Racial disparity and their impact on hepatocellular cancer outcomes in inner-city New Orleans

Thomas Jan, MD, MPH,[a] Sabeen Medvedev, MD,[a] Robert M. Cannon, MD,[b] Bob Saggi, MD,[a] Jennifer McGee, MD,[a] Anil Paramesh, MD,[a] Mary Killackey, MD,[a] Nathan J. Shores, MD,[a] Douglas P. Slakey, MD, MPH,[a] Luis Balart, MD,[a] *and* **Joseph F. Buell, MD, FACS,[a]** *New Orleans, LA, and Louisville, KY*

Background. *The role of socioeconomic factors that affect survival, particularly for hepatocellular cancer (HCC), has yet to be fully analyzed. This study attempts to elucidate those racial and socioeconomic factors that affect differences in survival for patients with HCC.*

Methods. *In a retrospective cohort study of 206 patients with HCC diagnosed in an inner-city urban center from 2003 to 2011, outcomes by race (African Americans versus white) were analyzed. Additional attention was paid to socioeconomic factors. Continuous variables were compared with the Student* t*-test, and categorical variables were compared with the* χ^2 *or Fisher exact test. Multivariate analysis was conducted using a logistic regression model. Patient death and survival data were analyzed with Kaplan-Meier and Cox proportional hazards.*

Results. *Comparison of 138 white and 68 African-American patients revealed that African-American patients were more likely to present with larger tumor size at the time of diagnosis (4.7 vs 3.7 cm;* $P < .05$*). African-American patients were also more likely to be intravenous drug users (25.4% vs 11.6%;* $P < .05$*) and have cirrhosis from hepatitis C (81% vs 60%;* $P < .01$*). African-American patients were less likely to have private insurance compared with white patients (68% vs 92%;* $P < .01$*). Despite these findings in our inner-city practice, there was no difference in liver transplantation rates or survival rates between the 2 groups.*

Conclusion. *Despite presentation with less-favorable tumor characteristics, African-American patients are able to achieve survival that is comparable with their white counterparts when treated in a program that is attuned to the challenges faced by their specific population. (Surgery 2012;152:661-7.)*

From the Tulane Abdominal Transplant Institute,[a] Tulane University, New Orleans, LA; and Department of Surgery,[b] University of Louisville, Louisville, KY

Hepatocellular cancer (HCC) currently is the third-leading cause of cancer related mortality worldwide.[1] The incidence of HCC in the United States has nearly doubled as reported through the National Cancer Institute's Surveillance Epidemiology, and End Results (SEER) program.[2] Once diagnosed, the outcomes for patients with HCC are dismal. Current 5-year survival rates have been reported as low as 6%.[1,2] HCC is a malignancy that most commonly arises as a long-term consequence of chronic liver disease secondary tochronic hepatitis B and/or hepatitis C infection. More recently, the majority of patients with cryptogenic cirrhosis have been recognized as nonalcoholic steatohepatitis associated with obesity, diabetes, and metabolic syndrome.[3]

Several groups have examined the incidence of HCC in the African-American (AA) community. A 2-fold increase in incidence of HCC was identified in this community. This increased incidence in AAs was attributed to a 2-fold incidence of hepatitis C in this population. Most disturbing was the finding that all studies identified racial disparity among the AA patients.[4-8] These patients often received fewer invasive therapies, particularly liver transplantation. This disparity often resulted in inferior survival rates among AA. Health care disparity is not unique to HCC. Multiple studies have identified disparities for AA with lung, breast, colon, cervical, and even head and neck cancer.[9-12]

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Reprint requests: Joseph F. Buell, MD, FACS, Professor of Surgery and Pediatrics, Tulane Transplant Institute, 1415 Tulane Avenue, TW35, New Orleans, LA 70124. E-mail: Jbuell1@tulane.edu.

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In our study we sought to examine the experience of an institution with a history and tradition of providing care to the AA community in New Orleans. We hypothesized that this traditionally proactive and culturally sensitive program would minimize the impact of racial disparity among AA with HCC.

METHODS

After approval by the institutional review board of Tulane University Medical Center, data were collected from our medical records department. All adult patients ≥18 years of age who were diagnosed at Tulane University Medical Center with HCC between the years 2003 and 2011 were identified. Relevant demographic, socioeconomic, clinical, and survival data were collected.

The primary outcome of interest was patient survival. Mode of therapy was categorized as no invasive treatment, local tumor destruction, hepatectomy, and liver transplantation. The primary category of interest was race. Only AA and white subjects were included in this evaluation. Clinical and socioeconomic factors were included in the analysis. Clinical factors included patient age at diagnosis, tumor size, Model for End-Stage Liver Disease (MELD) score, and clinical presentation. Socioeconomic factors included insurance status, history of intravenous drug use, and level of education.

Initial univariate analysis was conducted to test the effect of AA compared with white on clinical factors, socioeconomic factors, and survival data. The χ^2 test, Student *t*-test, and Kaplan-Meier survival analysis were used when appropriate. A multivariate analysis was also conducted using the Cox proportional hazard model to estimate survival adjusted by clinical and socioeconomic factors. Factors that were not predictive in the univariate analysis were excluded from the model. Statistical significance was accepted at 0.05 α level, and analysis was performed SPSS 17.0 (SPSS Inc. Chicago, IL).

RESULTS

Two hundred six adult patients with HCC diagnosed in an inner-city urban center from 2003 to 2011 were analyzed. One hundred thirty-eight (66.9%) patients were white and 68 (33%) were AA. All other racial populations were excluded from analysis. Table I demonstrates the demographic, socioeconomic, and clinical distribution among the cohort by patient race. Both groups were similar in age, sex, numbers of HCC neoplasms the time of diagnosis, incidence of vascular invasion, MELD score, body mass index, presence of diabetes, incidence of HIV, tobacco use, and alcohol use.

Although the mean tumor size was equivalent, AA were more likely to present with larger tumors (median 4.7 cm vs 3.7 cm; $P < .035$) and they were more often >3 cm at the time of diagnosis (75% vs 55%; odds ratio [OR] 2.37; $P < .05$). AA patients were also more likely to be previous intravenous drug users (25% vs 13%; OR 2.61; $P < .05$), and be associated with cirrhosis from hepatitis C (81% vs 59%; OR 2.89; $P < .01$). AAs were also less likely to have private insurance compared with white patients (68% vs 92%; OR 0.19; $P < .01$). White patients received similar percentages of invasive therapy, defined as ablation, chemoembolization, hepatectomy, or transplantation, compared with AA patients (74% vs 63%; $P < .166$). In addition, no difference in the rate of liver transplantation was observed between the 2 racial groups (28% in AA and 23% in CA; $P < .60$) at our center.

To further examine the use of invasive therapies by racial demographic, Figure 1 compares the individual modes of therapy amongst the two groups treated at our center. Figure 2 demonstrates the racial differences in unadjusted survival from the time of first diagnosis. Median survival for AA and white patients was similar (23 months vs 22 months; $P < .35$); 1- and 5-year survival rates for AA patients were 70% and 19%, respectively, and 59% and 21% for white patients, respectively. AA patients who underwent a liver transplantation or had other interventions had improved survival rate (hazard ratio [HR] 0.01 and 0.06, respectively; $P < .05$) compared with white patients who received no treatment. White patients who underwent a liver transplantation or had other interventions also had improved survival (HR 0.06 and 0.76, respectively; $P < .05$).

To examine the underlying effect of race, Figure 3 shows the survival curve after adjusting for various socioeconomic and clinical factors stratified by race. There was no difference in the survival from date of diagnosis between racial groups (HR 0.99; 95% CI 0.53–1.86; $P < .97$). After performing a multivariate analysis, the lack of disparity between racial groups is evident after adjusting for hepatitis C status, tumor size, insurance status, and previous intravenous drug use (Table II). The only variable that predicted patient outcome after multivariate analysis was tumor size at presentation.