Editorial

Surviving travel or travelling to survive: the association of travel distance with survival in muscle invasive bladder cancer

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Radical cystectomy with extended pelvic lymphadenectomy is recommended for treatment of patients with recurrent non-muscle invasive and muscle invasive bladder cancer (1). Despite these guideline recommendations, radical cystectomy is significantly underutilized. Recent studies show only 19% of patients with muscle-invasive disease undergo cystectomy with significant predictors for underutilization being advanced age and increased co-morbidities (2). Radical cystectomy remains a high-risk procedure with operative morbidity estimated at 28% (3) and operative mortality as high as 4.3% (4). Thus, increased attention has been placed on improving perioperative outcomes by focusing on quality of cancer care and its delivery. To this end, several population-based cohort studies have examined the effect of hospital and surgeon volume on morbidity and mortality after this complex surgery. The results show patients treated at high volume hospitals have lower rates of mortality with the added benefit of decreased length of hospital stay and lower costs (5-7). Therefore, surgeon and hospital volume have been targeted as modifiable factors that can improve outcomes for patients diagnosed with muscle invasive bladder cancer.

As a result, regionalization of care to high volume, tertiary referral centers have been put forth as a health policy to improve the quality of care and outcomes among patients diagnosed with malignancies requiring complex operations (8). In fact, regionalization for patients undergoing radical cystectomy has already occurred in the United States. In a study of national Medicare data of 8 major cancer operations including cystectomy from 1999 to 2008, Finks *et al.* reported a 20% redistribution of cystectomy patients to high volume hospitals resulting in a 37% reduction in 30-day mortality (4). While studies support this volume-outcome relationship for several cancers, one concern regarding regionalization of health care is the increased burden placed on patients to travel longer distances to high volume medical centers, especially considering such hospitals are often located in urban, population-dense locations (9,10). Additionally, it has been proposed that regionalization can cause delays in definitive treatment as a result of care transitions (11). While these are valid concerns, the burden of traveling greater distances to high volume hospitals and patient outcomes has not been addressed to date.

Ryan *et al.* examine this important health services research question to elucidate the association between distance traveled with overall survival in patients with muscle invasive bladder cancer and a subgroup of those who underwent radical cystectomy in the National Cancer Database (12). The authors hypothesized that patients who traveled greater distance for definitive treatment would have adverse oncologic outcomes due to possible delays in care,

or lack of coordination of care. Yet, the results demonstrated the contrary in that patients living intermediate or long distances from the treatment facility had increased overall survival compared to those living a short distance (HR =0.96; 95% CI, 0.92–0.99 and HR =0.91; 95% CI, 0.86–0.96 respectively, P<0.01). Further stratification by T stage demonstrated patients with clinical T2 disease had increased overall survival when they traveled an intermediate or long distance for care (HR =0.96; 95% CI, 0.92–0.99 and HR =0.88; 95% CI, 0.83–0.93 respectively, P<0.02). This did not hold true for cT3 or cT4a disease and importantly, no association between distance and stage at diagnosis was observed. Characteristics that were significantly associated with higher mortality included female gender, older age, African American race, residence in low income and low education ZIP codes, Medicaid or no insurance, and treatment at non-academic institutions (P<0.05). In the subgroup analysis of only patients who underwent radical cystectomy, the mortality benefit with greater distance traveled disappeared, despite patients travelling farther (>12.5 miles) being more likely to receive neoadjuvant chemotherapy (NAC) and to be treated at high-volume centers (>6 cases per year). However, examination of travel distance and treatment facility type demonstrated increased overall survival in patients who traveled farther for care at an academic facility (P<0.05). This interaction was not significant for other facility types. The authors cite multiple reasons for their unexpected results including selection bias in that patients willing to travel to high-volume centers may have better functional health, higher socio-economic status, better social support, and are willing to undergo more aggressive treatment modalities, variables that may in turn be related to surgical mortality risks.

Another important finding in their study is that among patients with muscle invasive bladder cancer undergoing radical cystectomy, those travelling to academic medical centers had a greater likelihood of receiving NAC. Despite level-1 evidence showing greater overall survival with NAC and radical cystectomy compared with radical cystectomy alone (13), only a minority of patients eligible for NAC go on to receive it in the United States (14). This trend is mirrored in the study by Ryan *et al.* as the majority of patients undergoing radical cystectomy did not receive NAC (76%) and notably, nearly half (49.6%) of these patients underwent surgery at low volume facilities. This observation further supports regionalization of radical cystectomy to improve the quality of oncologic care for patients as a larger proportion received health care in line with clinical practice guidelines at academic medical centers. Finally, a critical inference from this study is that travel distance does not represent a barrier to the receipt of high quality, guideline concordant care. In fact, it is the opposite. Clinicians and patients should be encouraged by these results and refer patients more readily even if they have to travel greater distance to academic medical centers.

A key concerning finding, however, is that patients who live close to the hospital where definitive care is received correlated with worse overall survival. While this is an unexpected finding, it does highlight concerns about improving the delivery of oncologic care among bladder cancer patients across all populations. Several reasons may contribute to this finding. For instance, it is essential to acknowledge that most academic hospitals are located in high population density and urban cities. A policy implication of this study is that the increased mortality seen in patients who are minorities, uninsured, have low-income, and live in low education ZIP codes could be attributed to difficulty accessing academic medical centers (15). Thus, emphasis should be placed on improving access and timely delivery of high quality care for all patients diagnosed with muscle-invasive bladder cancer. These are modifiable processes where substantive improvements can be made. Alternatively, determinants of high quality care at academic/high-volume hospitals can be identified and implemented at low-volume hospitals (16). In an attempt to address this, using data from the Healthcare Cost and Utilization Project (HCUP) Hollenbeck *et al.* observed that the driving factors distinguishing high quality care after radical cystectomy at high versus low volume hospitals was the increased availability and breadth of consultative, diagnostic and ancillary services (17). Some of the services that were more likely to be offered at high volume hospitals were interventional radiology, interventional cardiology, and hemodialysis, all of which may play a pivotal part in rescuing a patient postoperatively. While these results represent a step in the right direction, the complex relationships between volume, case mix, and surgeon related factors will be difficult to untangle and continued efforts to elucidate key determinants for delivery of high quality oncologic care across all populations should be encouraged.

The authors should be applauded for further contributing to the body of evidence on the impact of regionalization of healthcare on treatment of urologic malignancies. The main findings of their study were patients who traveled farther for bladder cancer treatment did not experience inferior survival outcomes and traveling to academic institutions

was associated with increased receipt of NAC with reduced mortality. These results further support the regionalization of complex surgeries to high volume medical centers as patients have better outcomes and are more likely to receive evidenced-based guideline care. With regionalization likely to continue, future efforts should be placed on improving access to high quality care for all patients regardless of insurance status or income while at the same time, continued efforts should be made to uncover the critical determinants of high quality care at academic/high-volume hospitals.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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