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Identification Of Plasma Serotonin And Adiponectin As Predictor Biomarkers For Early Detection Of Breast Cancer Among Karbala Province

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Abstract

Breast Malignancy Is The Most Common Malignancy Among Women, Constituting Eighteen Percent Of All Cancer Diagnoses In Females. It Is The Seventh Leading Cause Of Cancer-Related Fatalities Worldwide. The Goal Of This Research Is To Find Out How Breast Cancer Patients And Healthy People's Levels Of The Hormones Serotonin (St) And Adiponectin (Adp) Compare. A Group Of 85 People With Breast Cancer And 85 People Who Appeared To Be In Good Health Had Their Serum Concentrations Of The Hormones Serotonin (St) And Adiponectin (Adp) Measured. When Compared To The Control Group, Breast Cancer Patients' Serum Levels Of The Hormones Serotonin (St) And Adiponectin (Adp) Were Significantly Lower ($P \leq 0.05$). In Comparison To Healthy Controls, Breast Cancer Patients Have Substantially Reduced Levels Of The Hormones Serotonin (St) And Adiponectin (Adp).

keyWords: Breast Cancer, Serotonin, And Adiponectin Hormones.

Introduction

One Of The Most Prevalent Malignancies Affecting Women Worldwide, Breast Cancer Claimed The Lives Of Over 570,000 People In 2015. Breast Cancer Affects About 1.5 Million People Annually Around The Globe, Accounting For 25% Of All Cancer-Stricken Women (Sun, Y.-S.*Et Al*., 2012, Tao, Z., *Et Al* ., 2015).

The Fact That Breast Cancer Is Often Metastatic—Meaning It Has Spread To Other Organs Like The Liver, Lungs, Bone, And Brain—Makes It Nearly Impossible To Treat. Getting A Diagnosis Early On Can Make A Huge Difference In Your Health And Likelihood Of Survival. Patients In North America Have A Relative Survival Rate Of Over 80% After 5 Years Thanks To The Early Identification Of Breast Cancer. According To Waks And Winer (2019).

Although Serotonin Stimulates The Growth Of Various Carcinomas, Carcinoid, And Other Tumor Cell Types, Little Is Known About How It Affects The Migration And Metastasis Of

Cancer Cells. Serum Serotonin Levels Are Used In Oncology As A Neoplastic Biomarker For Ovarian, Hepatic, & Gastrointestinal Cancers And Are Suitable For Evaluating The Prognosis Of Prostate Adenocarcinoma; Renal Cell Carcinoma; & Bladder Urothelial Carcinoma. (Sarrouilhe D. Et Al. , 2015).

An Enzyme Called Tryptophan Hydroxylase Regulates The Rate Of Ring Hydroxylation Of The Essential Amino Acid Tryptophan, And Another Enzyme Called Aromatic Amino Acid Decarboxylase Decarboxylates The Side Chains Of Amino Acids. These Two Mechanisms Together Allow Mammals To Produce Serotonin. According To Mohammad-Zadeh Et Al. (2008).

Chromosome 3q27 Encodes The 244-Amino Acid Polypeptide Protein Known As Adiponectin. White Adipose Tissue Adipocytes, Cells Critical For Regulating Inflammation, Energy Balance, Insulin Sensitivity, And Cell Division, Are The Principal Secretors Of This Insulin-Sensitizing Hormone. Gu Et Al. (2018) Found That Low Serum Adiponectin Levels Were Associated With Hyperinsulinemia And Increased Levels Of Vascular Endothelial Growth Factor (Vegf) And Insulin-Like Growth Factor (Ilf). These Factors Have Been Demonstrated To Increase The Risk Of Obesity-Related Cancers, Such As Breast Cancer.

Material and Methods

All Of The Samples Used In This Prospective Research Come From Individuals Who Visit The Cancer Care Unit At Al-Hussein Medical Centre And Specialty Clinics. This Comprises (85) Blood Samples Collected From Patients Diagnosed With Breast Carcinoma & (85) From Healthy Women Serving As A Control Group.

Serum Samples From Breast Cancer Patients & Control Subjects Totaling About 5 Ml Were Taken & Placed In Sterile, Single-Use Plastic Tubes To Coagulate At Room Temperature. The Serum, Which Was Stored At -20^{o}c Until It Was Time To Test For Hormones Such As “Serotonin” And “Adiponectin”, Was Subsequently Extracted From The Samples Using Ultracentrifugation At 3000 Rpm For 10 Minutes. Using A Kit From Elabscience, Usa, The Enzyme-Linked Immunochemical Model Was Used To Predict The Levels Of The Hormones Serotonin And “Adiponectin” Using An Elisa Reader From The Usa. The Results Are Shown As Mean ± Sd Or Mean ± Standard Deviations. To Compare The Parameters Between The Different Groups Under Study, A One-Way Anova Test Was Used; When P-Values Were ≤ 0.05, The Statistics Were Considered Significant.

Results

The Objective Of This Study Was To Ascertain The Influence That These Disorders Have On The Hormonal Equilibrium Of Adiponectin And Serotonin Patients Diagnosed With Breast Cancer Exhibited Considerably Lower Levels Of Serotonin In Their Serum When Versus The Control Group.

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Table 1: Presents The Serum Levels Of Serotonin For Both The Control & Breast Cancer Cohorts.

(Group)	(N)	(Serotonin Concentration ($\frac{ng}{ml}$))
(Control)	(85)	(51.29 ± 14.76^{a})
(Breast Cancer)	(85)	(11.84 ± 2.176^{a})
(Lsd)		(2.17)

* The Mean (±) Standard Deviation (Sd) Is Used To Express Each Statistic, And For Values Where ($P \leq 0.05$), A Signifies Significant Differences.

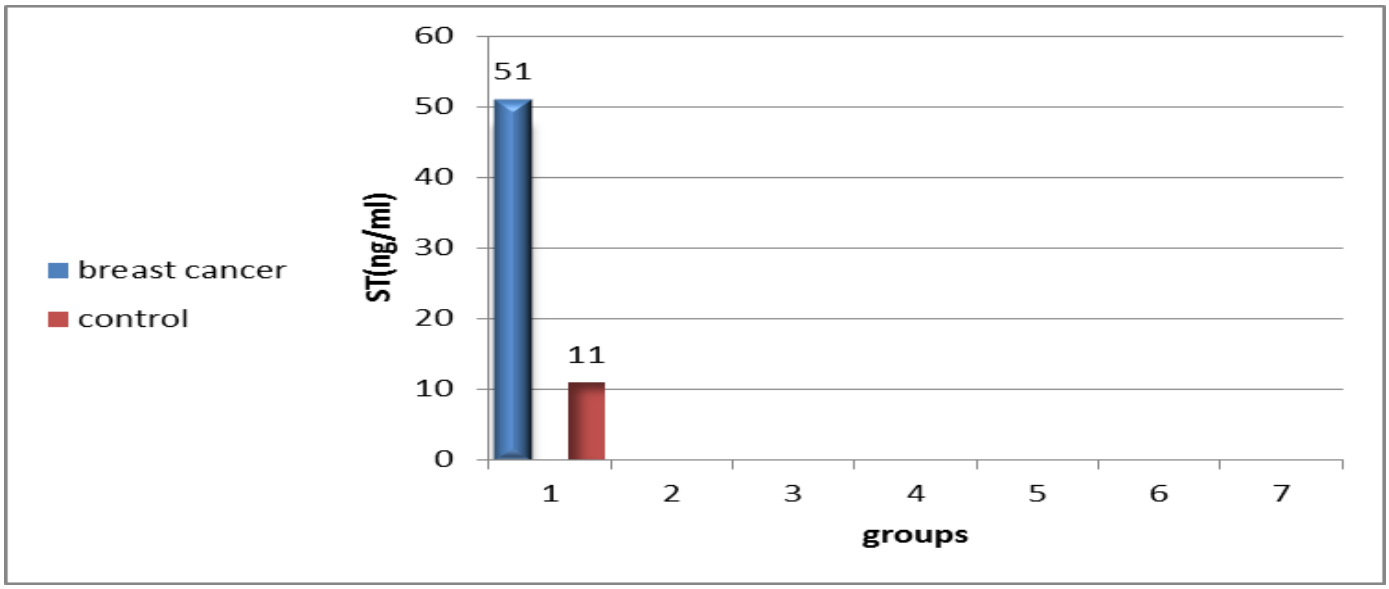

Figure 1: Health Subjects Serum Serotonin Level And Comparing Them To Breast Cancer Group

Table 2: The Serum Level Of Adiponectin For Both Control And Breast Cancer Groups

(Group)	(N)	(Adiponectin Concentration($\frac{ng}{ml}$)
(Control)	(85)	(6.74 ± 1.69^{a})
(Patients)	(85)	(0.11 ± 0.50^{A})
(Lsd)		(0.23)

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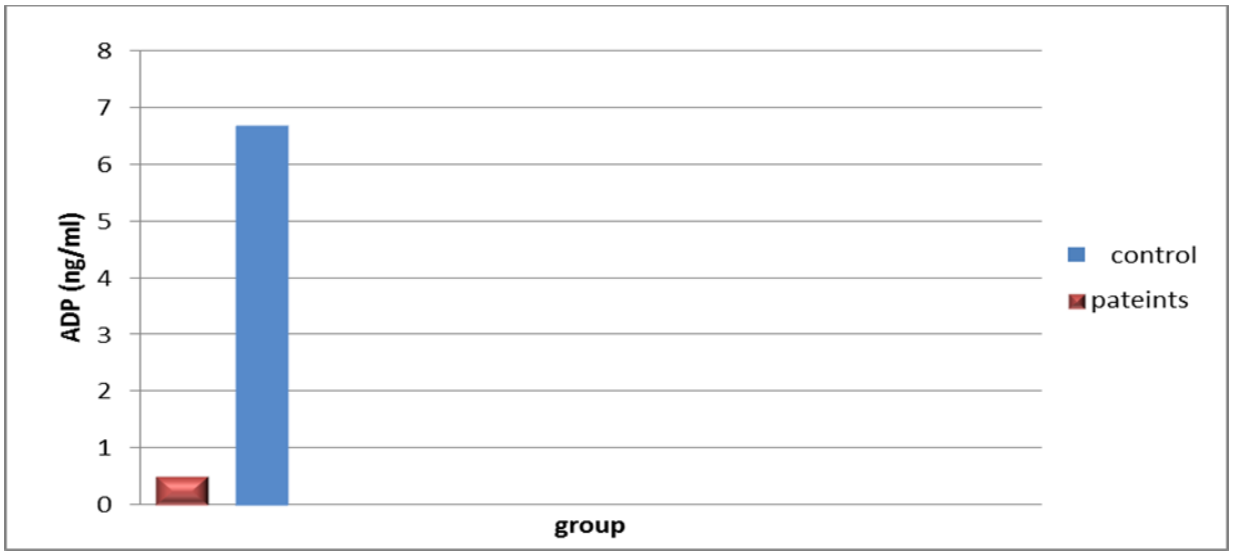

Figure 2: Controlling serum ADP levels and comparing them to breast cancer patient groups

Discussion

To This Day, Breast Cancer Remains The Most Common Kind Of Cancer That Affects Women All Over The World. According To Sharma, G. N., Et Al. (2010), It Is Estimated That Approximately 246,000 New Instances Of Carcinoma Of The Breast Would Be Discovered In The United States In The Year 2016, With Nearly 40,450 Deaths Resulting From The Disease.

Despite Significant Advancements In The Prognosis And Survival Rates Of Breast Cancer, It Continues To Be The Leading Cause Of Death From Cancer In Countries With Poor And Intermediate Incomes, With Over Fifty Percent Of Breast Cancer Fatalities Occurring In These Regions.(Smolarz, B., *Et Al* .,2022 , Rojas, K., & Stuckey, A. 2016).

In General, Serotonin Is Important For Many Vital Cellular Processes, Especially Those Involving Platelet Activation, Programmed Cell Death, And Cell Growth. (Jones, L. A.,*Et Al* ., 2020)

The Decrease In Aberrant (Cancerous) Cells Brought On By Toxic Treatment May Be The Cause Of The Serotonin Level Decrease Seen In Cancer Patients After Chemotherapy Or Radiation Therapy. As A Result Of This, This Reduction In Serotonin Concentration May Lead To Reduced “Vascularity” Of The Malignant Cells, Subsequently Increasing Necrosis And Ultimately Resulting In A Higher Mortality Rate Among Cancer Cells. (Gwynne, W. D., *Et Al*., 2021). “Adiponectin” Has Been Found To Have An Inverse Relationship With Estrogen Levels. Adiponectin's Ability To Change Circulating Estrogen Levels Makes It Reasonable That It Would Influence Breast Cancer Risk. Nalabou Et Al. (2014).

Many Studies Have Found A Higher Risk Of Breast Cancer Associated With Lowered Serum Adiponectin Levels.Jardé, T., Et Al. 2011; Grossmann, M. E., Et Al. 2008

A Few Years Later, Tabaan Et Al. In Baghdad, Iraq, Studied A Total Of 48 Breast Cancer Patients And 41 Healthy-Looking Controls. Studies Showed That Compared To The Control Group, Breast Cancer Patients Had Significantly Lower Serum Adiponectin Levels ($P< 0.001$), Suggesting A Negative Relationship Between The Two Variables And The Likelihood Of Breast Cancer.In A 2014 Study, Tabaan Et Al.

Conclusion:-

The Subsequent Conclusions Can Be Drawn From The Data Offered In This Study:When Contrasted With The Control Group, Serotonin, And "Adiponectin" Hormone Levels Are Observed To Be Lower In Breast Cancer Patients.

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