Sociodemographic Disparities in the Nonoperative Management of Small Renal Masses

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Abstract

Potential sociodemographic disparities in the access to local tumor ablation and expectant management for the management of small renal masses were examined in the Surveillance, Epidemiology, and End Results–Medicare database (1860 patients). Older age, male gender, nonmarried status, low socioeconomic status, and African-American ethnicity were associated with a lower use of local tumor ablation compared with expectant management.

Background: Local tumor ablation (LTA) and expectant management (EM) represent competing treatment modalities for patients with small renal masses (SRMs) who are unfit for surgery. We examined the potential social discrepancies in the access of LTA and EM. **Materials and Methods:** A total of 1860 patients with cT1a kidney cancer who had undergone either LTA (n = 553) or EM (n = 1307) from 2000 to 2009 were selected from the Surveillance, Epidemiology, and End Results–Medicare database. The baseline patient data (age, comorbidity status, defined as Charlson comorbidity index [CCI], and several sociodemographic variables) and tumor characteristics were examined. A multivariable analysis predicting access to LTA compared with EM was fitted. The subgroup analyses focused on patients aged ≥ 75 years with a CCI of ≥ 2. **Results:** Compared with LTA patients, the EM patients were significantly older (median age, 78 vs. 77 years; $P < .001$), more frequently unmarried (43% vs. 37%; $P = .02$), more frequently of African-American ethnicity (14% vs. 8%; $P = .005$), and more frequently of low socioeconomic status (SES; 55% vs. 46%; $P = .001$). No differences were seen according to gender, population density, CCI, or tumor size. In a multivariable analysis predicting access to LTA over EM, older age, African-American ethnicity, male gender, low SES, and unmarried status were associated with lower access to LTA ($P \leq .04$ for all). In the subgroup of older and sicker patients, none of the previous sociodemographic characteristics represented barriers to LTA access ($P \geq .1$ for all). **Conclusion:** Sociodemographic characteristics might represent barriers to LTA access for patients with SRMs managed nonoperatively. However, these associations vanished when older and sicker patients were examined.

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Introduction

Local tumor ablation (LTA) and expectant management (EM) represent competing treatment modalities for patients with small renal masses (SRMs) who are unfit for surgery or represent suboptimal surgical candidates.[1] Once the decision has been made to proceed with nonextirpative treatment, such as LTA or EM, the preference of one versus the other might be based on subjective considerations. For example, various sociodemographic characteristics might hinder access to more costly or more complex treatment options. In the current context, we postulated that socioeconomic

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status (SES), gender, race, and marital status might undermine access to LTA compared with EM. To the best of our knowledge, no previous study has examined those relationships. To address this void, we selected patients with T1a renal cell carcinoma (RCC) from the Surveillance, Epidemiology, and End Results (SEER)—Medicare database to analyze the effect of sociodemographic characteristics on the access to LTA compared with EM.

Materials and Methods

Study Source

We relied on the SEER—Medicare linked database. The SEER database contains approximately 28% of cancer cases identified in the United States. Medicare provides detailed information on approximately 97% of the population aged $\geq$ 65 years, which represents the proportion of Medicare coverage. Both databases are comprehensively linked in $>$ 90% of cases.[2]

Study Population

Patients who were diagnosed with T1aN0M0 kidney cancer and had undergone LTA or EM from 2000 to 2009 were selected. LTA was defined using specific procedural codes (Supplemental Table 1; available online).[3] Surgical treatment for kidney cancer was defined according to a previously validated claim-based algorithm (Supplemental Table 1; available online).[4] Because the main outcome of the study was primary treatment of newly diagnosed kidney cancer, patients who had undergone treatment within 6 months of diagnosis were selected.[3] Those patients who had not undergone LTA or partial or radical nephrectomy in the first 6 months after diagnosis were included in the EM category. The exclusion criteria were a diagnosis of kidney cancer only from the death certificate, receipt of EM followed by death in the first month after diagnosis, unknown race, unknown SES, bilateral tumors, and missing information on tumor size. These criteria resulted in an overall cohort of 1860 patients.

Covariates

Several patient characteristics were examined. These included age at diagnosis, gender, race (classified as white vs. African American vs. other), marital status (classified as married vs. unmarried vs. unknown), and population density (classified as urban vs. rural). Moreover, the Charlson comorbidity index (CCI) was generated for each patient, using the modification by Klabunde et al.[5] SES was evaluated using a composite variable, which included information on income, poverty level, and education, as previously shown.[6] That variable was then dichotomized into high versus low. Tumor size was evaluated in a continuous fashion. All analyses were repeated in a subgroup of patients aged $\geq$ 75 years with a CCI of $\geq$ 2.

Outcomes

The main outcome of the present study was to examine the effect of the sociodemographic characteristics (ie, gender, marital status, race, SES) on the rate of LTA and EM.

Statistical Analysis

Continuous variables are presented as the median and interquartile range. The Mann-Whitney *U* test was used to evaluate differences between groups in the continuous variables. Categorical variables are presented as frequencies and proportions, and the χ^2 test was used to test for difference between the 2 groups. All variables were evaluated in the overall cohort and in the subcohort of older and sicker patients. A multivariable logistic regression model predicting the rate of LTA or EM were generated for the overall cohort and for the subgroup of older and sicker patients. The covariates consisted of patient age, CCI, tumor size, year of diagnosis, race, gender, SES, marital status, and population density.

The statistical analyses were performed using RStudio,[7] version 0.98 (Boston, MA). All tests were 2-sided, and statistical significance was set at $P < .05$.

Results

Descriptive Characteristics

Overall Cohort. The overall cohort consisted of 1860 patients, of whom 553 and 1307 underwent LTA and EM, respectively (Table 1). The median follow-up period was 30 months among the survivors. Compared with patients who underwent LTA, those who received EM were significantly older (median age, 78 vs. 77 years; $P < .001$), more frequently unmarried (43% vs. 37%; $P = .02$), more frequently of African-American ethnicity (14% vs. 8%; $P = .005$), and more frequently of low SES (55% vs. 46%; $P = .001$). No differences were found according to gender, residency status, CCI, or tumor size. An increasing trend was seen in the use of LTA during the study period.

Subgroup Analyses of Older and Sicker Patients. When the data from patients aged $\geq$ 75 years with a CCI of $\geq$ 2 were analyzed, several changes in the baseline characteristics emerged (Table 1). In this subgroup, the patients who had received EM were older (median age, 83 vs. 80 years; $P < .001$) and sicker (median CCI, 4.2 vs. 3.5; $P = .02$) compared with patients who had undergone LTA. However, all the differences recorded in the overall cohort for ethnicity, marital status, and SES disappeared when the older and sicker patients were examined. No differences were found between the 2 groups with respect to tumor size, population density, and gender in the subanalyses.

Multivariable Logistic Regression Model

Overall Cohort. In the multivariable logistic regression model predicting the rate of LTA versus EM, several independent predictors emerged (Table 2). Specifically, African-American ethnicity (compared with white), low SES (compared with high), male gender, and unmarried status (compared with married) represented independent predictors of LTA instead of EM ($P \leq .04$ for all). Older age also predicted a lower rate of LTA relative to EM (odds ratio [OR], 0.96; $P < .001$). Additionally, LTA use was greatest in the more recent years ($P < .001$). Finally, no statistically significant association was identified for CCI, tumor size, or residency status and receiving LTA ($P \geq .07$ for all).

Subgroup Analyses in Older and Sicker Patients. When older and sicker patients were evaluated, the independent predictor status previously identified for ethnicity, gender, SES, and marital status was no longer present ($P \geq .1$ for all) (Table 2). Interestingly, age represented an independent predictor (OR, 0.88; $P < .001$), as did the CCI (OR, 0.9; $P = .03$). Both predicted a lower rate of LTA relative to EM. It is of note that the magnitude of the effect exerted by age increased in this subgroup, relative to the entire cohort (OR,