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Effect of Chitinase-3-Like Protein 1 (YKL-40) Levels in the Plasma of Babylon Women with Breast Cancer

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ABSTRACT

Background: *Breast cancer (BC) is a kind of cancer starts in the breast. patient in addition to doctor are disturbed with survival prognosis. Besides, prognostic factor has been the clinic pathological parameter which linked to consequences of tumors. Also, this cancer type possesses the biggest uprising rate of frequency as well as number two in rates of mortality in females' cancers. migration of cancer cell starting the primary tumor besides the invasion of cancer cell in the adjacent tissue are primary step in the process of cancer metastasis. The aim regarding the present education is to evaluate Chitinase-3-Like Protein 1 (YKL-40) levels in the of Babylon women with breast cancer and control groups.* ***Material and methods****: The case control group was made up of 60 subject, presumably healthy women, whereas the sick group was made up of 60 women with breast cancer . A study was agreed out in Marjan Medical City, Imam Al-Sadiq Hospital, AL-Hilla Teaching Hospital in Hilla city, between 2/11/2023 to April 29/4/2024 .An ELISA was used to calculate the plasma concentrations that referred to Chitinase-3-Like Protein 1 (YKL-40).* ***SPSS*** *software was used to conduct the statistical analysis.* ***Results:*** *Despite a considerable increase in Chitinase-3-Like Protein 1 levels, with patients comparing it together with control group ($p < 0.05$).* ***Conclusion****: women with breast cancer had considerably increase serum levels of Chitinase-3-Like Protein 1 levels. Based on the results of this investigation, this indicates the part of Chitinase-3-similar to Protein 1 as prognostic marker within females with BC disease.*

Keywords*: Chitinase-3-Like Protein 1, SPSS, ELISA.*

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INTRODUCTION

Breast cancer is a disease in which cell in the breast grow out of control. Several kinds of BC exist. It depends on which cell in the breast go into BC. With respect to breast cancer, main utilize prognostic influences are include the appearances of patient (age along with the menstrual status), properties of the tumor (extent of tumor, position of node, in addition to stage of TNM, Serum marker might be simple attained, in addition they are of great significance in variety of malignant tumors, however there is un-certainty concerning role in the breast cancers **(1).** The tumor careful to be malignant in case when cell rising in to adjacent tissues or even dispersion (metastasize) to additional body parts The exact cause concerning BC are unlimited. The growth of this disease be contingent on sex hormone of women, genetic predisposition, in addition to age, yet, remnants indefinite in what way features are contribute to the tumor's development **(2)**.

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These great case fatality amounts are maybe caused by an insufficient consciousness of assistances of treatment and early detection, additionally the lack of appropriate facilities for diagnosis and detection, in addition deficient availability to primary treatment. Diagnosis and treatment strategies of breast cancer are recently improved, but the incidence rates continue to increase **(3).** Histological grade determines founded on the difference level of individual tumors then itis used as a significant prognostic influence in BC running. Based to macroscopic examination of morphological and cytological type tumour cell, by analyzing three leading indications; level of tubule development, nuclear pleomorphism and mitotic count. three feature known a score of 1-3 and the score from altogether the factors joint for defining grade. Relying whole score, malignancies at that time branched to levels (4): Grade 1 (differentiate, slowly growth, overall score of 3-5), Grade 2 (deliberatively differentiated, total score of 6-7), -Stag of BC also delivers valued prognostic evidence for patient with BC. determine by TNM organization method, primary tumor size (T), distribution of cancer to local lymph nodes (N), then distant metastasis (M) is careful in responsible stage of the BC (5). In general, BC are classified addicted to stage 0-4, relying on the tumor pro- grissino status: Stage 0: Tumors of non-invasive status. Stage 1-3: Tumors are no distant metastasis then Stage 4: Tumor with distant metastatic disease. Grade 3 (poor differentiate, extremely proliferative, whole score of 8-9) (6). YKL-40 (chitinase-3 like-protein-1 (CHI3L1)) turns out to be a new biomarker, characterizes heparin-binding and chitin- binding glycol-protein. Involved in a collection of mammalian protein an amino acid arrangement like that 18 glucosyl hydrolases, a collection of bacterial chitinases, a Polysaccharide made of repeating N-acetylglucosamine units and a polymer of important structure in arthropod and other group **(7).** Chitinases hydrolyze chitin whereas CLPs do not possess any enzymatic activity with respect to chitin breaking. namely YKL-40 in human and breast deterioration protein 39 (BRP-39) in mice, is universal and found in together prokaryotic then eukaryotic organisms **(8).** More specifically, CHI3L1 is detected in several cell types such as macrophages, neutrophils, fibroblast-like cells, liver stellate cells, endothelial cells and cancer cells. So far, modifications of extracellular matrix, microRNA, growth factors and cytokine, stress, as well as drugs were demonstrated to regulate synthesis and secretion of CHI3L1 **(9).** Though YKL-40 does not must a chitinase activity, YKL-40 has a character in developing angiogenesis, spurring endothelial cell, involved to develop branching tubule, YKL-40 is a strong growth feature spurring proliferation of chondrocytes and fibroblasts. YKL-40 might possess a part through proliferation then differentiating malignant cell probably defend tumor cell of apoptosis, spurs angiogenesis; contributes in extracellular tissue alteration stimulate fibroblasts round the tumor **(10).**

MATERIALS AND METHODS

The current study involved 60 patient of AL- Hillah women diagnosed with BC. Aged between(32- 65) sample were drawn from the patients when come to hospitals for examination and treat during the period prolonged from 2/11/2023 to April 29/4/2024 .women with BC were separated into three grades, also into three subgroups according to ages (32-45),(46-53), and (54-65) y, then three other sub-groups rendering to BMI(ordinary weight and over-weight) .healthy people as control compose (60) appear as healthy aged between(36 -64) were gathered from laboratory of pathological analyzes in dissimilar time. age of healthy group was compared with patient age. The results of phenotype data were expressed as

mean ± SD. Student's ANOVA and the linear regression analysis were use for the assessment of data. The output data expressed as odd ratio (OR), confidence interval (CI) 95% and P value. Statistical analyses were performed with SPSS (version 20). A P value less than 0.05 was measured to be statistically significant.

ETHICAL APPROVAL

Approval of scientific committee in Biochemistry Department of Babylon Medical College. objectives and methodology of this study elucidate member in current study to gain their verbal acceptance. The objectives then methodology of study was elucidated to all participants in this study to gain their verbal receipt.

RESULTS

Table 1. Biochemical characteristics of the control and patient.

Variables	Group	N	Mean ± SD	95% Confidence Interval for Mean		Sig. value
				Min	Max	
Chitinase ng/ml	Grade 1	18	65.3 ±18.2	47.2	84.21	p< 0.05
	Grade 2	22	80.7± 17.4	62.4	98.56	
	Grade 3	20	145.9±17.4	128.8	164.8	
	control	60	32.5 ±10.7	21.8	43.2	

N:number of cases ; data were presented as mean±standard deviation ;p:comparison between Grade1, Grade2,S Grade3 and control groups, significant = P< 0.05

Table 2: Serum chitinase level at different ages in patients' group.

Age	Chitinase	
32-45	52.2±5.5	p < 0.05
46-53	87.4±10.1	p < 0.05
54-65	148.1±12.2	p < 0.05

This table shows the division of patients into three groups according to age and shows significant = P< 0.05, between groups.

Table 3: Comparison between Chitinase and BMI in women with BC disease.

BMI	Chitinase	
Normal weight	78.8 ±20.2	p < 0.05
Overweight	138.9 ± 28.4	p < 0.05

This table shows the division of patients into two groups according to BMI and shows significant = P< 0.05, between groups.

Table 4: Distribution of patient and control subject according to family history.

Family History	Patient (60)		Control (60)	
	N	%	N	%
positive	37	64	0	0
negative	23	36	60	100

This table shows the division of patients into two groups according to family history.

DISCUSSION

Breast cancer a kind of cancer that initiates as development of cell in breast tissue. After skin cancer, BC the greatest common cancer diagnosed in females in the United States. Nevertheless, BC doesn't just happen in women. Every person is born with certain breast tissue, so anybody can get BC. BC survival rate have been increasing. Then amount of people dying of BC is progressively going down. Abundant of this is due to extensive support for breast cancer consciousness and fund for research **(11).** Raised Chitinase expression has been experiential in several cancer type, including, breast, brain, ovarian, lung colorectal, and prostate cancers. Raised level of Chitinase in circulation originate in number of solid tumors with breast cancer, Serum level of Chitinase is indicative for the poor prognosis then efficiency of metastatic process (**12)**.

High Chitinase level are regularly associate with aggressive tumor comportment, cancer metastasis, and poor prognosis. There are different therapeutic drugs that target Chitinase presently being researched and established. Drugs act as characteristic YKL40 inhibitors, suppressing its biological activity and 7expression, thereby reducing its with chemotherapy, radiotherapy, or immune-therapy have also been explore. Also, chitinase was recently propose as a novel marker for the discovery of Endometrial cancer **(13)**. Addition there is direct association between the expression level of Chitinase and numerous tumor grades. the raised level of Chitinase can reflect integrate effect of cancer cell activity and activation status of tumor-associated macrophages **(14).** chitinase might have a part in differentiation and proliferating malignant cell. It defends cancer cell from undergo apoptosis, stimulate angiogenesis,

possesses a certain effect on extracellular tissue remodeling. It spurs fibroblasts nearby the malignancy, though in vivo evidence of these theories is yet to be concluded. It could not be excepted that Chitinase might play a role as a growth factor for cancer cells. Chitinase helps cell attachment and migration of vascular endothelial cell, a sign that protein can play its part in angiogenesis **(15).** In this study, The significant difference in Chitinase ($P< 0.05$) among patients and control groups, as in Table (1). This finding agreement with previous A study by Shaker Olfat *et al* **(16)** showed overexpression of Chitinase. Another study Robbe Salembier *et al* **(17)** showed considerably high levels regarding Chitinase activity in patients with carcinoma as compared with control group. The results of the present study in table (2), have explained that elevated level of Chitinase By increasing age. Also, increased Chitinase level in women with BC According to their BMI.

CONCLUSION

This study presents the significant difference in Chitinase level between carcinoma and control group, Also, variables such as age, stage and BMI in females with BC disease effect on level of Chitinase, show the role of Chitinase as a prognostic marker in females through BC disease.

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