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CIRCULATING SERUM BIOMARKERS FOR PROGRESSION AND SURVIVAL PREDICTION IN BREAST CANCER

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Abstract:

Background and objectives: *Cancer is a leading cause of mortality and morbidity worldwide, counting for 7 million deaths per year. This study aimed to assess the circulating biomarkers for survival in the prediction of breast cancer in females.* ***Methodology of the study:*** *This descriptive study was conducted in Bahawal Victoria Hospital, Bahawalpur during June 2019 to January 2020. The main eligibility requirements for this study included the patient's written informed consent, metastatic breast cancer, patients entering first-line chemotherapy with or without targeted therapy, life expectancy of at least three months, and measurable or evaluable disease.* ***Results:*** *The results indicate that CTC, CEA and ALP are the best indicating serum biomarkers for the diagnosis and progression of breast cancer. Mean, median and SD shows that there is a significant relationship in these serum biomarkers.* ***Conclusion:*** *It is concluded that CTC and ALP are the important biomarkers for the analysis of progression of breast cancer in females.*

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INTRODUCTION:

Cancer is a leading cause of mortality and morbidity worldwide, counting for 7 million deaths per year. It is the second most common cause of death in developing countries. Cancer is the second leading cause of death worldwide, surpassed only by cardiovascular disease[1]. Therefore, fighting cancer is measured to be one of the most significant areas of research in medicine and which possibly contributes to increased interest in chemoprevention as an alternative approach to the control of cancer. Natural or dietary factors have attracted a great deal of interest because of their safe efficacy and perceived ability to act as highly effective chemo preventive agents[2].

Several serum markers have been developed in different types of cancer as tools for non-invasive assessment of the tumor burden, mostly in metastatic patients. Quantitative variations of serum markers are, therefore, often used in several cancer types as noninvasive tools to assess treatment efficiency in metastatic patients[3].

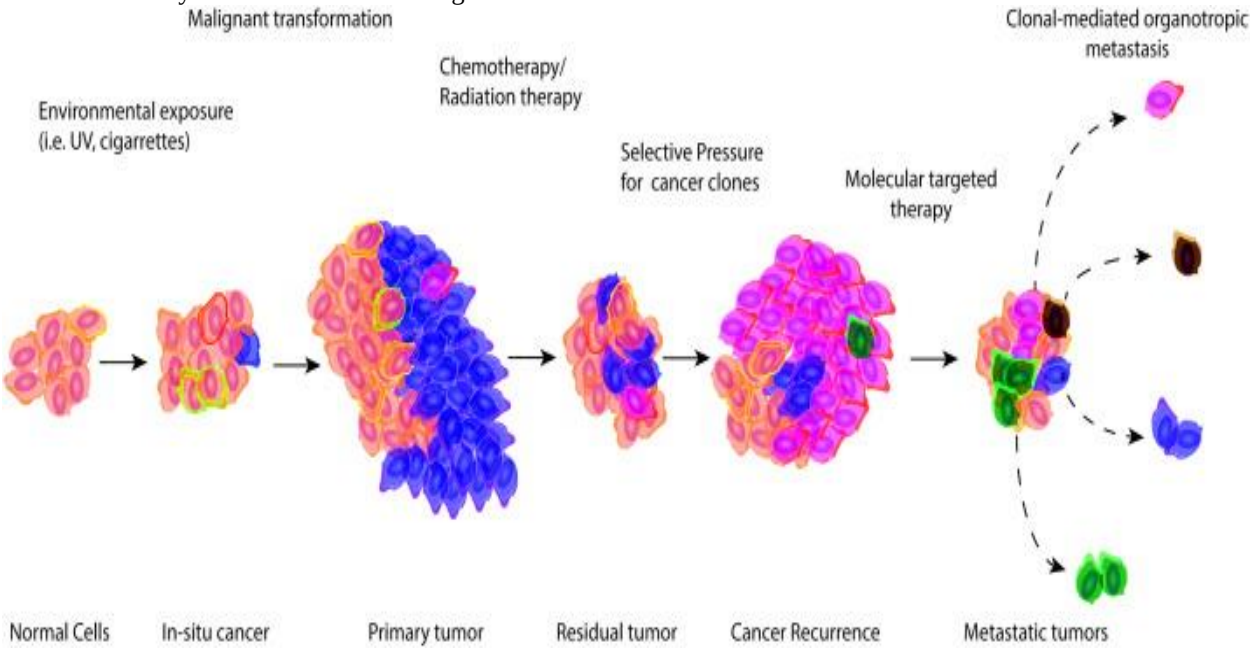

Figure 01: Prognosis of breast cancer

Tumor heterogeneity that enables malignant progression by evolutionary selection is also the major cause of emergent resistance during cancer treatment[4]. Yet, we rely on few standard diagnostic tumor biopsies for the characterization of a given cancer. These specimens will provide only a partial characterization of the overall makeup of the dynamic systemic disease cancer represents with intratumoral and interlesional heterogeneity as well as emerging host responses[5].

Objectives of the study

This study aimed to assess the circulating biomarkers for survival in the prediction of breast cancer in females.

METHODOLOGY OF THE STUDY:

This descriptive study was conducted in Bahawal Victoria Hospital, Bahawalpur during June 2019 to January 2020. The data was collected from 50 female patients. The main eligibility requirements for this study included the patient's written informed consent, metastatic breast cancer, patients entering first-line chemotherapy (chosen by clinicians) with or without targeted therapy, life expectancy of at least three months, and measurable or evaluable disease.

Biochemical analysis

Clinical evaluations were conducted as usual, but were mandatory at inclusion (before cycle 1, that is, week 0) and at the first radiological evaluation before cycle 3 or 4 (C3/4, that is, weeks 6 to 9). Radiological evaluations were mandatory at inclusion and before C3/4. The following blood tests were obtained at inclusion, before cycle 2 (C2), C3/4, and at progression: complete blood count, liver function (including LDH and ALP), serum calcium and serum markers: CEA, CA 15-3 and CYFRA 21-1[6].

RESULTS:

The results indicates that CTC, CEA and ALP are the best indicating serum biomarkers for the diagnosis and progression of breast cancer. Mean, median and SD shows that there is a significant relationship in these serum biomarkers. CTC and serum marker values at inclusion repartition in percentile, mean, median range are given in Table 1.

Table 01: Serum marker values repartition at inclusion

	Mean	SD	Quantile 0%	Quantile 25%	Quantile 50% (median)	Quantile 75%	Quantile 100%	N
CTC	81.65	324.76	0	0	2.5	23.25	3,369	260
CA15.3	7.53	23.77	0.14	0.7	1.76	4.45	314.1	247
CEA	7.20	18.23	0.04	0.4	1	3.45	146.13	212
CYFRA21	9.01	29.51	0.1	0.65	1.95	5.25	284.54	191
LDH	1.39	2.02	0.28	0.71	0.92	1.45	25.54	220
ALP	1.056	1.00	0.26	0.58	0.79	1.06	10	241

CTC and serum markers values at inclusion repartition in percentile, mean, median range. Values for serum marker are expressed in ULNV, upper limit of the normal value

DISCUSSION:

The need for novel independent prognostic factors in metastatic breast cancer patients is much lower than the need for dynamic blood markers, which can indicate the treatment efficiency in a reliable and early fashion[7]. Serum tumor markers are an easy, quick, cheap, but rather imprecise and sometimes misleading tool, to monitor the treatment efficacy. However, they are particularly valuable for treatment monitoring in patients that have disease that cannot be evaluated by radiology[8].

Here, by comparing the early and late changes of five blood markers together with CTC changes for PFS prediction, we showed no clear superiority of CTC over the other serum markers. This result was, however, not the primary endpoint of our study, and the statistical power of these analyses may still be discussed, although performed in more than 200 patients[9]. For this analysis, we used the "prognosis-optimized" threshold of ≥ 5 CTC/7.5 ml, which was initially defined as the best dichotomizing threshold for PFS and OS prediction by CTC at baseline and under treatment[10].

CONCLUSION:

It is concluded that CTC and ALP are the important biomarkers for the analysis of progression of breast cancer in females.

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