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STUDY OF BIO-MARKERS IN CARCINOMA BREAST

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Abstract

Introduction: Cancer is the second largest killer disease. Cancer Of the breast is common in women in developed countries and more than 40% of all breast cancer cases found in developing countries. The present study was done for the early detection of carcinoma. **Methodology**: The present study was conducted in the Department of Biochemistry, Rangaraya Medical College, Kakinada, and Andhra Pradesh, India. The present study was undertaken to determine biochemical changes in60carcinomabreastcases.60casesweredividedinto2groups-a. Premenopausal 30 cases, and b. Post-menopausal 30 cases, who were newly diagnosed and untreated. These values are compared with40 healthy controls. All of these subjects were taken from surgery department, Government General Hospital, Kakinada. R.B.S., Total Proteins, Albumin, A/G ratio, lactate dehydrogenase, gamma glutamyl transferase and liver enzymes (T. Bilirubin, SGOT, SGPT, ALP) were estimated among cases and controls. **Results**:. Mean values of LDH, GGT, PROTEINS, ALP were significantly increased in all the cases when compared with controls. **Conclusion**: These findings suggest that the estimation of less specific biomarkers like LDH, GGT and ALP can be used as routine tests in all suspected carcinoma breast patients because these can be easily assayed, approached for general population, less expensive and can detect metastasis also

Key words: CA Carcinoma, LDH Lactate dehydrogenase, GGT gamma glutamyl Tran's peptidase

INTRODUCTION

Cancer is the second largest killer disease. Cancer Of the breast is common in women in developed countries and more than 40% of all breast cancer cases found in developing countries.[1] Breast cancer primarily affects women accounting for 23% of all female cancers around the globe. Breast development and function are initiated by a variety of hormonal stimuli like estrogen, progesterone, prolactin, oxytocin, thyroid hormone, cortisol and growth hormone. [2]. **A lactate dehydrogenase (LDH or LD)** is an enzyme found in animals, plants, and prokaryotes. Lactate Ox dehydrogenase is of medical significance because it is found extensively in body tissues, such as blood cells and heart muscle. Because it is released during tissue damage, it is a marker of common injuries and disease. A dehydrogenase is an enzyme that transfers a hydride from one molecule to another. Lactate dehydrogenase catalyzes the conversion of pyruvate to lactate and back, a sit converts NAOH to NAO+ and back GGT is present in the cell membranes of many tissues, including the kidneys, bile duct, pancreas, gallbladder, spleen, heart, brain, and seminal vesicles. It is involved in the transfer of amino acids across the cellular embrace and leukotriene metabolism. It is also involved in glutathione metabolism by transferring the glutamyl moiety to a variety of accept or molecules including water, certain Lamina acids, and peptides, leaving the cysteine product to preserve intracellular homeostasis of oxidative stress.[3] Despite the extensive research for many years throughout the world, the etiopatho genesis of cancer still remains obscure. For the early detection of carcinoma of various origins, a number of biochemical markers have been studied to evaluate the malignancy. [4]

AIMS AND OBJECTIVES

1. The present study was under taken to assess the clinical utility of certain biochemical investigations like LDH, GGT and ALP in diagnosis of carcinoma of breast cases and compared with controls.
2. To estimate liver enzymes [SGOT, SGPT, ALP] and serum total proteins in carcinoma breast cases and compared with controls.
3. To evaluate the relationship of Serum. LDH, GGT, levels with ALP of carcinoma breast patients of post-menopausal age group.
4. To evaluate and compare Biochemical parameters between cases of carcinoma breast patients in pre menopause and post menopause patients.

MATERIAL AND METHODS

The present study was conducted in the Department of Biochemistry, Rangaraya Medical College, Kakinada, and Andhra Pradesh, India. The present study was undertaken to determine biochemical changes in 60 carcinoma breast cases. 60 cases were divided into 2 groups-

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a. Premenopausal 30 cases, and b. Post-menopausal 30 cases, which were newly diagnosed and untreated. These values are compared with40 healthy controls. All of these subjects were taken from surgery department, Government General Hospital, Kakinada. Blood samples were obtained from Ante Cubical Vein of. Upper limbs of each patient. Control group consists of women of age group of 18 -60 years. The consent was obtained both from cases and controls. Plasma was separated and analyzed by using standard methods. The observed values were compared with control group for statistical analysis. All data were expressed as mean. Standard deviation. Student paired't' test was used to compare the values. Differences with 'p' less than 0.05 were considered to be statistically significant. The study was approved by ethical committee of the institution.

INCLUSION CRITERIA

All patients who were recently diagnosed as carcinoma breast clinically and histologically confirmed in the age group of female 20-60 years.

EXCLUSION CRITERIA

Carcinoma breast associated with concomitant pathology like DM, HTN renal failure and severely ill or disabled patients

R.B.S. Total Proteins, Albumin, A/G ratio, lactate dehydrogenase, gamma glut amyl transferase and liver enzymes (T. bilirubin, SGOT, SGPT, ALP) were estimated among cases and controls.

TABLE-1. DISTRIBUTION OF CONTROLSANO CARCINOMA BREAST CASES

Cases[60]	Controls
A] premenopausal[30] B] postmenopausal[30]	40

60 cases and 40 controls were included in the study.

TABLE-2

S.NO.	PARAMETER	MEAN	SD	NORMAL VALUES
1	R.B.S	97.58	20.68	80-130mg/di
2	TOTALPROTEINS	6.917	0.451	6-8gm/di.
3	ALBUMIN	4.0532	0.422	3.4-4.5mg/di
4	GLOBULIN	2.835	0.351	2.5-3.5mg/di
5	LACTATEDEHYDROGENASE	304.85	47.07	230-460U/L
6	y-GLUTAMYLTRANSFERASE	24.55	5.92	7-35U/L
7	TOTALBILIRUBIN	0.910	0.536	0.2-1mg/di
8	AST(SGOT)	36.20	20.35	5-45IU/L
9	ALT(SGPT)	33.43	18.59	5-40IU/L
10	ALP	34.15	15.59	–140IU/L

Biochemical parameter value and statistics of controls(n=40)

TABLE-3 BIOCHEMICAL PARAMETERVALUE AND STATISTICS OF CASES (N=60)

S.NO.	PARAMETER	MEAN	S.D.	NORMALVALUES
1	R.B.S.	108.4	24.29	80-130mg/dl
2	TOTALPROTEIN	7.975	1.034	6-8gm/dl
3	ALBUMIN	2.665	0.833	3.5-5mg/dl
4	GLOBULIN	4.460	0.556	2.5-3mg/dl
5	LDH	543.22	127.37	230-460U/L
6	GGT	55.68	14.65	7-35U/L
7	TOTALBILIRUBIN	0.968	0.313	0.2-1mg/dl
8	SGOT	66.90	14.03	5-45IU/L
9	SGPT	58.70	15.96	5-40IU/L

TABLE-4 LEVELS OF DIFFERENT BIOCHEMICAL PARAMETERS IN CARCINOMA BREAST CASES OF PREMENOPAUSALAGE GROUP AND CONTROLS

S.NO.	PARAMETER	CONTROLS n=40	CASES premenopausal n=30	P
1	R.B.S.	97.58±20.68	108.40±24.29	0.0132 Significant
2	TOTALPROTEINS	6.917±0.451	7.975±1.034	<0.0001

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				Significant
3	ALBUMIN	4.054±0.422	2.667±0.833	<0.0001 Significant
4	GLOBULIN	2.845±0.351	5.310±0.556	0.7356 Ns
5	LDH	304.85±47.07	543.22±127.37	<0.0001 Significant
6	GGT	24.55±5.92	55.68±14.65	<0.0001 Significant
7	TOTALBILIRUBIN	0.910±0.536	0.968±0.313	0.0259 Ns
8	SGOT	36.20±20.35	66.90±14.03	<0.0001 Significant
9	SGPT	33.43±18.59	58.70±15.96	<0.0001 Significant
10	ALP	34.15±15.59	114.88±23.84	<0.0001 Significant

TABLE-5 LEVELS OF DIFFERENT BIOCHEMICALPARAMETERS IN CARCINOMA BREAST CASES POST MENOPAUSAL AGE GROUP AND CONTROLS

\S.NO.	PARAMETER	CONTROLS n=40	CASES post-menopausal n=30	P
1	R.B.S.	97.58±20.68	122.03±26.45	0.0002 significant
2	TOTALPROTEINS	6.917±0.451	8.237±1.182	<0.0001 significant
3	ALBUMIN	4.053±0.422	2.665±0.920	<0.0001 significant
4	GLOBULIN	2.835±0.351	5.315±0.526	0.0602 Ns
5	LDH	304.85±47.07	748.37±76.42	<0.0001 significant
6	GGT	24.55±5.92	82.83±15.92	<0.0001 significant
7	TOTALBILIRUBIN	0.910±0.536	1.077±0.339	0.0986 Ns
8	SGOT	36.20±20.35	63.77±14.01	<0.0001 Significant
9	SGPT	33.4663±18.59	59.07±14.95	<0.0001 Significant
10	ALP	34.15±15.59	174.50±23.3	<0.0001 significant

TABLE-6 CORRELATION OF ALP WITH OTHER PARAMETERS IN CARCINOMA BREAST CASES OF POST-MENOPAUSAL AGE GROUP

	r	P
LDH	+0.1017	0.592Ns
GGT	-2.105	0.265Ns

TABLE-7 TABLE SHOWING AGE DISTRIBUTION IN CARCINOMA BREAST CASES

AGE	NO. Of CASES
15-25	1
26-35	9
36-45	13
46-55	21
56-60	11

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>60	5

DISCUSSION:

As breast cancer is one of the leading causes of death in women, in developed and developing countries, a need is felt for some simple biochemical· investigations for the early detection of cancer and can be assayed in smaller laboratories located in remote areas. In view of this certain biochemical investigations which are though considered non-specific carried out in breast cancer patients to establish their diagnostic values in cancer with and without metastasis.

In present study, Serum LDH is significantly (P < 0.001) increased in CA breast patients (mean 543.22±127.37) when compared to controls (mean 304.85± 47.07) but further increased in carcinoma breast cases of postmenopausal age group [mean 748±47.07] which is statistically significant (p<0.001). It is due to induction of LDH synthesis in normal tissues of the host by invading tumor causes release of intracellular enzymes so aggressiveness of its tumor growth directly correlates with Serum LDH levels and act as a diagnostic and prognostic marker in CA breast patients. Serum LDH level in carcinoma breast patients of postmenopausal age group is positively correlated with ALP (r =+0.1017). The present study correlates with SWETHA et.al [5] and KHER et.al.

Cancer cells respire anaerobically and malignant conditions are known for demonstrating high levels of LDH. [6-9] the invading tumor causes release of intracellular enzymes like Lactate dehydrogenase into the blood by the dying cells. Secondly the elevated levels of LDH couldn't be brought about as it is an enzyme essential for anaerobic glycolysis. Induction of LDH synthesis in the normal tissue of the host by the tumor also contribute to raise LDH levels Serum GGT is significantly (p<0.001) increased (mean 55.68±14.65) in the study group of carcinoma Breast patients when compared to control (mean 24.55 ± 5.92) but further increased in carcinoma breast cases of postmenopausal age group [mean 82.84 ± 15.92] which is statistically significant (p<0.001)It may be due to response of increased reactive oxygen production in the blood. Although GGT is an index of Liver discreet its higher level in breast CA patients suggests it is the release of membrane bound constituents from different tissues even in carcinoma. [10-12] Serum GGT level in carcinoma breast patients of post-menopausal age group is negatively correlated with ALP [-0..2105]. The present study correlates with Seth and Chowdhary et.al. [13]

Serum ALP levels(mean114.88±23.84)is significantly increased (p <0.001) in carcinoma Breast patients when compared with the controls (mean 34.15 ± 15.59) but further increased in carcinoma breast cases of postmenopausal age group [mean 174±23.3] which is statistically significant (p <0.001). It may be due to neoplastic metastasis of the liver resulting from localized intra hepatic cholestasis within creased synthesis of enzyme in liver tissue also in bone metastasis. ALP being a good bio chemical marker to predict osteoplastic activity and to indicate early and advanced bone metastasis. So it is useful for differentiating breast cancer stages and metastasis. Present study correlate with study conducted by MISHRA,WALIA M, BAUMAHPK and COOMBES RC and YEU-TSU Net.al.[14] Serum Total proteins was significantly (p<0.001) increased and serum Albumin was significantly decreased (p<0.001) in study group but within normal range when compared to controls.

SGOT and SGPT is also significant (p<0.001) increased in carcinoma breast patients when compared to controls because of accelerated denovo synthesis of the enzyme and subsequent regulation in the serum.

SUMMARY AND CONCLUSIONS

Breast cancer presents a major health care burden of females as it is the most common type of cancer occurring in female worldwide.

The present study restricted to carcinoma breast patients in premenopausal and postmenopausal women. As per the present study aggressiveness of breast cancer has been seen in post-menopausal patients and accounts for high morbidity and mortality. The present study shows significant elevation of serum LDH in total carcinoma breast cases than that of controls and it was revealed that there is significant variation in LDH between premenopausal and post-menopausal carcinoma breast patients. In post-menopausal patients LDH concentration more markedly increased due to aggressiveness of tumor growth and metastasis. So it is used as a diagnostic and prognostic marker. Serum GGT is significantly increased in total carcinoma breast patients but further more increased in postmenopausal patients. It may be due to oxidative stress. Serum ALP is significantly increased in total carcinoma breast patients but further more increased in post-menopausal patients. ALP is potential marker for early detection of cancer with and without metastasis that helps to diagnose the people in developing countries. Serum total proteins is significantly increased and .SGOT,SGPT levels were significantly are significantly increased in all carcinoma breast patients than that of controls.

These findings suggest that the estimation of less specific biomarkers like LDH, GGT and ALP can be used as routine tests in all suspected carcinoma breast patients because these can be easily assayed, approached for general population, less expensive and can detect metastasis also

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REFERENCES

1. Ferly J, Soerjomataram I, Ervik M, et al. *GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide. IARC Cancer Base No. 11*. Lyon, France: International Agency for Research on Cancer; 2013. http://globocan.iarc.fr. Accessed October 1, 2016.
2. Hiller-Sturmhöfel S, Bartke A. The endocrine system: an overview. Alcohol Health Res World. 1998;22(3):153-64. PMID: 15706790; PMCID: PMC6761896.
3. Liu Y, Hyde AS, Simpson MA, Barycki JJ. Emerging regulatory paradigms in glutathione metabolism. Adv Cancer Res. 2014;122:69-101. doi: 10.1016/B978-0-12-420117-0.00002-5. PMID: 24974179; PMCID: PMC4515967.
4. Stefanni M. Enzymes is enzymes enzyme variants in the diagnosis of cancer. A short review. Cancer 1985;55:1931-6.
5. Serum Lactate Dehydrogenase and Lipid Profile In Breast Cancer lips !Volume3IIssue2IAPR-JUN120131423-43
6. Lee YTN, Haymond R. Feder. Biochemical evaluation of patients with breast cancer. SurgOnc1982; 19:**197200.D**
7. Rao YN, Singh GP, Chakravoroty M. Khanna NH. Serum LOH, leonine amino peptidase and alkaline phosphatase in the diagnosis of cancer. Ind J Can 1978;15:39-41.
8. Lippman, M., Bolan, G., and Huff, K. The Effects of Estrogens and Anti estrogens on Hormone-responsive Human Breast Cancer in Long Term Tissue Culture. CancerRca.,36: 4595-4601, 1976
9. Lippman, M. E., Bolan, G., Monaco, M. E., Plnkus, L., and Engel, L. Model Systems for the Study of Estrogen Action. J.Steroid Biochem., 7:1045-1052,1976
10. Sharma B.K and Ray A (2000).Breast and Prostate Cancer. lJCB., 15 (Suppl.): 110-117.
11. Sandhya Mishra, D.C.Sharma and Praveen Sharma (2004).Studies of Biochemical Parameters in Breast Cancer With and Without Metastasis. IJCB., 19(1):71
12. N.S ElSaghir, M.K.Khalil, T.Eid etal.,(2007). Trends in Epidemiology and Management of Breast Cancer in Developing Arab Countries: A literature and registry analysis. Int. J.of Surgery, 5(4): 225
13. Activities of serum Ada, GGT and alp in carcinoma breast-acase control study for diagnostic and prognostic significanc:e.year:2013, volume :67, issue:5, page:123-129
14. Studies of biochemical parameters in breast cancer with and without metastasis Sandhya Mishra Indian Journal of Clinical Biochemistry
15. January2004,Volume19, Issue1,pp71-75