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CORR Insights

CORR Insights®: Are There Racial or Socioeconomic Disparities in Ambulatory Outcome or Survival After Oncologic Spine Surgery for Metastatic Cancer? Results From a Medically Underserved Center

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Where Are We Now?

Cancer care outcomes are influenced by disease characteristics as well as individual and community socioeconomic factors. A National Cancer Database study of patients who underwent gastric cancer resections found that after controlling for host, tumor size, and resection completeness, patients with higher incomes and a higher level of education had lower 30-day and 90-day perioperative survival rates [8]. A second study using the National Cancer Database showed that patients with lower incomes were more likely to have a diagnosis of later-stage breast cancer and undergo mastectomy but were less likely to receive immediate breast reconstruction [14]. Across 55 Phase II and III cancer trials supported by the Southwest Oncology Group Cancer Research Network from 1985 to 2012, patients from areas with increased community socioeconomic deprivation had worse overall, progression-free, and cancer-specific survival, independent of cancer histology [19].

Similar trends have been observed in patients with metastatic cancer of the spine. An analysis of patient and socioeconomic factors included in the United States National Inpatient Sample found that non-White patients with a lower income and public insurance were more likely to undergo nonelective surgery for metastatic spine disease [5]. An additional query from this same database found that among patients with late-stage cancer, those with Medicaid coverage were more likely to have metastatic epidural spinal cord compression, were less likely to undergo surgery, and had longer hospital stays and higher rates of nonhome discharge [13]. Socioeconomic factors were also associated with radiotherapy outcomes. A National Cancer Database study found that government insurance, Black race, and treatment at a nonacademic medical center were associated with the use of spinal stereotactic body radiation therapy [6], which has been shown to provide superior symptomatic control [15].

De la Garza Ramos et al. [2] did not find that race or socioeconomic status was associated with the postoperative ambulation of patients who underwent surgery for metastatic cancer of the spine, a key outcome with catastrophic quality of life implications [17]. At face value, this highlights the overwhelmingly negative prognostic nature of nonambulatory status in terms of postoperative mobility. Yet I don't believe this is the only lesson we can learn from this work. A prior work by De la Garza Ramos et al. [1] using the

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National Inpatient Sample reported that Black patients were more likely to be paralyzed than their White counterparts. The authors reconciled these contrasting findings by noting the unique social vulnerability of their regional patient population as defined by its very poor Social Vulnerability Index (0.9987 on a 0- to 1-point scale, with 1 being the most vulnerable), which considers socioeconomic status, household characteristics, racial and ethnic minority status, housing status, and transportation [1]. The authors contend that socioeconomic factors may therefore not have mattered if the entire population was uniformly disadvantaged. This completely reasonable explanation highlights what, in my opinion, is a fundamental challenge in social disparities research in patients with complex metastatic disease: Cohort selection, be it regional, surgical or nonsurgical, or disease-specific, skews the inherent socioeconomic and racial factors that impact the decision of when to receive care, when to accept care, and how to deal with end-stage disease such as metastatic cancer. Based on these discoveries, surgeons are encouraged to consider the social challenges faced by a patient with metastatic cancer when discussing important decisions such as surgery, because it is likely that such decisions depend not just on individual needs, but also on familial socioeconomic ramifications.

Where Do We Need To Go?

In socioeconomic studies, we must embrace and continuously strive to minimize bias related to the uniqueness of the population being studied. Studying patients who have been selected as part of their care pathway, geographic location, community distribution, health network referral pattern, or personal self-selection may only yield data specific to those patients. This ultimate lack of generalizability does not necessarily represent a quality problem in any given study, but rather indicates the immense challenge of identifying how the included patients got to that point in the first place.

Consider regaining mobility after ambulatory surgery. The present work [2] reported that no measure of individual or community socioeconomic disparity influenced ambulatory outcome after metastatic spine surgery. However, this cohort is already quite privileged. Schoenfeld et al. [16] reported that patients with epidural spine disease who underwent surgical decompression were more likely to be ambulatory than those treated nonoperatively. Although this work [2] evaluated their population without considering race or the socioeconomic state of the group, in a prior study, De la Garza Ramos et al. [1] reported that paralysis was more prevalent among Black patients, although surgery was less commonly performed and complications were more frequent when surgery was performed. The authors could have therefore been still comparing surgery and nonsurgery rather than race. We therefore must consider the findings of the present work by accepting that although the cohort of interest came from an area where patients were generally not affluent and may have had low levels of educational attainment, they were potentially less disadvantaged than patients not offered surgery. Thus, although I agree with the authors that the present work suggests that when indicated, perioperative care and rehabilitation were applied in a judicious and unbiased manner, I disagree that they have shown social factors were not at play. In my opinion, they were simply not visible in that small branch of the tree of spine metastatic cancer care. This discourse highlights the need for works that seek to understand how specific patient or social factors influence not only the ultimate disease outcome, but also steps along the treatment process such as time until presentation, consent for surgery, chemotherapy and radiation, and transition home.

Our current ability to analyze socioeconomic disparities also suffers from our inability to effectively label host physiology or frailty. Disparity and frailty are intersectional characteristics, yet it is hard to consider disparity as unique from aspects of frailty until we more consistently define and subdivide the latter. Many metrics have been used to describe patients with frailty, a prominent example of which is the Adult Spinal Deformity Frailty Index. Well-validated in spine studies to predict mortality in patients with deformities, the Adult Spinal Deformity Frailty Index [11, 12] contains more than 40 measures of social disability, comorbidity, and function, using a proportion of these vulnerability measures to establish a score in a manner established as “standard procedure” for creating a frailty index [18]. However, I question what we can do with such general information. Is disability truly as important as comorbidity, and how can we tell true frailty from dependency and comorbidity? These questions are in part limited by our ability to collect quantitative (yes versus no) data in these areas, and the current capacity of existing large repositories of patient data to provide them.

How Do We Get There?

If we agree that metastatic disease of the spine is best studied using diverse patient groups that include both operative and nonoperative care, reliable access to medical health providers is critical to avoid the self-selection that results from simply not having access to care and the early diagnostic and educational benefits of routine surveillance. This is easier said than done. Poor cancer follow-up among patients living in remote regions or socioeconomically disadvantaged areas has been reported [10]. My institution, like that of the authors of the present work [2], accepts the inevitability of the late and missed appointments that result from alterations in bus schedules and the financial consequences of missed work to see a doctor. Telemedicine may serve to improve that access. Ye et al. [21] reported that although patients who lived in communities with average and below-average socioeconomic status as measured with the Area Deprivation Index [7] had a higher rate of missed appointments than those from healthier regions, this relationship was not seen for telemedicine visits. Given the near-universal prevalence of smartphones and the growing number of local and federal programs providing low-cost or free cellular service, virtual encounters may provide better longitudinal follow-up for patients with a low income. However, this modality is far from perfect. Xiong et al. [20], in their analysis of two urban medical centers during a 2-month period, found that patients with Medicaid insurance or of Asian or Hispanic ethnicity were less likely to agree to telemedicine evaluation than White patients, as were patients whose primary language was not English or Spanish. Although Leopold [9] notes the challenges of generalizing a coronavirus-19 pandemic-era study to nonpandemic periods, the challenge of providing a service that is broadly socioculturally acceptable and at a technological level permissive of universal participation has not yet been met.

I further contend that research studying patient and regional socioeconomic factors be performed with minimal narrowing to focus on single interventions (such as surgery versus nonsurgery). Bias is introduced when narrowing any cohort for a surgical or procedural intervention, because narrowing the cohort removes consideration of factors that could have led a patient to accept or defer such an intervention. We should consider the use of artificial intelligence and machine learning to parse data rather than attempting to tailor data ourselves for better statistical convenience. Factors identified using such a method may be “truer” across a larger swathe of society and a broader stretch of clinical care than more-niche works. We should seek to leverage existing national and multinational prospective data collection initiatives to include more-granular patient and socioeconomic factors, which may make such analyses more feasible and broadly accessible to the scientific community.

Finally, we should consider whether studies that examine purely quantifiable measures of disease and socioeconomic disparity are truly telling us the entire story about why such disparities exist. Many studies have identified differences in the likelihood of pursuing and receiving care among patients of different races, some finding trends independent of host and socioeconomic factors [3, 4]. Although perhaps useful when considering community-level interventions, such works do not fully identify why such differences exist. To that end, it is likely that qualitative study designs such as interviews are necessary to answer these questions, and thereby get us closer to the root of why social disparities exist. Succeeding in such an endeavor would truly introduce the level of individualized care we seek to provide.

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