Discharge Patterns After Radical Cystectomy: Contemporary Trends in the United States

Marco Bianchi,*,† Quoc-Dien Trinh,† Maxine Sun, Jesse Sammon, Jan Schmitges, Shahrokh F. Shariat, Shyam Sukumar, Khurshid R. Ghani, Claudio Jeldres, Paul Perrotte, Craig G. Rogers, Alberto Briganti, James O. Peabody, Francesco Montorsi, Mani Menon and Pierre I. Karakiewicz

From the Department of Urology, Vita Salute San Raffaele University, Urologic Research Institute, Milan, Italy (MB, AB, FM), Cancer Prognostics and Health Outcomes Unit, University of Montreal Health Center, Montreal, Canada (MB, QDT, MS, JS, CJ, PP, PIK), Vattikuti Urology Institute, Henry Ford Health System, Detroit, Michigan (QDT, JS, SS, KRG, CGR, JOP, MM), Martini-Clinic, Prostate Cancer Center Hamburg-Eppendorf, Hamburg, Germany (JS), and Department of Urology, Weill Medical College of Cornell University, New York, New York (SFS)

Abbreviations and Acronyms

AHC = annual hospital caseload
CCI = Charlson comorbidity index
LOS = length of stay
NIS = Nationwide Inpatient Sample
pLOS = prolonged LOS
RC = radical cystectomy

Submitted for publication August 2, 2011.
Nothing to disclose.

Supplementary material for this article can be obtained at http://cs.mcgill.ca/~ztian3/dischargepattern/.

* Correspondence: Cancer Prognostics and Health Outcomes Unit, University of Montreal Health Center, 1058, rue St-Denis, Montreal, Québec, Canada H2X 3J4 (telephone: +15149417862; FAX: +15142275103; e-mail: bianchihsr@gmail.com).

† Equal study contribution.

Editor's Note: This article is the first of 5 published in this issue for which category 1 CME credits can be earned. Instructions for obtaining credits are given with the questions on pages 1514 and 1515.

Purpose: Discharge patterns, including rates of prolonged length of stay and transfer to a facility, were evaluated in the context of radical cystectomy.

Materials and Methods: Within the Nationwide Inpatient Sample we focused on radical cystectomy performed between 1998 and 2007. Multivariable logistic regression analyses predicting the likelihood of prolonged length of stay or transfer to a facility were performed.

Results: Overall 11,876 eligible radical cystectomy cases were identified. The rates of prolonged length of stay decreased from 59% in the early period (1998 to 2001) to 50% in the late period (2005 to 2007, $p < 0.001$) while the rates of transfer to a facility remained stable (14%). On multivariable analyses adjusted for clustering, prolonged length of stay was more frequently recorded in patients from low annual caseload hospitals (OR 1.42, $p < 0.001$), as well as in Medicaid and Medicare patients (OR 1.66 and 1.17, respectively, all $p < 0.01$). Similarly rates of transfer to a facility were significantly higher for patients from low annual caseload hospitals (OR 1.81, $p < 0.001$) and for those with Medicaid or Medicare (OR 2.18 and 1.54, respectively, all $p < 0.001$), as well as for patients treated at nonacademic institutions (OR 1.31, $p < 0.001$).

Conclusions: It is encouraging that the rates of prolonged length of stay have decreased while the rates of transfer to a facility remained stable. However, it is worrisome that individuals treated at low annual caseload centers as well as those with Medicare and Medicaid insurance experience less favorable discharge patterns.

Key Words: urinary bladder neoplasms, cystectomy, patient discharge, length of stay

In 2010, 70,530 new cases of bladder cancer were recorded, of which approximately 25% were muscle invasive.[1] Radical cystectomy with urinary diversion is considered the gold standard for muscle invasive or refractory nonmuscle invasive bladder cancer.[2,3] Of cancer directed surgeries, RC is certainly one the most complex procedures, which may lead to several procedure specific complications. Reported complication rates after RC range from 21% to 57%, which may lead to a prolonged length of stay

0022-5347/12/1874-1206/0
THE JOURNAL OF UROLOGY®

Vol. 187, 1206-1209, April 2012
Printed in U.S.A.
DOI:10.1016/j.juro.2011.11.097

and, thus, to increased hospital costs.[4] Therefore, RC is associated with a heavy societal cost burden with a median hospital charge of $41,905 per patient following diagnosis.[4] Moreover bladder cancer is most commonly diagnosed in elderly patients and these patients often harbor numerous comorbidities. In this context postoperative care patterns are of the utmost importance. A recent report indicated that earlier patterns of hospital discharge may coincide with higher rates of transfer to a facility, and suggested that the burden of care is shifted away from hospitals.[5]

In the current study we reexamine this topic in a more contemporary patient population. Additionally, we test for potentially modifiable predictors of pLOS and transfer to a facility in a large contemporary (1998 to 2007) population based cohort of individuals undergoing RC.

MATERIALS AND METHODS

Data Source

Data from the most contemporary years (1998 to 2007) of the Nationwide Inpatient Sample were abstracted. The NIS includes inpatient discharge data collected via federal-state partnerships as part of the Agency for Healthcare Research and Quality Healthcare Cost and Utilization Project. As of 2007 the NIS contained administrative data on 8,043,415 discharges from 1,044 hospitals in 40 states, approximating 20% of community hospitals in the United States, including public hospitals and academic medical centers. The NIS is the sole hospital database in the United States with information on all patients regardless of payer, including Medicare, Medicaid, private insurance and self-pay. This study was exempt from institutional review board approval in accordance with provincial and federal legislation when dealing with population based publicly available data.

Sample Population and Surgical Procedures

Relying on discharge records, all patients with a primary diagnosis of bladder cancer (ICD-9-CM code 188) were identified. The cystectomy procedure code (ICD-9-CM 57.7) resulted in the identification of 11,876 patients who underwent RC between 1998 and 2007. Urinary diversion was stratified as continent (orthotopic neobladder or continent cutaneous reservoir, ICD-9 57.87), incontinent (ileal conduit, ICD-9 56.51) and unknown.

Baseline Patient and Hospital Characteristics

For all patients data on several variables were available including age, gender, year of surgery, race (white vs black vs other vs unknown), CCI, urinary diversion, AHC, hospital academic status, hospital region, insurance status, postoperative complication status and disposition of the patient at discharge. Information about hospital region was obtained from the American Hospital Association Annual Survey of Hospitals and was defined by the United States Census Bureau.[6] These data comprised the South (Delaware, Maryland, District of Columbia, Virginia, Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas), West (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii), Northeast (Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania) and Midwest (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Dakota, Nebraska, Kansas). CCI was derived from ICD-9 codes according to previously established criteria,[7] and was stratified according to the 4 levels of 0, 1, 2 and 3 or greater.

AHC was defined according to the number of procedures performed at each participating institution during each study calendar year. High AHC was defined as institutions with an annual volume higher than the 75th percentile. This resulted in the categories of less than 22 vs 22 or more cystectomies performed. Hospitals were divided into academic and nonacademic institutions. Hospital academic status was obtained from the American Hospital Association Annual Survey of Hospitals. A hospital is considered a teaching hospital if it has an American Medical Association approved residency program, is a member of the Council of Teaching Hospitals, or has a ratio of full-time equivalent interns and residents-to-beds of 0.25 or higher. To ensure uniformity of coding across data sources, detailed insurance categories are combined into more general groups, namely private insurance, Medicare, Medicaid and other.

Disposition of the Patient at Discharge

The NIS records the disposition of the patient at discharge into 7 distinct categories of 1) routine, 2) transfer to short-term hospital, 3) transfer to another type of facility, 4) home health care, 5) discharged against medical advice, 6) deceased and 7) unknown/missing. Patients in categories 5, 6 and 7 were excluded from analyses (339). For the purpose of exploratory analyses, patients were subsequently stratified to routine discharge (category 1), transfer to any facility (categories 2 and 3) or home health care (category 4).

Postoperative Complications and LOS

The NIS records up to 15 diagnoses and procedures per in-hospital stay. The presence of any complication was defined using ICD-9 diagnoses 2 through 15. The specific ICD-9 codes for complications were used as previously described.[8] Length of stay, provided by the NIS, is calculated by subtracting the admission date from the discharge date. LOS was initially used as a continuous variable to properly assess its temporal trends. Subsequently pLOS was defined as patients staying beyond the median length of stay for the entire cohort. Patients with missing or invalid LOS or in-hospital mortality status were not considered in the current study.

Statistical Analysis

Descriptive statistics focused on frequencies and proportions for categorical variables. Means, medians and ranges were reported for continuously coded variables. The chi-square and ANOVA tests were used to compare the statistical significance of differences in proportions and means, respectively. The p values of the relative percentage change in temporal trends were derived from logistic regression. Moreover, linear regression analyses were used to assess the effect of year of surgery on LOS.

Logistic regression analyses focused on the prediction of pLOS. Separate logistic regression models were fitted for the prediction of transfer to a facility. To account for the effect of clustering among hospitals, all models relied