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International Conference on
Internal Medicine & Practice and Primary Care
&
International Meeting on
Breast Pathology & Cancer Diagnosis

April 04-05, 2018 | Miami, USA

The prognostic significance of breast cancer stem cells in patients with metastatic breast cancer

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Background: Breast cancer ranks as the first malignancy affecting females, contributing 29% of all female cancers diagnosed each year. It is second only to lung cancer as a cause of cancer death in females. There is increasing evidence that this cancer is originated in and maintained by a small population of undifferentiated cells with self-renewal and proliferation capacities that called breast cancer stem cells (BCSCs).

Objective: This study is aiming to assess the prognostic value of BCSCs (CD44+ CD24) in patients with metastatic breast cancer as well as the overall survival.

Patients & Methods: The present study was conducted on 60 patients with metastatic breast cancer, presented to outpatient clinics in Oncology Center, Mansoura University from December 2010 till November 2014. All patients received treatment (surgery, chemotherapy, radiotherapy, hormonal treatment or combination of two or more lines) according to protocols and guidelines. The presence of breast cancer stem cells was evaluated by immunohistochemistry expression of CD44 and CD24 to assess its possible prognostic and predictive values via correlation with overall survival, tumor response and different clinico-pathological features of the patients. The expression patterns were analyzed according to the clinico-pathologic prognostic parameters, such as hormone receptors, Her2/neu status, grade of tumors and stage on presentation as well as overall survival.

Results: Median age was 50 (31-70) years. Twenty six patients (43.3%) were premenopausal and 34 patients (56.7%) were postmenopausal. This study classified the breast tumor tissues into four subgroups according to CD44 and CD24 expression patterns (CD44+ CD24- group that carry stem cell property were 41.7% and the remaining three groups (CD44- CD24-, CD44+ CD24+ , CD44- CD24+) were 58.3%. 64% of tumors with CD44+ CD24- BCSCs were IDC histology, 84% of cases belongs to this group were grade 3, 88% were stage III on presentation, 56% were luminal subtype, 68% of them developed both bone and visceral metastasis. Our study showed that presence of BCSCs (CD44+ CD24-) carry significantly shorter OS (19 vs. 44 months) compared to other three groups. Also, a multivariate analysis showed that presence of BCSCs (CD44+ CD24-) was significant independent prognostic factor for poor overall survival.

Conclusion: This study is a prospective trial testing the concept of detecting breast cancer stem cells in tumor tissue biopsies, according to CD44 & CD24 expression status. As such, it has demonstrated both the feasibility of this approach and its implication as a future prognostic marker, and has paved the way for future research in this field.

Speaker Biography

Kamel Farag is a Medical Oncologist with interest in Breast and GI cancers. He is Assistant Consultant of Oncology in King Faisal Specialist Hospital & Research Center, Jeddah, Saudi Arabia. He is Associate Professor of Medicine and Medical Oncology at Mansoura University, School of Medicine, Egypt, where he also earned his Medical degree. He completed his residency and got his Master's Degree at Mansoura University. He rapidly moved to National Cancer Institute, Cairo University to get his Doctorate Degree. He is a member in various oncology societies in regional area.

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