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Can microcalcifications' characteristics predict the risk of breast cancer metastasis to bone?

Rita Bonfiglio¹, Manuel Scimeca^{2,3}, Alessandro Polidori¹, Clara Nazzaro¹, Giselda De Silva⁴, Elena Bonanno^{1,5}

¹Department of Experimental Medicine, University of Rome "Tor Vergata", Via Montpellier 1, Rome 00133, Italy.

²Department of Biomedicine and Prevention, University of Rome "Tor Vergata", Via Montpellier 1, Rome 00133, Italy.

³San Raffaele University, Via di Val Cannuta 247, Rome 00166, Italy.

⁴Assing S.p.a, Via Edoardo Amaldi 14, Monterotondo 00015, Italy.

⁵Diagnostica Medica' & "Villa dei Platani", Neuromed Group, Avellino 83100, Italy.

Correspondence to: Prof. Elena Bonanno, Department of Experimental Medicine, University of Rome "Tor Vergata", Via Montpellier 1, Rome 00133, Italy. E-mail: elena.bonanno@uniroma2.it

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Abstract

Aim: To correlate the microcalcifications' characteristics, such as morphology and elemental compositions, with the occurrence of bone metastatic lesions at 5 years from diagnosis.

Methods: In this retrospective study, we enrolled 70 patients from which we collected one breast biopsy each. From each biopsy, paraffin serial sections were obtained to perform histological classifications, immunohistochemical analyses and Energy Dispersive X-ray evaluation.

Results: Microcalcifications analysis showed a significant association between the presence of calcium crystals made of magnesium substituted hydroxyapatite and the development of bone metastasis from 5 years from diagnosis. No significant association was observed by evaluation the morphological appearance of microcalcifications. Immunohistochemical analysis displayed a significant association between the expression of bone morphogenetic proteins 2 and pentraxin-3, two osteoblast induction factors, and the formation of bone metastatic lesions.

Conclusion: Results here reported highlighted the possible use of breast microcalcifications as a negative prognostic marker of bone metastatic diseases. In particular, the association between elemental composition of breast microcalcifications and the formation of bone lesions can lay the foundation for the development of new *in vivo* diagnostic tools based on the analysis of microcalcifications and capable to predict the formation of bone metastasis.



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