Care Transitions between Hospitals are Associated with Treatment Delay for Patients with Muscle Invasive Bladder Cancer

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Purpose: Hypothesizing that changing hospitals between diagnosis and definitive therapy (care transition) may delay timely treatment, we identified the association between care transitions and a treatment delay of 3 months or greater in patients with muscle invasive bladder cancer.

Materials and Methods: Using the National Cancer Database we identified all patients with stage II or greater urothelial carcinoma treated from 2003 to 2010. Care transition was defined as a change in hospital from diagnosis to definitive treatment course, that is diagnosis to radical cystectomy or the start of neoadjuvant chemotherapy. Logistic regression models were used to test the association between care transition and treatment delay.

Results: Of 22,251 patients 14.2% experienced a treatment delay of 3 months or greater and this proportion increased with time (13.5% in 2003 to 2006 vs 14.8% in 2007 to 2010, $p = 0.01$). Of patients who underwent a care transition 19.4% experienced a delay to definitive treatment compared to 10.7% diagnosed and treated at the same hospital ($p < 0.001$). The proportion of patients with a care transition increased during the study period (37.4% in 2003 to 2006 vs 42.3% in 2007 to 2010, $p < 0.001$). After adjustment patients were more likely to experience a treatment delay when undergoing a care transition (OR 2.0, 95% CI 1.8–2.2).

Conclusions: Patients with muscle invasive bladder cancer who underwent a care transition were more likely to experience a treatment delay of 3 months or greater. Strategies to expedite care transitions at the time of hospital referral may improve quality of care.

Key Words: urinary bladder neoplasms; cystectomy; patient handoff; quality indicators, health care; hospitals

Abbreviations and Acronyms

MIBC = muscle invasive bladder cancer

NCDB = National Cancer Database

RC = radical cystectomy

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PATIENTS often travel a great distance for centralized surgical care[1] and they are at risk for being temporarily taken out of their usual health care system. Improving provider care coordination at the time of care transitions, loosely defined as movement between health care practitioners and care settings as needs change during the course of chronic or acute illness,[2] is a priority of contemporary health care reform. While most current research and interventions have focused on the transition between inpatient and outpatient care for longitudinal management of chronic

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illness, the impact of interruptions in care coordination when patients change providers and hospitals for complex surgical care has been inadequately studied.

For Medicare beneficiaries high surgical volume is associated with decreased mortality and an improved outcome for numerous cancers at the national level.[3] It was proposed as a surrogate for care quality. Regionalization of complex cancer operations and high risk surgical procedures to high volume providers may provide a mechanism to curtail potentially avoidable expenses, which has been championed by the media and advocacy organizations such as the Leapfrog Group.[4] However, widespread centralization of surgical care could result in a large proportion of patients changing hospitals and health care systems, exacerbating existing access disparities and overwhelming the resources of tertiary and quaternary referral centers.[5] Confirming these concerns, as case loads at specialized centers have increased in the last decade, wait time for the treatment of 8 common solid organ malignancies has increased.[6]

Bladder cancer, the second most common genitourinary malignancy in the United States and one of the most expensive cancers from diagnosis to death,[7] represents a targetable area for quality improvement. RC with urinary diversion in conjunction with neoadjuvant or adjuvant chemotherapy[8] is the gold standard treatment of MIBC with a 5-year survival rate of 62% to 80%.[9] Time from cancer diagnosis to treatment reflects the availability of hospital resources and the efficiency of overall care.[6,10] A greater than 3-month delay in the receipt of RC is associated with decreased disease specific and overall survival.[11,12]

Hypothesizing that care transitions at the time of referral for RC may delay timely treatment in patients with muscle invasive bladder cancer, we examined the association between care transitions and a treatment delay of 3 months or greater using a large national tumor registry.

PATIENTS AND METHODS

Cohort Definition

The NCDB, a national cancer registry established in 1989 that is a program of the American College of Surgeons Commission on Cancer and the American Cancer Society, serves as a comprehensive clinical surveillance resource for cancer care in the United States. The NCDB compiles data from more than 1,500 commission accredited cancer programs in the United States and Puerto Rico, and captures approximately 70% of all newly diagnosed cancer cases.

All patients with urothelial carcinoma of the bladder were identified based on ICD-O-3 site codes (8120, 8121, 8122, 8123, 8124, 8130, 8131 and 8132). Our analytical cohort was restricted to adults 18 to 90 years old undergoing RC for analytical stage II-IV disease during 2003 to 2010. Patients with a nonurothelial histological type, stage I or less, or an unknown stage or second primary cancer were excluded from study. Patient socioeconomic characteristics were provided using United States Census tract data. The comorbidity burden was determined using the Charlson-Deyo classification and categorized as 0, 1, or 2 or greater.

Based on case volume, and access to cancer related services and specialists the NCDB classifies hospitals as unknown, community centers (100 to 500 new cancer cases per year), comprehensive community centers (greater than 500 cases per year) and teaching/research centers (academic) defined by National Cancer Institute designation or medical school affiliation. Using previously described methods[3,13,14] we determined annual RC hospital volume status by tercile by dividing the total number of RCs performed at each hospital during the study period by the number of years that the hospital reported any bladder cancer cases. The distance between the patient residence and the hospital of record was defined by mile quintiles using the ZIP Code centroid location to determine residence, and hospital latitude and longitude. The NCDB requires the reporting of the initial cancer diagnosis date, as defined by the first clinical or histological confirmation, in addition to treatment initiation and treatment completion dates of index surgery and neoadjuvant chemotherapy. Neoadjuvant chemotherapy was defined as systemic treatment received before RC using the date of initiation of therapy. Using these data time to treatment was defined as time from diagnosis to index surgery or initiation of neoadjuvant chemotherapy to avoid penalizing hospitals where preoperative chemotherapy was preferentially administered.[15] Treatment delay was defined as 3 months or greater from diagnosis to treatment.

While the facility reporting each case to the NCDB is the hospital where a patient receives the first course of definitive therapy, the NCDB also requires reporting if diagnosis and definitive treatment were performed at different hospitals. Using these data a care transition was defined as a change in hospital from diagnosis to definitive treatment.[6]

Statistical Analysis

Trends in care transition and delay to definitive treatment were assessed during 2003 to 2010 using the chi-square test. Patient demographic and clinical characteristics were compared between those who did and did not experience a care transition using the chi-square test. We examined the association between care transition and delay in receipt of definitive therapy using multivariable logistic regression adjusting for year, patient age, gender, race, ethnicity, volume, distance, payer group, Charlson-Deyo score, income, education, tumor grade, analytical stage, urban/rural status, and facility type and location. To account for clustering within hospitals we calculated robust SEs using generalized estimating equations. All statistical analysis was done with SAS®, version 9.3.