HEPATOCELLULAR CARCINOMA INSIGHTS: A COMPREHENSIVE UPDATED ANALYSIS OF 60,034 PATIENTS FROM THE SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS (SEER) DATABASE

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Background:

- Hepatocellular carcinoma (HCC) is the primary liver neoplasm linked to chronic liver diseases (CLD), including hepatitis B and C, alcohol overconsumption, nonalcoholic fatty liver disease (NAFLD), and aflatoxin exposure.
- Its late diagnosis and limited advanced-stage treatment make it even more challenging. Early detection can improve survival outcomes, with treatments ranging from surgery, transplantation, and ablation to systemic therapy.
- The current study describes the largest cohort of patients with HCC from the Surveillance, Epidemiology, and End Results (SEER) database to better identify the demographic, clinical, and treatment modalities that impact clinical outcomes.

Methods:

- **Data Source:** The data were abstracted on 60,034 patients with HCC from the SEER research plus database (2000 – 2018). SEER*stat software (version 8.4.0) was used to extract data using the International Classification of Diseases version 3 (ICD-O-3). Patients diagnosed by autopsy, death certificate only, and/or non-microscopically confirmed methods were excluded from the study.
- **Outcomes and Variables:** Patient demographics, including age, sex, and race, were collected at the time of HCC diagnosis. Tumor characteristics, such as tumor size, grade, stage and metastasis to four organs, liver, lungs, bone and brain were also extracted.
- **Statistical Analysis:** Data were exported to the Statistical Analysis System (SAS) v9.4 for analysis. Descriptive statistics were used to summarize the data. Categorical variables were reported as frequencies and percentages and compared using chi-square tests. Survival analysis was performed using log-rank analysis and Kaplan-Meier survival plots to compare survival among patients with different characteristics. Univariate and multivariate regression analysis was performed to identify variables significantly associated with mortality. A p-value of ≤ 0.05 was considered statistically significant. Hazard ratios (HR) and 95% confidence intervals (CIs) were calculated.

Results:

- A total of 60,034 cases of HCC were identified, comprising 45,868 (76.4%) male and 14,166 (23.6%) female patients. Most of the patients (n= 289) were diagnosed after the 7th decade of life (18, 816; 31.3%) and belonged to Caucasian ethnicity (40, 974; 68.3%).
- When information regarding tumor staging 51,934 (86.5%), grading 32,472 (54.1%), and tumor size 31,757 (52.9%) was available, most of the tumors were localized 27,422 (52.8%), moderately differentiated 14,207 (43.7%), and were more >5cm in size 15,424 (48.6%). Also, where the treatment information was available, most 25, 654 (43.2%) received no treatment; surgery alone, 13,639 (23.0%), chemotherapy alone, 14,184 (24.0%), and 83 (0.1%) had radiation alone.
- Also, 4,915 (8.2%) of the cases had surgery plus chemotherapy combined, 452 (0.8%) had surgery plus radiation combined, and 114 (0.2%) had chemotherapy plus radiation. The overall 5-year survival was 20.2% (19.8-20.6) and highest in those who received surgery 57.7% (56.8-58.5). Multivariable analysis identified age >60 hazard ratio (H.R) 1.167 (0.001), moderately differentiated; H.R 1.212 (0.001), poorly differentiated; H.R 1.704 (0.001), undifferentiated; anaplastic; H.R 1.854 (0.001), tumor size >5 cm; H.R 1.555 (0.001), regional stage; H.R 1.585 (0.001), distant stage H.R 2.303 (0.001), lungs metastasis H.R 1.171 (0.013) and radiation H.R 1.331 (0.001) as factors associated with increased mortality, p-value <0.05.

Conclusion:

- HCC preferably affects Caucasian men and is detected later due to non-specific presentation. Surgical resection remains a treatment choice because it significantly increases 5-year survival.
- Although radiation alone decreases survival, more extensive studies are needed to investigate the proper role of radiation for HCC, given the limited number of cases who underwent radiation in the study.