Genetic and immunologic characteristics in Chinese breast patients with different HER2 mutation types

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Background

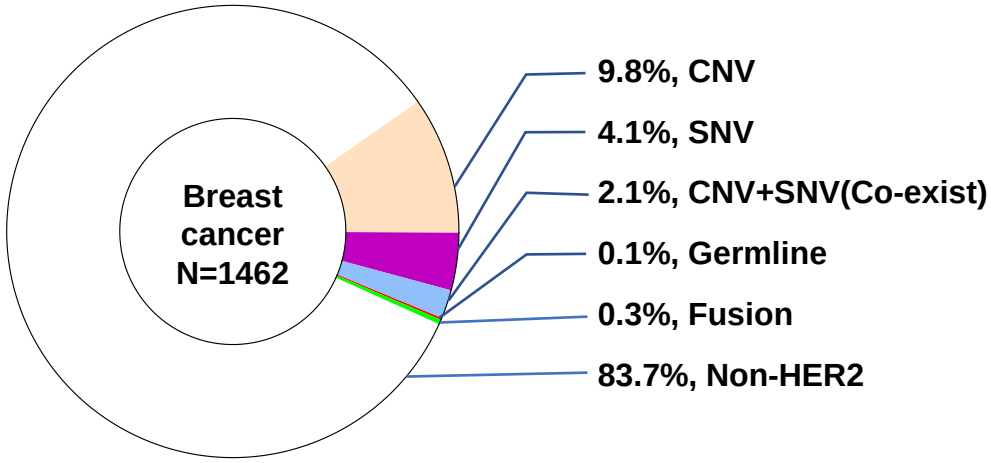
Breast cancer (BC) has been traditionally considered poorly immunogenic and characterized by relatively low tumor mutation burden (TMB). However, with development of clinical researches of immune checkpoint inhibitors (ICI) treatment in BC, ICI become an emerging option for BC treatment, even including the HER2 positive subtype. Herein, based on data of 1462 Chinese patients with BC, we analyzed the genetic and immunologic characteristics of Chinese patients with different types of mutations in gene HER2.

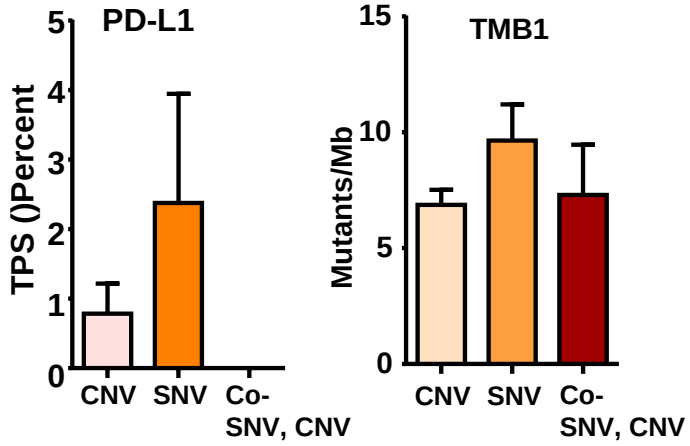
Methods

A total of 1462 breast tumor tissue samples were collected from January 2018 to December 2020 and subjected to NGS and IHC testing in 3D Medicines Inc.,Shanghai, China, a College of American Pathologists (CAP)-certified and Clinical Laboratory Improvement Amendments (CLIA)-accredited lab. Statistical analysis was performed using GraphPad Prism (version 7.01) and SPSS version 21.0 (SPSS,Inc.).

Results

According to the analysis of NGS testing results, the proportion of patients with HER2 alteration was 16.5% (241/1462), and there were four mutation types found in HER2, including copy number variant (CNV), single-nucleotide variant (SNV), gene fusion, germline mutation. The proportion of different HER2 mutation types were 9.8% (144/1462) of CNV, 4.1% (60/1462) of SNV, 2.1% (30/1462) of co-existing CNV and SNV, 0.1% (2/1462) of germline mutation, and 0.3% (5/1462) gene fusion. Furthermore, TMB level and PD-L1 expression level were compared among group of CNV, SNV, and co-existing CNV and SNV. While results showed that there were no significant difference among these different mutation types.





Conclusion

Immunotherapy as an option should also be put into consideration for treatment of HER2 positive BC, and different HER2 mutation types may have a limit effect on immunotherapy.