos AM, Zeymo A, McDermott J et al. Evaluating dissemination of adequate lymphadenectomy for gastric cancer in the USA. *J Gastrointest Surg.* 2019;23:2119–2128.
8. Ihse I. The volume-outcome relationship in cancer surgery. *Ann Surg.* 2003;238(6):777–781.
9. Zhao B, Blair SL, Kelly KJ et al. Adherence with operative standards in the treatment of gastric cancer in the United States. *Gastric Cancer.* 2020;23:550–560.
10. Stitzenber KB, Sirgurdson ER, Meropol, NJ et al. Centralization of cancer surgery: implications for patient access to optimal care. *J Clin Oncol.* 2009;27(28):4671–4678.
11. Sheetz KH, Dimick JB, Nathan H. Centralization of high-risk cancer surgery within existing hospital systems. *J Clin Oncol.* 2019;37(34):3234–3242.
12. Elrod JK, Fortenberry JL. The hub-and-spoke organization design: an avenue for serving patients well. *BMC Health Services Res.* 2019;17:457.
13. Vaddepally RK, Hejab A, Ali H. Institutional adherence to National Comprehensive Cancer Network (NCCN) guidelines in neoadjuvant treatment of breast cancer and its correlation to outcomes. *J Clin Oncol.* 2018;36(30):47.
14. Worhunsky DJ, Ma Y, Zak Y et al. Compliance with gastric cancer guidelines is associated with improved outcomes. *J Natl Compr Canc Netw.* 2015;13(3):319–325.

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