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Daana Bajnauth

Advisor(s): Yolanda Bryce M.D.

Co-author(s): Amy Deipolyi, MD, PhD and Frank Annie

Impact of Genetic Mutations on Response and Time to Progression After Radioembolization of Breast Cancer Liver Metastasis

Purpose

To evaluate the association between genetic mutations and clinical outcomes, including response rate and time to progression, in patients with breast cancer liver metastasis treated with Y-90 radioembolization.

Methods

This is a retrospective, single-institution study. 110 patients with biopsy-proven breast cancer liver metastasis who underwent Y-90 radioembolization were included. Genomic profiling was conducted using MSK-IMPACT. Data was collected from electronic medical records (EMR) and Picture Archiving and Communication System (PACS) for patient demographics and treatment response. Treatment responses were categorized as complete, partial, none, or progression. For patients with an initial treatment response, complete and partial, statistical analysis was used to assess the correlation between genetic mutations and time to progression. Median survival using Kaplan Meier estimation was performed and correlated to genetic mutations. 17 patients died before progression was assessed, and 6 patients were not yet evaluated post-procedure.

Results

The overall median survival was 32.8 months. Patients with the ERBB2 mutation had the longest median survival (70.2 months) while those with the RAD21 mutation had the shortest median survival (25.5 months). KDM5C and CBFB mutations had the highest response rates (100%, $p=0.00346$ and $p=0.01462$, respectively) while the H3C13 mutation had the lowest response rate (0%, $p=0.00222$). Of patients with an initial response to therapy, median time to progression was 32.8 months. The H3F3B mutation had the longest time to progression (105 months) while the RUNX1 mutation had the shortest time to progression (1.4 months).

Conclusion

Specific genetic mutations are associated with response and time to progression in patients with breast cancer liver metastasis treated with Y-90 radioembolization. This study underscores the impact genetic profiling can have in individualizing treatment plans and improving patient outcomes.