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EDITORIAL – HEPATOBILIARY TUMORS

Geographic Disparities in Oncologic Treatment and Outcomes: The Urban–Rural Divide

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Health care providers and policymakers have long been concerned with increasing access to high-quality cancer care. Seminal work by Birkmeyer et al. demonstrated a strong volume–outcome relationship for high-risk operations. Subsequently, the volume–outcome relationship has informed delivery of high-quality surgical oncology care over the past several decades.[1] Because high-volume surgical centers have lower morbidity and mortality compared with low-volume centers, especially among patients undergoing complex, high-risk cancer-related surgical procedures, there has been extensive centralization of these cases across the country.[2] Despite quality improvements due to embracing the volume–outcome relationship, many providers have raised concerns that subsequent centralization has led to increased disparities and an additional burden for a subset of vulnerable patients.[2,3] In this issue of *Annals of Surgical Oncology*, Sutton et al. analyzed care received among patients with a diagnosis of intrahepatic cholangiocarcinoma (ICC) from a single state (Oregon) and reported that patients who were evaluated at a referral center were more likely to receive treatments associated with better oncologic outcomes.[4]

While centralization of complex cancer care, including for ICC, has improved outcomes for many patients, researchers have speculated that centralization may lead to unintended consequences.[2] Specifically, centralization of care can result in an increased travel burden for many patients undergoing complex cancer operations at high-volume centers.[5,6] While most studies have focused on the centralization of surgery, there remains a question as to whether centralization of the continuum of cancer care, including surgery, radiation, and chemotherapy, has led to disparities in access and outcomes. By using a large, longitudinal cancer state registry, Sutton et al. retrospectively analyzed outcomes among 740 patients who received either all or some of their cancer care at one of two cancer referral centers versus non-referral centers. Previous studies had examined the association between travel distance, hospital volume, and outcomes following resection of cholangiocarcinoma. Specifically, Beal et al. reported that travel distance and hospital volume were associated with surgical quality-of-care metrics among patients with cholangiocarcinoma.[7] Sutton et al. built on this previous work by demonstrating that patients receiving some or all of their oncologic treatment (i.e., surgery, radiation, chemotherapy) at one of two referral centers, both of which were high volume academic medical centers, had better oncologic outcomes, including overall survival.[4]

While the study by Sutton et al. examined outcomes relative to the site of care (i.e., referral center vs. non-referral center), understanding where patients come from may be equally important. In their study, the authors controlled for county and zip code level measures of income, education, insurance, and urbanicity and found no association with treatment at a referral center for ICC; only distance to the nearest referral center was associated with treatment at a referral center. Unfortunately, the characteristics of patients who lived near a referral center, yet received care elsewhere, were not delineated. As the authors demonstrated, better oncologic outcomes were achieved at these referral centers. In turn, optimizing site of care among patients who live near referral centers may be

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'low hanging fruit' to optimize delivery of high-quality oncologic care for ICC. To this point, our group and others have demonstrated that many patients undergoing a complex cancer operation bypass a high-volume hospital on the way to a lower-volume site of care.[6,8–10] Identifying and developing strategies to improve the care of these patients may improve oncologic outcomes without increasing patient travel burden. Sutton et al. also demonstrated that patients receiving some or all oncologic treatment (i.e., surgery, radiation, chemotherapy) at one of two referral centers, both of which were high-volume academic medical centers, had better oncologic outcomes, including overall survival. However, whether patients who traveled to receive care at referral centers had improved outcomes versus their counterparts who received cancer care locally remains unknown. For example, in a study of rural Medicare beneficiaries with colon cancer without metastatic disease, there was no difference in surgical outcomes among patients who underwent an operation locally at a rural hospital versus individuals who traveled to an urban center.[11] Therefore, it may be possible that the differences observed by Sutton et al. were driven by differences in stage of disease treated by referral and non-referral centers. For example, patients who live further away from referral centers may be disproportionally diagnosed with more advanced-stage ICC and thus be referred to a high-volume, academic medical center for surgical consideration at a lower rate.

Sutton et al. demonstrate that patients who received combined care (i.e., care at both community and referral centers) had the longest median survival. The underlying mechanisms for these findings were unclear but may be related to early diagnosis and work-up locally at community hospitals followed by referral to high-volume centers for definitive treatment. Unfortunately, Sutton et al. did not report which oncologic services were delivered within the community and which were more likely to be optimally delivered at the referral center. For example, diagnosis and work-up may be safely performed within the community, while complex surgical procedures are more likely to be performed optimally at a referral center; similarly, chemotherapy and radiation may be delivered locally in the community in collaboration with the referral center. As the geographic footprints of large academic health systems continue to grow, a better understanding of which aspects of oncologic treatment can be performed locally versus at a tertiary healthcare system referral hub is paramount to improve the quality and value of cancer care while also making care more patient-centric and accessible.[12]

Another interesting point, which was not emphasized by Sutton et al., was that the only two referral centers in Oregon were in the same city. While Portland is the most populous city in the state of Oregon, this city only accounts for about 16% of the state's total population. As such, the majority of individuals would need to travel at least some reasonable distance to access one of the referral centers, emphasizing that coordinated, state-wide efforts are needed to improve delivery of healthcare. Using geospatial analysis, several groups have noted that optimizing the location of referral centers can increase the number of patients treated for pancreas surgery, traumatic finger amputation replants, and emergency general surgery at these facilities while ensuring travel distances are not prohibitively long.[13–15] States and large health systems should consider a similar approach in locating oncology referral centers to ensure equitable access to high-quality, specialty-based cancer care treatment.

The study by Sutton et al. adds to a growing body of literature that validates improved clinical outcomes at high-volume academic medical centers for patients with complex cancer diagnoses. However, the study also demonstrates that access to high-volume specialty cancer care can often be inequitable and inaccessible, especially for patients living in communities that are far away from urban centers. Future research should aim to move beyond simply examining outcomes among different types of centers (e.g., academic, high-volume, referral, etc.) and towards identifying communities that are at risk of having limited access to high-quality care.[16] Researchers and policymakers must move beyond mere demonstration of inequities in healthcare delivery and begin to conceptualize and implement actual strategies to make access to high-quality specialty care more feasible. In particular, a focus on patient preference, as well as social determinants of health that may drive decisions and the ability to obtain high-quality oncologic care, is needed.[17] Rather than a singular focus on centralization to high-volume hospitals, strategies are needed that disseminate best practices and optimize the delivery of high-quality cancer care that patients can access anywhere.

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