Prevalence of Breast Cancer Molecular Subtypes at a Tertiary Cancer Institute

Authors : Nahush Modak, Meena Pangarkar, Anand Pathak, Ankita Tamhane

Abstract : Background: Breast cancer is the prominent cause of cancer and mortality among women. This study was done to show the statistical analysis of a cohort of over 250 patients detected with breast cancer diagnosed by oncologists using Immunohistochemistry (IHC). IHC was performed by using ER; PR; HER2; Ki-67 antibodies. Materials and methods: Formalin fixed Paraffin embedded tissue samples were obtained by surgical manner and standard protocol was followed for fixation, grossing, tissue processing, embedding, cutting and IHC. The Ventana Benchmark XT machine was used for automated IHC of the samples. Antibodies used were supplied by F. Hoffmann-La Roche Ltd. Statistical analysis was performed by using SPSS for windows. Statistical tests performed were chi-squared test and Correlation tests with $p < .01$. The raw data was collected and provided by National Cancer Insitute, Jamtha, India. Result: Luminal B was the most prevailing molecular subtype of Breast cancer at our institute. Chi squared test of homogeneity was performed to find equality in distribution and Luminal B was the most prevalent molecular subtype. The worse prognostic indicator for breast cancer depends upon expression of Ki-67 and her2 protein in cancerous cells. Our study was done at $p < .01$ and significant dependence was observed. There exists no dependence of age on molecular subtype of breast cancer. Similarly, age is an independent variable while considering Ki-67 expression. Chi square test performed on Human epidermal growth factor receptor 2 (HER2) statuses of patients and strong dependence was observed in percentage of Ki-67 expression and Her2 (+/-) character which shows that, value of Ki depends upon Her2 expression in cancerous cells ($p < .01$). Surprisingly, dependence was observed in case of Ki-67 and Pr, at $p < .01$. This shows that Progesterone receptor proteins (PR) are over-expressed when there is an elevation in expression of Ki-67 protein. Conclusion: We conclude from that Luminal B is the most prevalent molecular subtype at National Cancer Institute, Jamtha, India. There was found no significant correlation between age and Ki-67 expression in any molecular subtype. And no dependence or correlation exists between patients' age and molecular subtype. We also found that, when the diagnosis is Luminal A, out of the cohort of 257 patients, no patient shows >14% Ki-67 value. Statistically, extremely significant values were observed for dependence of PR+Her2- and PR-Her2+ scores on Ki-67 expression. ($p < .01$). Her2 is an important prognostic factor in breast cancer. Chi squared test for Her2 and Ki-67 shows that the expression of Ki depends upon Her2 statuses. Moreover, Ki-67 cannot be used as a standalone prognostic factor for determining breast cancer.