## *University of Baghdad*

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| **Thesis Title** | **Immunohistochemical Expression of Stem Cell Markers CD24, CD44 and ALDH1 in Invasive Breast Carcinoma A Clinicopathological Study** |
| **Year** | **2015** |
| **Abstract** | **Breast Cancer is the most frequent diagnosed cancer among women worldwide with an estimated 1.7 million new cancer cases diagnosed in 2012 (11.9% of all cancers). In Iraq, cancer of the breast is the commonest cancer in females, in 2010 constituted 34.8% of all other malignancies in women. Cancer stem cells have been defined as -a small subset of cancer cells within a cancer that constitute a reservoir of self-sustaining cells with the exclusive ability to self-renew and to cause the heterogeneous lineages of cancer cells that comprise the tumor, the well-accepted cancer stem cell markers are CD44, CD24, CD133, CD166, EpCAM and ALDH1.**<br>**Aim of the study**<br>**To assess the immunohistochemical expression of CD24, CD44 and ALDH1 as stem cell markers in normal breast tissue, fibroadenoma and breast carcinoma (Invasive ductal and Invasive lobular carcinomas), in correlation with some clinicopathological parameters (Age of patient, tumor size, tumor grade and lymph node status).**<br>**Patients, materials and methods**<br>**From April 2012 to March 2013, total of (133) tissue samples of surgical breast biopsies were included in this retrospective study, 37 cases of non-malignant breast cases (12 cases of normal breast tissue and 25 fibroadenoma case) and 96 cases of malignant breast cases (51 mastectomy case and 45 cases of excisional biopsies) were all of them invasive breast carcinoma, eighty seven cases were of invasive ductal carcinomas and nine cases of invasive lobular carcinomas.**<br>**The samples were obtained from archival paraffin embedded blocks for the years (2011) to (2013) from the histopathology files of department of pathology in Teaching Laboratories of medical city Hospital, Al-Ghadaq's private Laboratory and Institute Of Forensic Medicine in Baghdad.. The** |

histopathological diagnosis had been revised and all cases were stained by immunohistochemical technique with CD24, CD44 and ALDH1 tumor markers.

## Results

There was significant difference among the three states of health status (normal breast cases, fibroadenoma cases and invasive breast carcinoma) and immunohistochemical expression of stem cell marker (CD24, CD44 and ALDH1 epithelial and stromal expression).

Regarding Immunohistochemical expression of CD24, ten cases out of 37(27%) of non malignant breast cases were positive of CD24 expression. For malignant breast cases, forty one invasive ductal carcinoma cases out of 87(47.1%) and four invasive lobular carcinoma cases out of 9(44.4%) were CD24 with positive expression, and there was no significant difference regarding CD24 expression in relation to different clinicopathological variables (age of the patient, tumor grade, lymph node status and tumor size).

For CD44 immunohistochemical expression, eight cases out of 37(21.6%) of non malignant breast cases were positive of CD44 expression. For malignant breast cases, Twenty seven  invasive ductal carcinoma cases out of 87(31.03%) and three invasive lobular carcinoma cases out of 9(33.3%) were positive CD44 expression, and there was a significant difference regarding CD44 expression in relation to lymph node status of the patients (P=0.0140). Regarding the age of the patient in invasive breast carcinomas there was no significant difference between CD44 expression and the three groups of the patient age, so as for grade of tumor and tumor size (P > 0.05).

Regarding ALDH1 epithelial immunohistochemical expression, seven cases out of 37(18.9%) of non malignant breast cases were positive of CD44 expression, while for malignant breast cases, thirty four invasive ductal carcinoma cases out of 87(39.2%) and three invasive lobular carcinoma case out of 9(33.3%) showed a positive expression of epithelial ALDH1. There was no significant difference in epithelial ALDH1 expression between different age groups of the patients. CD44 immunohistochemical expression was significantly different in different grades of invasive breast carcinomas (P=0.0323). The mean value of ALDH1-E expression showed no significant difference between cases with positive lymph node involvement and those with a negative lymph node involvement, also there was no significant correlation in epithelial ALDH1  immunohistochemical expression in relation to the tumor size.

For stromal ALDH1 immunohistochemical expression, eight cases out of 37(21.6%) of non malignant breast cases were moderate/strong of stromal ALDH1 expression and 29(78.4%) cases were none/weak expression. Regarding malignant breast cases, forty seven  invasive ductal carcinoma cases out of 87(54.2%) and five

invasive lobular carcinoma cases out of 9(55.6%) were moderate/strong expression of stromal ALDH1, and there was no significant difference regarding stromal expression of ALDH1 in relation to different clinicopathological variables (age of the patient, tumor grade, lymph node status and tumor size).

**Conclusions**

- A statistical significant correlation has been found between Malignant Breast cases and Non Malignant Breast cases regarding the Immunohistochemical over expression of stem cell markers (CD24, CD44 and ALDH1 epithelial and stromal Expression).
- There was a statistical significant correlation between CD44 immunohistochemical expression and lymph node status in invasive breast carcinomas cases.
- A statistical significant correlation has been found between ALDH1 Epithelial immunohistochemical expression and Grade of tumor in cases of invasive breast carcinoma.
- The results of this study suggest that higher stem cell markers (CD24, CD44 and ALDH1) expression may be associated with malignant transformation and progression in breast cancer biology.