Life Expectancy and Variation in Treatment for Early Stage Kidney Cancer

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Purpose: Patients with limited life expectancy are at risk for overtreatment of T1a kidney cancer. We sought to determine patterns of treatment for T1a kidney cancer in a nationally representative sample of patients with life expectancy less than 10 and less than 5 years.

Materials and Methods: We sampled 9,825 patients older than 65 years with clinical T1a kidney cancer diagnosed between 2000 and 2010 from the SEER (Surveillance, Epidemiology and End Results)-Medicare database. We performed competing risks regression to model survival by age/comorbidity and identified patients with life expectancy less than 10 and less than 5 years. Multivariate logistic regression was used to determine the probability of aggressive treatment with surgery or ablation among those with limited life expectancy.

Results: Life expectancy was less than 10 years in patients 66 to 80 years old with a Charlson score of 3+, in those 80 to 84 years old with a Charlson score of 1+ and in all patients 85 years old or older. Among those with life expectancy less than 10 years the multivariate probability of aggressive treatment was 85%, 84%, 82%, 75% and 50% in those 66 to 69, 70 to 74, 75 to 79, 80 to 84 and 85 years old or older, respectively. In those with life expectancy less than 10 years who were treated aggressively treatment was radical nephrectomy in 61%, partial nephrectomy in 24% and ablation in 14%. Among those with life expectancy less than 5 years (age 85 years or greater with a Charlson score of 3+) the multivariate probability of aggressive treatment was 41% and more often surgery than ablation (68% vs 32% of patients).

Conclusions: The majority of patients with life expectancy less than 10 years and a significant minority with life expectancy less than 5 years were treated with surgery or ablation for T1a kidney cancer. Life expectancy should be better incorporated into treatment decision making for early stage kidney cancer.

Key Words: kidney neoplasms, age factors, life expectancy, nephrectomy, comorbidity

Patients with limited life expectancy are at risk for overtreatment of indolent cancers.[1–3] Such patients are at low risk of death from cancer during their life span and at high risk of death from causes other than cancer.[4–6] Overtreatment of these patients leads to increased morbidity and cost while often failing to improve survival, since patients do not often live long enough to reap the delayed benefits of aggressive treatment.[7–10]

In urology the 2 malignancies at risk for overtreatment are lower risk

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prostate cancer and early stage kidney cancer. Previous studies have shown that men with limited life expectancy are frequently overtreated for lower risk prostate cancer, that is 52% of Medicare beneficiaries with lower risk disease have life expectancy less than 10 years and more than half are treated with surgery or radiation therapy.[11] However, it is unclear whether patients with early stage kidney cancer are similarly overtreated.

Growing prospective and retrospective evidence suggests that patients with T1a (4 cm or less) kidney cancer can be treated with long-term active surveillance. A recent systematic review of series of surveillance of small renal masses showed that only 18 of 259 patients (2%) followed expectantly during a mean followup of 34 months progressed to metastatic disease and 65 masses (23%) showed zero growth.[12] Although 45% of these patients eventually underwent treatment, more than half were spared the morbidity of treatment during followup.[12] Retrospective analysis of SEER data has also shown that an increase in the rate of surgery for renal masses 4 cm or less did not lead to a decrease in cancer mortality in a 20-year period of observation.[13] This would suggest that an expectant approach to such tumors may be equivalent to aggressive local therapy in terms of cancer mortality in the long term.

Current AUA (American Urological Association) guidelines support surgery (radical or partial nephrectomy) as standard therapy in patients with major comorbidities and clinical T1a renal cancers while active surveillance is reserved as a second line recommendation.[14] NCCN (National Comprehensive Cancer Network®) guidelines similarly endorse partial nephrectomy as the standard of care for clinical T1a lesions, reserving active surveillance as an option for patients "who are not optimal surgical candidates."[15] However, some investigators believe that active surveillance or expectant treatment should be the unequivocal standard of care for those with limited life expectancy,[16] given the low morbidity and mortality associated with these tumors in the short term,[17–22] the high likelihood of death from other causes[5,23] and the risk of complications related to treatment.[24]

In this study we used a nationally representative cohort of patients with unilateral T1a kidney cancer diagnosed between 2000 and 2009 from the SEER-Medicare database to investigate patterns of treatment for patients with limited life expectancy. We sought to identify subgroups of patients with less than 10 and less than 5-year life expectancy based on age and comorbidity, and then determine probabilities of aggressive treatment (radical or partial nephrectomy, or ablation) among these patients. We hypothesized that, like lower risk prostate cancer, there would be high rates of overtreatment and low rates of conservative treatment in patients with limited life expectancy.

METHODS

Study Population

We identified patients 66 years old or older with incident kidney cancer (ICD-9 codes 189 to 189.01) diagnosed between January 1, 2000 and December 31, 2009 using the linked SEER-Medicare database. The Medicare database covers approximately 97% of Americans 65 years old or older and SEER regions encompass 14% of the population of the United States before 2000 and 25% thereafter. Our cohort included only patients with nonmetastatic clinical T1a tumors. The study was approved by the UCLA institutional review board.

Variable Definitions

Sociodemographic Data. We determined sociodemographic information, including gender, age, race, marital status, income and year of diagnosis, from the PEDSF (Patient Entitlement and Diagnosis Summary File) of the Medicare data set. Geographic region of diagnosis was obtained using SEER data.

Comorbidity. Comorbidity burden at diagnosis was ascertained with the Deyo-Klabunde modification of the Charlson comorbidity index. We used inpatient claims from MEDPAR (Medicare Provider Analysis and Review) Part A and Carrier Part B, and outpatient claims for the 12 months preceding kidney cancer diagnosis.[25,26]

Tumor Data. Tumor stage and grade were obtained using SEER data. We used the AJCC (American Joint Committee on Cancer) 7th edition to define clinical tumor stage as T1a, including CS (Collaborative Stage) codes 990 to 994.

Treatment Type. Treatment type was identified by ICD-9 and CPT-4 codes in the MEDPAR, NCH (Carrier Claims) and Outpatient files of the Medicare data set using a previously described method.[27] Treatment was categorized as aggressive or nonaggressive. Aggressive treatment was defined as radical nephrectomy (open or laparoscopic), partial nephrectomy (open or laparoscopic) or ablation therapy within the first year after diagnosis. Nonaggressive treatment was defined as active surveillance or expectant management.

Survival and Cause of Death. Overall survival was defined as the date of diagnosis to the date of death as determined by the PEDSF file. Other cause and cancer specific mortality was defined according to those designations in SEER.

Statistical Analysis

We used competing risks regression analysis as described by Fine and Gray[28] to determine the cumulative incidence of other cause mortality by Charlson score in age subgroups. The primary predictor was Charlson score, the failure event was other cause mortality and the competing