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ANALYSIS OF BLOOD CIRCULATING SERUM BIOMARKERS FOR THE DIAGNOSIS OF BREAST CANCER

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Abstract:

Introduction: *Breast cancer is the most common neoplasm in women and the second leading cause of cancer-related mortality in females worldwide. Breast cancer is the second most common type of cancer (after lung cancer), and the fifth most common cause of cancer death.*

Objectives of the study: *The main objective of the study is to assess the blood circulating serum biomarkers for the diagnosis of breast cancer.*

Methodology of the study: *This cross sectional study was conducted at DHQ teaching hospital Sahiwal during February 2018 to November 2018. Breast cancer notifications were confirmed and characterized by postal questionnaire sent to treating clinicians (consultant, or General Practitioner if details not provided by the volunteer), which was designed to ascertain clinical and histological data on diagnosed cases (date of diagnosis, histology, nodal status, staging, grade, prognosis, ER, PR and HER2 status).*

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.*

Conclusion: *It is concluded that biomarkers are the useful tool for the analysis of progression of breast cancer in females.*

Key words: *Diagnosis, Breast, Cancer, Females*

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INTRODUCTION:

Breast cancer is the most common neoplasm in women and the second leading cause of cancer-related mortality in females worldwide. Breast cancer is the second most common type of cancer (after lung cancer), and the fifth most common cause of cancer death. There is thus an urgent need for early biomarkers that could predict disease outcome, providing prognostic information to the clinician for treatment stratification [1]. The addition of a blood-based tumor marker test may also increase patient compliance as blood testing is more acceptable and would also circumvent the problems associated with imaging high-density breast tissue [2]. Breast cancer, the most common cancer among women worldwide, accounts for the highest morbidity and mortality [3]. The etiology of breast cancer is multifactorial and numerous risk factors associated with breast cancer may exert their effects via generation of an oxidative stress status [4]. In all over the world, breast cancer is considered the most common type of cancer among women [5]. Every year, breast cancer accounts for 22% of new cancers found in women. Breast cancer is a disease with multiple etiological factors linked to genetic, environmental, social demographic, behavioral, psychological and hormonal factors[6]. 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 [7].

Objectives of the study

The main objective of the study is to assess the blood circulating serum biomarkers for the diagnosis of breast cancer.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted at DHQ teaching hospital Sahiwal during February 2018 to November 2018. Breast cancer notifications were confirmed and characterized by postal questionnaire sent to treating clinicians (consultant, or General Practitioner if details not provided by the volunteer), which was designed to ascertain clinical and histological data on diagnosed cases (date of diagnosis, histology, nodal status, staging, grade, prognosis, ER, PR and HER2 status). 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.

Statistical analysis

The data were analyzed using one-way analysis of variance (ANOVA) followed by multiple comparison test. All biochemical experiments were performed thrice in triplicates to ensure reproducibility.

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%**	**N**
CEA	7.20	18.23	0.04	0.4	212
CYFRA21	9.01	29.51	0.1	0.65	191
LDH	1.39	2.02	0.28	0.71	220
ALP	1.056	1.00	0.26	0.58	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:

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 [8]. 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].

Predictive biomarkers that can guide treatment decision have been sought after to identify subsets of patients who would be “exceptional responders” to specific cancer therapies, or individuals who would benefit from alternative treatment modalities [10]. An

example of ctDNA as a potential predictive biomarker is the measurement of O^6-methyl-guanine-methyl-transferase (*MGMT*) promoter methylation from ctDNA in glioblastoma multiforme (GBM) patients. This would determine potential benefits from adjuvant alkylating chemotherapy such as temozolomide or dacarbazine, in addition to standard post-operative adjuvant radiation [11].

CONCLUSION:

It is concluded that biomarkers and TAC are the useful tool for the analysis of progression of breast cancer in females.

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