

Relation Between Hyperinsulinemia & Breast Cancer

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Abstract:- The relationship between Breast Cancer & Hyperinsulinemia is as related to oxidative stress factor, as breast cancer & Hyperinsulinemia helps in the progression of a Tumor, But it is not necessary that Hyperinsulinemia patient will always show Breast cancer symptoms and according to my Research , it indicates an insignificant Relation between Hyperinsulinemic Patient And Breast Cancer. But according to my research High BMI Patients are more Prone to Hyperinsulinemia. & reasons, Which cause breast cancer increases with high BMI & high chronic stress, with a high level of Hyperinsulinemia.

Introduction

Hyperinsulinemia, the word is divided from the prefix hyper-amia in the blood so Hyperinsulinemia literally means too much insulin in the blood. "It is often known as insulin resistance". Insulin is a natural hormone released into the blood by the Pancreas's response to food. Generally, insulin functions as a nutrient sensor because it shows the presence of carbohydrates & proteins in the body, which is able to either store the food & Convert the food into energy. It was studied that High insulin level increases the risk of cancer, as insulin is a hormone best known for glucose metabolism. In 1985 Dr. Lewis Canley discover PI3K Pathway. This pathway is seen to play an important role in cancer. PI3K was also found an one of the important oncogenes in human cancer causing mutation. High PI3K levels increase cell growth & promote cancer. Now PI3K was stimulated by insulin, as insulin hormone not only plays an important role in metabolism (how cells generate energy) but also regulate cell growth. PI3K provides a vital link between the nutrient sensing and the growth pathway. Insulin in the blood activate the receptor cells of the surface . although cancers carries many copies of the insulin receptor as insulin activates PI3K, it activates other two key pathways- a metabolic pathway and a growth pathway. Insulin also activates the MTOR system with the activation of PI3K MTOR System stimulates cells growth & proliferator.

In a rare genetic disease called Cowden syndrome, a mutation along this pathway results in increasing insulin signaling, which invaluablely increases the risk of obesity & cancers, Particularly one of the obesity-related cancer is breast

cancer & colon cancer, Hyperinsulinemia stimulates the growth of excessive proliferation. It has been studied that people with diabetes type 2 are likely to develop cancer & breast cancer. Excess fat during obesity surrounds internal organs which secretes some chemicals which sends signals, which activate more aggressive, initializing the cells to tumor growth & insulin resistance & Hyperinsulinemia. High level of insulin, typical to type 2 diabetes, can cause cancer because cells of cancer love glucose, as they are their primary fuel . (1930 Warburg effect) demonstrated that cancer cells consume & metabolize glucose at 200 times the normal rate. PTBT scans were based on the high glucose consumption area of the body. Approximately 18% of people with cancer have concurrent diabetes, insulin is one of the role players in the homeostatic regulation of blood glucose. Hyperinsulinemia can trigger cancer progression by several mechanisms and is sensitive towards IR/insulin growth factor GSC. Hyperinsulinemia also leads to elevated circulation of free estrogen.

Which in turn can act as a postcoital mitogen for estrogen-dependent cancer of the breast. Department of medical oncology and clinical biochemistry, Sher-e-kashmir institute of medical sciences made a study with 50 women, both pre & post menopausal controls, they found that metabolic syndrome (MS) also called insulin resistance syndrome, consisting of a constellation of metabolic abnormalities which include control obesity, hyperinsulinemia, hypertension, Low & High Hypotension etc. Metabolism plays an important role in breast carcinogens in the number of interrelated hormonal pathways including insulin, estrogen, cytokine & growth factor in research it is established that women with diabetes are at even greater risk, with a 27% higher likelihood of cancer than women without diabetes.

Foshiaki Ohkuma, (Ph.D.) the lead author of the study & a research fellow with the George institute for global health, states that during her study women with diabetes 2 or insulin resistance develop cancer and have a significantly high chance of developing Kidney, oral, Stomach, Liver Cancer. As glucose levels were also able to damage DNA and is a known cause of cancer. A study showed that insulin resistance bodies or diabetic bodies are ideal for cancer growth.

Dr. Monisha Sood an endocrinologist at Lenox Hill Hospital in New York City, told health line, both obesity and type 2 diabetes are associated with metabolic abnormalities that may promote cancer progressions, Sood added that the overall exister inflammation in people with any type of diabetes is a significant contributory factor. This inflammation can lead to insulin resistance within other bodily tissues & higher insulin levels may lead to an increase in

other hormones which can promote cell growth & cancer growth as well. Altogether, It is likely a combination of high blood glucose levels, and high insulin level with fastened growth factor (IGFI) action inflammatory environment in patients with diabetes & obesity leads to increased growth of cancer cells.

A consequence of insulin resistance is a metabolic disease that, (according to the latest data from the world health organization in 2014) affects 9% of the world's population, both in developed & developing syndrome was found in nearly 35% of Mitochondria and also helps in the oxidation of glucose. in the high nutrient environment. Due to an increased supply of glucose in higher sugar diets, mitochondria. Mitochondria become hyperactive & produce more of the natural by-products. ROS damages the infrastructure of the cell & induces, Stress responses, mitochondria are responsible for ROS to stimulate NF-KB, JNK, P3r Mark insulin receptor pathway & stress protein. Mitochondrial fission has been directly linked to insulin resistance in skeletal muscle. Any combination of increased growth factors or decreased growth factors will create disturbances in the cell death pathway at the molecular level cause cancer.

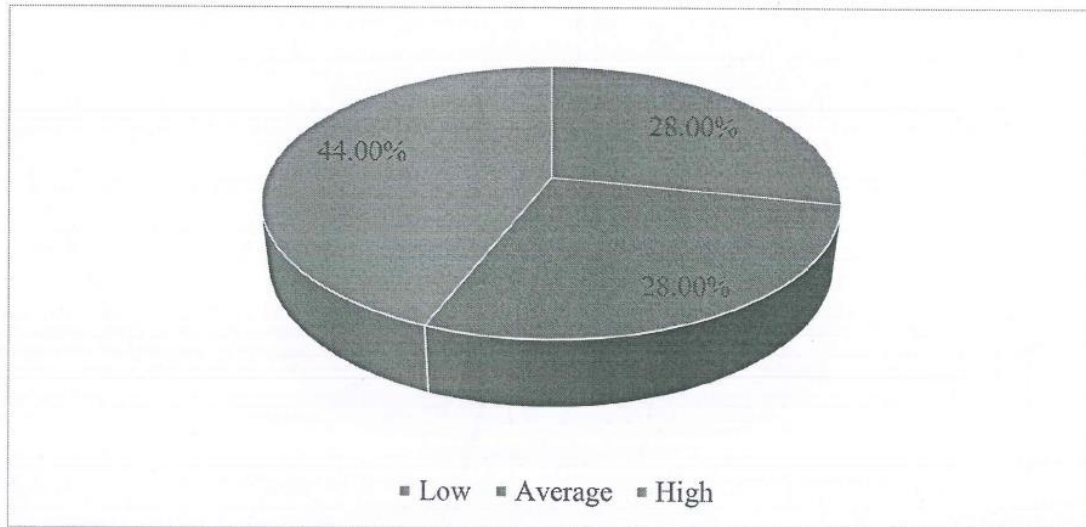
Nobel laureate otto Heinrich Warburg (1883-1970). He did specific research on cellular energetics, where he applied physical science to biology. According to him, normally cells generate energy in the form of adenosine triphosphate (ATP) in two different ways; Oxidative phosphorylation (OxPhos), also called respiration, and glycolysis also called fermentation OxPhos, which occurs in the mitochondria, burns each glucose molecule with oxygen to generate 36 ATP, without oxygen, normal cells resort to glycolysis, which generates only 2 ATP and two lactic acid molecule per glucose. when cell generating a lot of energy using Oxphos naturally requires more oxygen, cells grows rapidly (He model fertilized, Sca urchin eggs. He speculated that rapidly growing cancer cells also consume oxygen prodigiously But in 1923 he noticed that fast-growing rate of human cells used no more oxygen than regular cells, the cancer cells were instead using 10 times more glucose & producing lactic acid at 70 times the rate of normal issues. Despite the ready availability of oxygen, cancer cells were generating energy using the less efficient glycolysis pattern. This surprising process is referred as the Warburg effect. Warburg effect previously used for the common cancer imaging test the PET Scan. PET Scan measures how much glucose is being consumed by cells because cancer cells absorb the glucose much faster than normal surrounding cells & the PET Scan picks up those hot spots. Aerobic (glycolysis/glycolysis in the presence of lots of oxygen) is unique to cancer. According to Warburg hypothesis, cancer was caused

primarily by mitochondrial damages, cancer was not being forced to use glycolysis, it was, it efficiently generating energy (ATP) under conditions of scarcity, if there is a lot of glucose around them, One cell metabolizes glucose to 36 ATP, Cancer cells metabolize "Glucose molecules to 22ATP & 22 Lactic acids" because lactic acid can be commended to ATP one by to one this gives cancer a potential total of 44 ATP. Recent studies show that not only glucose, but cancer cells can metabolize fatty acids & amino acids cancer cells produce lactic aid during glycolysis & they dump that acid into their surrounding and Tumors are using previous energy to deliberated manufacture & pump more acid into their immediate surroundings which are already acidic, compared normal cells, which live in an environment with a pH of 7.2 - 7.4, as acidity give the cells, a huge survival advantage. Normal cells are injured in an acidic environment and undergo apoptosis while cancer cells to tolerate the acidity. Hyperinsulinemia has been shown to be resistant to chemotherapy in breast cancer, and hyperinsulinemia-induced oxidative stress leads to cancer progression. It has been seen insulin resistance of hyperglycemia is also seen in chronic stress development, during studies it was found that excess body given is associated with hyperinsulinemia and it may be a risk factor for tumors, including colon & breast cancer. Hyperinsulinemia affects breast cancer cells via the endocrine system.

In my research and according to the data of 50 breast cancer patients 14 (28%) respondents low level of hyperglycemia, 14 (28%) respondents average level of hyperglycemia & 22 (44%) respondents have a high level. The hyperglycemic problem although related to some extent to those having high BMI, but those having Hyperglycemia showed high levels of stress before they suffered from Breast Cancer due to the stress, then food habits sloping disorder occur which increased their weight & made than obsessed so the relation between the oxidative level of stress many forever give hyperglycemia/diabetes-2 but causing breast cancer is not completely in hyperinsulinemia, It's not necessary that all diabetic-2 or insulin resistance people will face cancer, specifically colon/breast.

Level of Hyperinsulinemia

Sr. No.	Score Range	Level	Number of Patients	Percentage (N=50)
1	0-7	Low	14	28%
2	8-14	Average	14	28%
3	15-20	High	22	44%

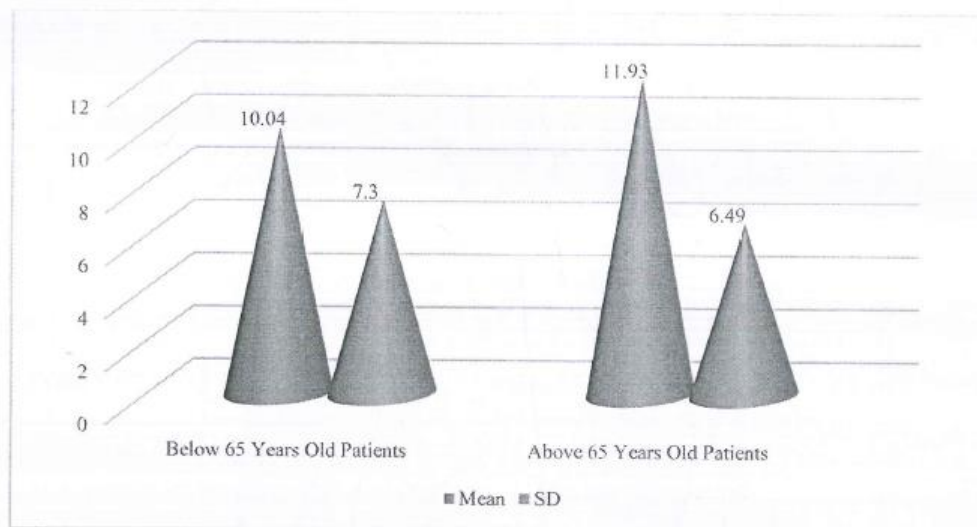


Level of Hyperinsulinemia
HYPERINSULINEMIA IN REFERENCE TO AGE

There is no significant difference between hyperinsulinemia in below 65 years old and above 65 years old breast cancer patients of Jaipur.

Significant Difference Between Hyperinsulinemia In Breast Cancer Patients of Jaipur In Reference To Their Age

Group	N	Mean	SD	t- value	P-Value $\alpha = 0.05$
Below 65 Years Old Patients	23	10.04	7.30	0.96	0.67
Above 65 Years Old Patients	27	11.93	6.49		



Significant difference between hyperinsulinemia in Breast Cancer Patients of Jaipur in reference to their age

Conclusion:- When We Observe Huperinsulinemia Patients with reference to Age Group of above and below 65, with the help of questionnaire and their medical report we score them : (0-7 – Low), (8-14 – Average), (15-20 – High) Percentage of Hyperinsulinemia after calculating t-square,SD, the result shows insignificant difference in the relation between the Hyperinsulinemic Patient below or Above 65 years of age, relation with Breast Cancer which give the result that it is not necessary Patient with High Level of BMI (May causes Hyperinsulinemia) but all Hyperinsulinemic patient is not have any sort of Cancer in them, As per my 50 Patients Data.