Gender Disparities in Hematuria Evaluation and Bladder Cancer Diagnosis: A Population Based Analysis

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Purpose: Men are diagnosed with bladder cancer at 3 times the rate of women. However, women present with advanced disease and have poorer survival, suggesting delays in bladder cancer diagnosis. Hematuria is the presenting symptom in most cases. We assessed gender differences in hematuria evaluation in older adults with bladder cancer.

Materials and Methods: Using the SEER (Surveillance, Epidemiology and End Results) cancer registry linked with Medicare claims we identified Medicare beneficiaries 66 years old or older diagnosed with bladder cancer between 2000 and 2007 with a claim for hematuria in the year before diagnosis. We examined the impact of gender, and demographic and clinical factors on time from initial hematuria claim to urology visit and on time from initial hematuria claim to hematuria evaluation, including cystoscopy, upper urinary tract imaging and urine cytology.

Results: Of 35,646 patients with a hematuria claim in the year preceding bladder cancer diagnosis 97% had a urology visit claim. Mean time to urology visit was 27 days (range 0 to 377). Time to urology visit was longer for women than for men (adjusted HR 0.9, 95% CI 0.87–0.92). Women were more likely to undergo delayed (after greater than 30 days) hematuria evaluation (adjusted OR 1.13, 95% CI 1.07–1.21).

Conclusions: We observed longer time to a urology visit for women than for men presenting with hematuria. These findings may explain stage differences in bladder cancer diagnosis and inform efforts to decrease gender disparities in bladder cancer stage and outcomes.

Key Words: urinary bladder neoplasms, hematuria, female, quality of health care, SEER program

In 2012 bladder cancer affected more than 70,000 Americans and caused almost 15,000 deaths.[1] Although men are diagnosed with bladder cancer at almost 3 times the rate of women, women present with more advanced disease and a greater proportion die of the disease.[2] Differences in stage distribution suggest that delayed diagnosis may explain at least some poorer outcomes observed in women.[3–5]

More than 80% of bladder cancers are diagnosed after the presenting symptom of hematuria.[6] Hematuria is caused by benign and malignant conditions that vary by gender. In men hematuria typically arises from

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a source in the urinary tract, including kidney stones, bladder cancer or kidney cancer. In women hematuria may be attributable to urinary tract infection or gynecologic origins.

The AUA (American Urological Association) recommends diagnostic evaluation of hematuria that includes cystoscopy, urine cytology and upper urinary tract imaging.[7,8] Any physician may order urine cytology and imaging but cystoscopy is performed almost exclusively by urologists. Despite clear guidelines for hematuria evaluation women may be referred to urologists less often and after a longer time since the first hematuria presentation than men.[9] However, prior studies of this question have been limited in scope, sample size and generalizability.[9–11]

We estimated differences between men and women in the timeliness of hematuria evaluation and consultation with a urologist in a population based cohort of older patients with bladder cancer. We also identified predictors of delayed evaluation.

METHODS

Data

We used SEER cancer registry data linked with Medicare claims. SEER is a consortium of population based cancer registries in select states and areas that covers 30% of the population of the United States.[12] SEER collects information on the site and extent of disease, first course of cancer therapy, and date and cause of death. For adults 65 years old or older diagnosed with cancer in SEER areas cancer registry information is linked with Medicare claims for inpatient, outpatient and physician services. SEER-Medicare files were used in accordance with a data use agreement with the NCI (National Cancer Institute). This study was reviewed by the Memorial Sloan Kettering Cancer Center institutional review board and deemed exempt research.

Cohort

We identified patients 66 years old or older in whom primary bladder cancer was diagnosed between January 1, 2000 and December 31, 2007, and who had a claim for hematuria in the 12 months before bladder cancer diagnosis. We included in study patients with known cancer stage and continuous enrollment in Medicare Parts A and B for at least 1 year before bladder cancer diagnosis. We excluded those with prior malignancy and those enrolled in a Medicare managed care plan.

Outcomes

The primary outcome was time to first urology visit, defined as the interval between the first Medicare claim for hematuria in the year before bladder cancer diagnosis and the first claim for a urology visit. Urologists were identified by Medicare provider specialty code.

The secondary outcome was time to initiation of hematuria evaluation, defined as the interval between the first Medicare claim for hematuria in the year before bladder cancer diagnosis and the first claim for cystoscopy, upper urinary tract imaging or urine cytology. Upper tract imaging included computerized tomography urogram, renal ultrasound, retrograde pyelogram or excretory urogram. Delayed hematuria evaluation was defined as an interval of greater than 30 days between the first hematuria claim and the initiation of evaluation.

Covariates

The predictor of interest for each outcome was gender. On multivariable analysis we controlled for other characteristics, including age, race, marital status, median income in the census tract of residence, urban vs rural residence, comorbidity, geographic region, diagnosis year and specialty of the provider associated with the first claim for hematuria. Comorbidity was estimated using an adaptation of the Charlson comorbidity index based on claims in the year before bladder cancer diagnosis.[13] Provider specialty associated with the index hematuria claim of each patient was classified as primary care, obstetrics/gynecology, urology or other. Primary care included internal medicine, family practice and general practice physicians, and nurse practitioners. Disease characteristics included bladder cancer stage, grade, histology and lymph node involvement. Stage was classified according to the AJCC (American Joint Committee on Cancer) staging scheme, 6th edition.[14] To control for a preexisting relationship with a urologist we created a binary indicator reflecting the presence or absence of any Medicare claim for an encounter with a urologist preceding the index hematuria claim in the year before bladder cancer diagnosis.

Analysis

Unadjusted associations between genders and the frequency of each outcome (urology visit, cystoscopy, upper tract imaging and cytology) were assessed by the chi-square test. We estimated Kaplan-Meier survival functions and the log rank tests to assess unadjusted associations between gender and time to a urology visit. We used Cox proportional hazards regression to estimate the impact of gender on time to the first urology visit after the index hematuria claim adjusting for demographic and disease characteristics. If the index hematuria claim coincided with a urology visit, time to the first urology visit was defined as a fraction of a day. Patients without a urology visit were censored at bladder cancer diagnosis.

We used logistic regression to estimate the impact of gender on the likelihood of delayed hematuria evaluation, adjusting for demographic and disease characteristics. There was a significant unadjusted association between the specialty of the provider associated with the index hematuria claim and a previous visit with a urologist. Thus, we included a single 4-level variable reflecting the interaction of these 2 terms, that is specialty of the provider associated with the index hematuria claim (urologist vs other) and claim for a urology visit in the year before the index hematuria claim (any vs none). All analysis was done with SAS®, version 9.2.

RESULTS

We identified 41,229 patients with bladder cancer, of whom 35,646 (86%) had at least 1 claim with a