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Risk Association of RANKL and OPG Gene Polymorphism with Breast to Bone Metastasis

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Abstract : Background: The receptor activator NF-κβ ligand (RANKL) and Osteoprotegerin (OPG) polymorphisms have been associated with the progression of breast cancer to bone metastasis. Here, we aimed to investigate the association of RANKL and OPG gene polymorphism with breast to bone metastasis in the Pashtun population, Pakistan. Methods: Genomic DNA was obtained from all the study subjects (106 breast cancer, 58 breast to bone metastasis, and 51 healthy controls). RANKL (rs9533156) and OPG (rs2073618, rs3102735) polymorphisms were genotyped using Tetra-ARMS PCR. Results: Our results indicated that the frequencies of OPG (rs3102735) risk allele and genotypes carrying risk allele in breast cancer vs healthy control (C- p=0.005; CC- p=0.0208; TC- p=0.0181), bone metastasis vs healthy control (C- p=0.0211; CC- p=0.0153; TC- p=0.0775), and breast cancer vs breast to bone metastasis (C- p=0.0001; CC- p=0.0001; TC- p=0.001) were found significantly associated with disease risk. However, there was no significant association observed for OPG (rs2073618) risk allele and risk allele containing genotypes in all study groups. Similarly, RANKL (rs9533156) risk alleles and corresponding genotypes in breast cancer vs healthy control (C- p=0.0001; CC- p=0.0001; TC- p=0.0084), bone metastasis vs healthy control (C- p=0.0001; CC- p=0.0001; TC- p=0.5593), and breast cancer vs breast to bone metastasis (C- p=0.0185; CC- p=0.6077; TC- p=0.1436) showed significant association except for the risk allele carrying genotypes in breast cancer to bone metastasis (TC, p=0.1436; CC, p=0.6077). Conclusion: OPG (rs3102735) and RANKL (rs9533156) showed significant association with breast to bone metastasis, while OPG (rs2073618) didn’t show a significant association with breast to bone metastasis in Pashtun population of Pakistan. However, more investigation will be required to disseminate the results while gene sequencing or whole-exome sequencing.

Keywords : breast cancer, bone metastasis, OPG, RANKL, polymorphism
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