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Prognostic Value of the Expression of Endogenous Hypoxia Associated Proteins Hypoxia Inducible Factor-1 Alpha (HIF-1α) and Carbonic Anhydrase Isoform 9 (CAIX) Expressions in Breast Carcinoma

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Background: Hypoxia has been found to be related to malignant initiation, progression, increasing the occurrence of metastasis and therapy resistance in many cancer types, which made a real need for discovering drugs that could antagonize the bad effect of hypoxia in cancer, decide which patients will have benefit from such anti-hypoxia therapy then to monitor response to therapy, especially in breast carcinoma. It is important to detect degree of hypoxia in each cancer that could be done by evaluation of the expression of hypoxia-associated protein in cancer biopsies e.g. hypoxia inducible factor-1 alpha (HIF-1α) and carbonic anhydrase IX (CAIX) and their detailed role in breast cancer is still uncertain and gives conflicting results.

Aim of the Work: Was to evaluate HIF-1α and CAIX expressions in breast carcinoma, correlating their expressions with each other, with presence of lymph node & distant metastases, with recurrence free and overall survival rates of breast cancer patients.

Methods: We evaluated HIF-1α & CAIX expressions in sections from 90 paraffin blocks of breast carcinoma using immunohistochemistry. We analyzed correlations between their levels of expressions, clinic-pathological and prognostic parameters of our patients.

Results: HIF-1α and CAIX positive expression in breast carcinoma was related to advanced stage, presence of lymph node metastases, HER2 amplified and triple negative molecular subtypes ($p<0.001$), higher tumor grade ($p= 0.001$ & 0.02 respectively) and negative ER ($p= 0.005$ & 0.008 respectively) & PR ($p= 0.009$ & 0.027 respectively) hormonal receptors, The expression of both markers was significantly positively correlated with each other ($p<0.001$). HIF-1α and CAIX positive expression in breast carcinoma was associated with shortened recurrence free and overall survival rates ($p<0.001$).

Conclusion: HIF-1α and CAIX are markers of poor prognosis of breast carcinoma patients.

Key words: Breast carcinoma, hypoxia; HIF-1α; CAIX; immunohistochemistry; prognosis

Biography:

Dr. Ola A Harb, MD; completed her Pregraduate Medical Education (December 2005) in M.B.B.CH., with Total grade-Excellent from Zagazig University, Egypt. She obtained her Postgraduate/M.Sc (May, 2010) & M. D. (January 2015) in pathology from Zagazig University, Egypt. Dr. Ola is presently working as a Lecturer, at Department of pathology, Faculty of Medicine, Zagazig University, Egypt.

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