The Role of Adiponectin, Leptin, Soluble Leptin Receptor and Insulin-like Growth Factor in A Sample of Breast Cancer Iraqi woman

A thesis
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BY

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Abstract

Background:

Breast cancer (BC) is the most common cancer in women worldwide, according to the latest Iraqi Cancer Registry; BC is the commonest type of female malignancy, accounting for approximately one-third of the registered female cancers. Obesity has been consistently associated with increased risk of postmenopausal BC; in addition, obesity in women diagnosed with BC is associated with greater tumor burden and overall poorer prognosis for both pre and postmenopausal women. The implications of obesity and its association with cancer through hormonal mechanisms by which obesity may affect BC risk are not fully understood. Currently there are three core hypothesized molecular pathways that link obesity and BC: Increased estrogen, increased insulin and insulin–like growth factor , in addition to ,an autocrine, paracrine, and endocrine signaling from proteins secreted by adipocytes, although the main focuses of this thesis are the second and third pathways, they are all inextricably linked.

Objective:

The aim of this study was to investigate the relationship between serum levels of insulin like growth factor 1(IGF-1), insulin like growth factor binding protein 3 (IGFBP-3), leptin (Lp), adiponectin (ApN) and soluble leptin receptor (sOB-R) with breast cancer by studying the biochemical changes among three different groups: breast cancer, benign breast disease (BBD) and healthy women. In addition to, the evaluation of the association of these parameters with BC development according to body mass index (BMI) and menopausal status and evaluate the possibility of these biomarkers as screening tools in high-risk women.

Subjects and methods:

This study consists of three groups, the first group was composed of 48 women with breast cancer (23 with stage 1, 2 and 25 with stage 3) the diagnosis based on histopathological analysis, mean age was ($50.41\pm .76$)

and BMI (30± 0.72). In addition to two control groups; 15 women with benign breast disease (fibroadenoma) as control group 1 (C1) mean age (36.6±2.15) and 26 apparently healthy women as control group 2(C2) mean age (47.81±2.01), both matched for BMI of breast cancer patients. Venous blood specimen (5 ml) was withdrawn from each woman; sera were obtained by processing of clotting and centrifugation and kept frozen at -20°C until used to measure adiponectin, leptin, sOB-R, IGF-1and IGFBP-3 by utilizing specific ELISA kits.

Results:

Leptin, sOB-R, IGF-1 and IGFBP-3 levels were significantly higher in BC group as compared to C1 and C2 groups. Contrarily, adiponectin was significantly lower in BC cases compared with the controls. Regarding obesity and BC association, high serum levels of leptin and sOB-R were associated with breast cancer among obese while, an inverse association between adiponectin and breast cancer was observed. When incorporating menopausal status as covariant in data analysis, higher serum level of IGF-1 and sOB-R were associated with breast cancer in premenopausal women. While postmenopausal women were presented with higher serum level of leptin and lower serum level of adiponectin to be associated with breast cancer.

Conclusion:

High serum level of leptin, sOBR, IGF-1, IGFBP-3 and Low serum level of adiponectin were positively associated with the breast cancer in a sample of Iraqi women. As marker for menopausal status and its association with obesity, higher serum leptin and lower serum adiponectin were strongly associated with postmenopausal breast cancer and may have the potential to provide a diagnostic and screening aid in the future.