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ORIGINAL RESEARCH

Assessment of serum LDH and GGT level in breast cancer patients

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Abstract
Background: Breast cancer is a type of cancer that originates in the cells of the breast tissue. The present study was conducted to assess serum LDH and Gamma GT in breast cancer patients.
Materials & Methods: 80 female subjects were divided into 2 groups of 40 each. Group I was cases with breast cancer who were further divided into premenopausal and post-menopausal. Group II was control subjects. Biochemical investigations like serum Lactate dehydrogenase, Gamma Glutamyl Transpeptidase, Alkaline phosphatase, liver enzymes (SGOT, SGPT, & ALP), and total proteins were calculated.
Results: The age group 20-45 years (premenopausal) had 18 patients in group I and 20 subjects in group II and >45 years had 22 post-menopausal patients in group I and 20 subjects in group II. The difference was non- significant (P> 0.05). Total protein (g/dl) in premenopausal, post-menopausal, and in group II subjects was 7.4, 8.6, 6.2 respectively. The mean albumin (g/dl) was 2.8, 3.0, and 2.4 respectively. The mean globulin (g/dl) levels were 4.6, 5.6, and 3.8 respectively. The mean LDH (U/L) level was 512.4, 536.4 and 290.4 respectively. The mean GGT (IU/L) level was 50.2, 84.6 and 24.6 respectively. The mean ALP (IU/L) was 122.5, 180.4, and 43.1 respectively. The mean SGOT (U/L) level was 62.1, 75.3 and 34.6. The mean SGPT (U/L) level was 68.5, 69.2, and 36.2 respectively.
Conclusion: The level of LDH, GGT, and ALP was significantly higher in breast cancer patients and hence, can be used as routine screening tests in all suspected carcinoma breast patients.

Key words: Breast cancer, LDH, women

Introduction

Breast cancer is a type of cancer that originates in the cells of the breast tissue. It can occur in both men and women, but it is far more common in women. Breast cancer can develop in different parts of the breast, including the ducts, lobules, and connective tissues. Early detection and advances in treatment have significantly improved the outcomes for individuals diagnosed with breast cancer.[1] Women are at a higher risk, and the risk increases with age. A family history of breast cancer, as well as certain genetic mutations (e.g., BRCA1 and BRCA2), can increase the risk. Long-term use of hormone replacement therapy (HRT) may

increase the risk. A previous history of breast cancer or certain non-cancerous breast diseases may elevate the risk.[2]

The primary focus in the fight against breast cancer remains to be promoting early diagnosis because primary prevention of the disease is still unattainable, barring drastic measures such a preventive mastectomy for women who are genetically predisposed to the disease. Early diagnosis and treatment of breast cancer patients is intended to maximize their chances of long-term survival. This is known as early detection. Women with early-stage diseases typically have a better prognosis than those with more advanced diseases since early identification is linked to a lower death rate.[3]

Lactate dehydrogenase (LDH) is an enzyme found in various tissues and cells in the body, including the breast tissue.[4] LDH is involved in the conversion of lactate to pyruvate, playing a role in cellular energy production. While LDH levels are not typically used as a specific marker for breast cancer diagnosis or screening, they may be measured in certain situations as part of general blood tests or in the evaluation of cancer patients.[5] Gamma Glutamyl transpeptidase (GGT) is an enzyme found in various tissues, including the liver, bile ducts, and kidney. While GGT is not typically used as a specific marker for breast cancer, it is sometimes measured as part of routine liver function tests or in the assessment of overall health.[6] The present study was conducted to assess serum LDH and Gamma GT in breast cancer patients.

Materials & Methods

The present study consisted of 80 female subjects. All gave their written consent to participate in the study.

Data such as name, age, etc. was recorded. All were divided into 2 groups of 40 each. Group I was cases with breast cancer who were further divided into premenopausal and post-menopausal. Group II was control subjects. 5 ml blood samples were obtained from ant. cubital vein of the upper limb. Biochemical investigations like serum Lactate dehydrogenase, Gamma Glutamyl Transpeptidase, Alkaline phosphatase, liver enzymes (SGOT, SGPT, & ALP), and total proteins were calculated. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Age group (years)	Group I (Breast cancer)	Group II (Control)	P value
20-45	18	20	0.86
>45	22	20	

Table I shows that the age group 20-45 years (premenopausal) had 18 patients in group I and 20 subjects in group II and >45 years had 22 post-menopausal patients in group I and 20 subjects in group II. The difference was non- significant (P> 0.05).

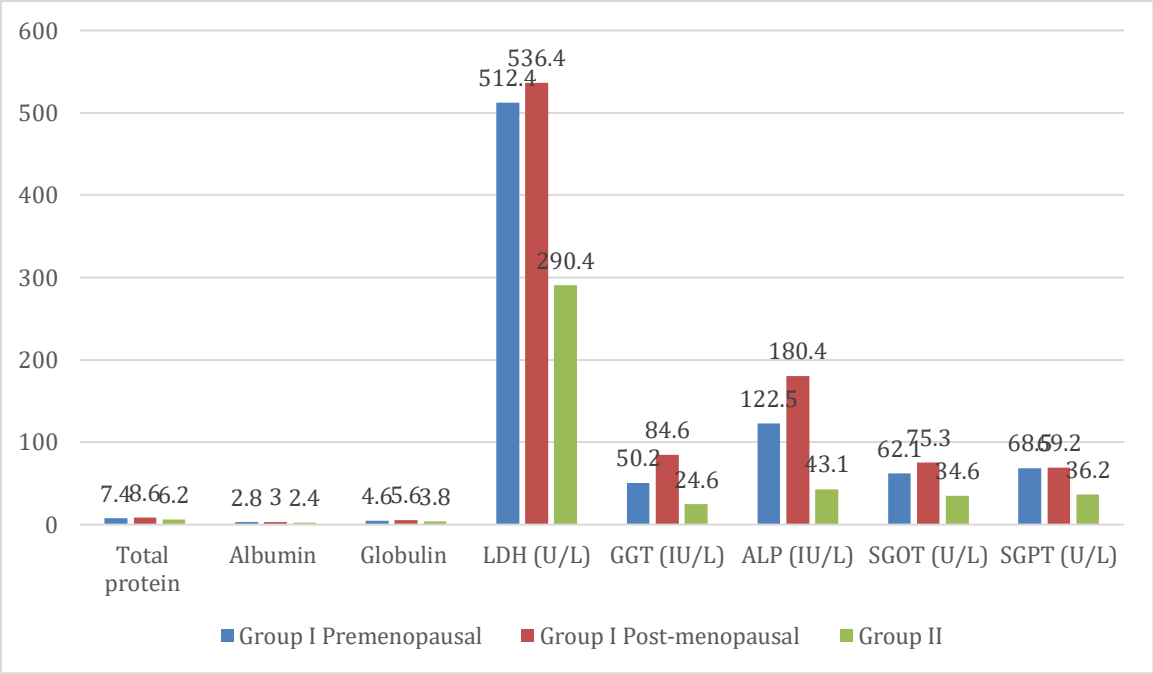
Table II Biochemical investigations

Parameters	Group I		Group II	P value
	Premenopausal	Post-menopausal		
Total protein (g/dl)	7.4	8.6	6.2	0.01
Albumin (g/dl)	2.8	3.0	2.4	0.03
Globulin (g/dl)	4.6	5.6	3.8	0.05
LDH (U/L)	512.4	536.4	290.4	0.02
GGT (IU/L)	50.2	84.6	24.6	0.04
ALP (IU/L)	122.5	180.4	43.1	0.01

SGOT (U/L)	62.1	75.3	34.6	0.01
SGPT (U/L)	68.5	69.2	36.2	0.05

Table II, graph I show that total protein (g/dl) in premenopausal, post-menopausal, and in group II subjects was 7.4, 8.6, 6.2 respectively. The mean albumin (g/dl) was 2.8, 3.0, and 2.4 respectively. The mean globulin (g/dl) levels were 4.6, 5.6, and 3.8 respectively. The mean LDH (U/L) level was 512.4, 536.4 and 290.4 respectively. The mean GGT (IU/L) level was 50.2, 84.6 and 24.6 respectively. The mean ALP (IU/L) was 122.5, 180.4, and 43.1 respectively. The mean SGOT (U/L) level was 62.1, 75.3 and 34.6. The mean SGPT (U/L) level was 68.5, 69.2, and 36.2 respectively.

Graph I Biochemical investigations



Discussion

LDH is a general marker of cellular damage or injury. Elevated LDH levels may be seen in various conditions, including infections, tissue damage, and some cancers.[7] LDH levels may be monitored during cancer treatment to assess the response to therapy. Changes in LDH levels may indicate how well the treatment is working or if there is progression of the disease. LDH levels can be elevated in the presence of metastatic cancer.[8] Metastasis refers to the spread of cancer to distant organs or tissues. Monitoring LDH levels may be part of the evaluation for metastatic breast cancer. GGT is primarily produced in the liver, and elevated levels may indicate liver dysfunction or damage.[9] In breast cancer, GGT levels may be monitored if there is concern about liver involvement or metastasis. Some chemotherapy drugs may affect liver function, leading to changes in GGT levels. Monitoring GGT, along with other liver function markers, can help assess the impact of chemotherapy on the liver.[10] The present study was conducted to assess serum LDH and Gamma GT in breast cancer patients.

We found that the age group 20-45 years (premenopausal) had 18 patients in group I and 20 subjects in group II and >45 years had 22 post-menopausal patients in group I and 20 subjects in group II. Owiredu et al[11] in their study 200 consented women comprising 100 breast cancer patients (43 pre- and 57 post-menopausal) and 100 controls (45 pre- and 55 post-menopausal) with similar age range (25 to 80 years) were assessed for lipid profile, oestradiol and BMI.

There was a significant increase in Body Mass Index (BMI) ($p = 0.011$), Total Cholesterol (TC) ($p < 0.001$), triglyceride ($p = 0.026$) and low- density lipoprotein (LDL-cholesterol) of the breast cancer patients compared to the controls. With the exception of oestradiol (EST) that decreased, the lipid profile generally increased with age in both subjects and controls with the subjects having a much higher value than the corresponding control. There was also a significant positive correlation between BMI and TC ($r2 = 0.022$; $p = 0.002$) and also between BMI and LDL-cholesterol ($r2 = 0.031$; $p = 0.0003$). Apart from EST and LDL-cholesterol that were increased significantly only in the postmenopausal phase in comparison to the controls, BMI, TC and TG were increased in both pre-menopausal and post-menopausal phases with HDL-cholesterol remaining unchanged.

We found that total protein (g/dl) in premenopausal, post-menopausal, and in group II subjects was 7.4, 8.6, 6.2 respectively. The mean albumin (g/dl) was 2.8, 3.0, and 2.4 respectively. The mean globulin (g/dl) levels were 4.6, 5.6, and 3.8 respectively. The mean LDH (U/L) level was 512.4, 536.4 and 290.4 respectively. The mean GGT (IU/L) level was 50.2, 84.6 and 24.6 respectively. The mean ALP (IU/L) was 122.5, 180.4, and 43.1 respectively. The mean SGOT (U/L) level was 62.1, 75.3 and 34.6. The mean SGPT (U/L) level was 68.5, 69.2, and 36.2 respectively. Meenal Vaidya Rajput et al[12] in their study the mean serum LDH, GGT, and ALP activities in patients with carcinoma breast were significantly ($p<0.0001$) increased as compared to controls, and a steady increase was observed in their levels from premenopausal to post-menopausal women.

Sandhya Mishra et al[13] reported a significant increase in serum Gamma glutamyl transferase levels in breast cancer. Serum ALP levels (mean 124.23±24.09) is significantly increased ($p<0.001$) in CA breast patients when compared with controls (mean 40.23±16.37) but further increased in CA breast cases of post-menopausal age group (mean 186.01±22.64) it may be due to neoplastic metastasis of the liver resulting from localised intra hepatic cholestasis with increased synthesis of enzyme in liver tissue.

The limitation of the study is the small sample size.

Conclusion

Authors found that the level of LDH, GGT, and ALP was significantly higher in breast cancer patients and hence, can be used as routine screening tests in all suspected carcinoma breast patients.

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