

Original Research Article

Levels of serum prolactin and estradiol hormone of pre-and postmenopausal women breast cancer in misan city –Iraq: Comparative studyMohammed Abdul-Mounther¹, Ali Abdul Aziz Al-shawi², Hanaa S. Khadem³, Mahdi M. Thuwaini⁴^{1,2}College of medicine, Misan Univ. Iraq³Ph.D. Physiology, Biology, College of science, Basra University⁴Ph.D. Pathology, College of Nursing, Thi-Qar University***Corresponding author**

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Abstract: Most of epidemiologic studies were suggested that hormones concentration in blood are associated with breast cancer and because of limited comparative data about breast cancer concerning Iraq, This study was conducted whether prolactin and estradiol level were associated with weighting as risk factor. However, the analysis include 58 cases of breast cancer (10 patients of premenopausal and 48 patient of post-menopausal) and 30 healthy women as control (15premenopausal. and 15 postmenopausal), with similar age range (22-≤ 50 years) were assessed for prolactin, estradiol and BMI. The study was declared significant increase prolactin as well as BMI in premenopausal group (p<0.001). Conversely, estradiol was decreased with increase age in the postmenopausal phase in comparison to the control. These data were indicated to important the prolactin and estradiol in breast cancer etiology of patients of misan city, southern of Iraq.

Keywords: BMI, postmenopausal, prolactin and estradiol.

INTRODUCTION

Developing of many types of cancer has declined in the world over the last thirty years with regard of the incidence of breast cancer globally has increased [1]. Furthermore, among women breast cancer remains one of the most common cancers. Though at the end of 2007 estimated 178,480 women are expected to be diagnosed with invasive breast cancer and 40.460 women will have died [2]. However, many factors have been implicated in the etiology of human breast carcinoma .In particular menses. Marital status [3] these factors are thought to operate through differences in hormonal status associated with pregnancy, menarche and the (pre and post-menopausal). Moreover, some of studies of animal model systems and human subjects support a role for both prolactin (PRL) and estrogens in the initiation and development of mammary tumors [4]. However, Prolactin is a peptide hormone responsible for growth and development of the normal human breast and also enhances proliferation, migration, and survival of human breast cancer cells in vitro [5]. A recent prospective study, high serum prolactin level of

premenopausal women was reported to be associated with increased risk of developing breast cancer [6].

Furthermore, high circulating levels of estradiol have also been associated with an increased risk of breast cancer [6]. Estradiol (17-beta-estradiol or E2), a steroid hormone derived from cholesterol, targets a variety of tissues, located in the female and male reproductive tracts, mammary gland, skeletal and cardiovascular systems. Among women, it is primarily synthesized from testosterone in the ovarian follicles, whereas among men, it is produced by the testes and extra glandular conversion of androgens [7]. However, estradiol synthesis normally declines after menopause. This lead to decreased vaginal lubrication and atrophy of the vaginal epithelium due to diminished genital vasocongestion. Still accumulated data about the role of prolactin and estradiol in human breast cancer are controversial. Besides, there is also firm evidence of a direct stimulatory effect of prolactin on mammary epithelial cells [8]. In addition, some epidemiological studies showing significant increase in serum prolactin concentrations in certain subpopulations of breast

cancer patients, whereas other studies did not confirm these findings [9].

In women ,40-50% of plasma estradiol (E2) is bound to the sex-hormone-binding globulin(SHBG) but 2-4% of the remainder is bound to albumin ,with the development of relevant laboratory technology, most attention has focused on evaluating whether the free ,non –protein bound fraction of plasma (E2) is higher in women with breast cancer than healthy women [10]. The other well –known breast cancer risk factors such as early menarche and late menopause have not been found to be associated levels of prolactin and estradiol in postmenopausal women because of limited data, particularly in different aged women. Current study was aimed to evaluate diagnostic usefulness of prolactin and estradiol in breast cancer patient and the relationship between its circulating concentrations.

The patients

A total of fifty–eight patients had malignant tumors at an early stage limited to the breast and regional lymph nodes have been studied .These patients were attending the breast cancer at Al Sadder general hospital in Amarah city–Southern of Iraq.

Experimental design

According to menopausal status the patients were divided depended on gynecologic unit of their cases history. Teen premenopausal cancer patients with mean age of 44±1.1 years and a mean body weight Of 57.8±1 Kg. Forty –eight postmenopausal cancer patients with a mean age of 59±1.4 years and mean body weight of 60.3±3Kg. The non-cancerous group was sub–divided in to a pre-menopausal sub-group of 15 women with a mean age of 38±2.2 years and mean body weight of 59±1.6Kg, besides postmenopausal

sub–group of fifteen women with a mean age (61±1) years and a mean body weight of 60.3±2.6Kg. Blood samples were taken before surgery a fast of at least 14 hrs. Samples were drawn in to lithium heparinized tubes and immediately chilled on ice, then centrifuged within 2hrs of collection and the serum stored at -20 Council analyzed.

Laboratory Assays:-

Prolactin and estradiol were estimated by microparticles enzyme immunoassay. Samples were assayed at the reproductive endocrinology unit laboratory of the college of medicine Misan University. The limit of detection was 0.6 mg/ml

Statistical analysis

Data obtained was analyzed by using student t-test by statistical packages for social significant at P≤0.01.

RESULTS

The results of the present study were appeared that the breast cancer patients have significantly higher BMI as compared to the control group. Furthermore, data of this study show a statistical significant linear trend for increasing prolactin level with increasing weight as well as body mass index (BMI)(P =0.01) table (2). However, the women who had premenopausal were appeared significantly higher prolactin levels than those who had postmenopausal and control groups (P≤0.001). Nonetheless, this study was observed presence a modest positive links between estradiol and breast cancer risk, for most subgroup Analysis the women for postmenopausal had slightly significant increased comparison with control groups (table2).

Table 1:- participant information for each data of study groups:

Menopausal statuses	No. of cases	No. of control	Age rang years
Premenopausal	10	15	40-≤50
Postmenopausal	48	15	22-45

Table2:-Show comparison of pre- and postmenopausal parameters values

Parameters	PRE.MC	POS.MC	PRE.MS	POS.MS
BMI(Kgm ⁻²)	22.7±4	23.6±4.6	27.2±6.2	26.8±5.1
Prolactin(ng/ml)	409±81	240±60	1112±27*	366±51
Estradiol	45±22	10±3.1	32.5±32.5	58 ±13*

All values expression by mean±SD, *highly significant at (P≤0.001)

DISCUSSION

A large number of studies have proved the importance of PRL and E2 development and function of mammary gland. Besides, the growth factors were also implicated in breast cancer pathogenesis. Since PRL and E2 may be present simultaneously in the tumor milieu, the hormones may potentially influence each other's action [11]. This study has demonstrated a marked elevation of serum prolactin and estradiol in all breast cancer patients for (post and pre-menopausal) in comparison with control. However, the higher BMI of the breast cancer patients as compared to the control and the significantly raised BMI level in the breast cancer patients during the pre-and post-menopausal period indicates a strong association between increased BMI and breast cancer risk. This observation is in line with the findings of previous studies [12, 13]. Although, some workers observe there n't associate had been reported [14], it has also been hypothesized that the adult weight gain or increased BMI is strong predictor of postmenopausal breast cancer risk [15].

However, this study was appeared that the results obtained for serum prolactin concentration showed that no significant changes in premenopausal in contrast to post-menopausal breast cancer patients. Furthermore, not all investigators observed at least modestly higher prolactin levels (examined primarily in the luteal phase) in women with a family history of breast cancer compared with women with no such history. This findings match with present study [16-18]. However, several studies among either adolescents or postmenopausal women, little if any relationship was observed according to family history of breast cancer [19, 20] through the of these reasons of those differences by menopausal status are not clear. Our justification, the relationship between PRL levels and specific gene mutation has not been assessed.

In addition, prolactin can enhance chemical transformation of breast epithelium and growth of established or transplanted mammary tumors. Anyhow, 40-50% of women plasma estradiol (E2) is bound to sex hormone-binding globulin (SHBG), but 2-4% of the remainder is bound to the albumin [21]. Recently attention was focused on measuring the distribution of E2 binding to proteins in blood. However, the fraction of plasma E2 is higher in women with breast cancer than healthy women, though E2 was considered to be freely diffusible into cells and biologically available to receptors in target tissue, this would further explanation the effect of body weight on breast cancer in old women. On the other hand, obesity is not only associated with decreased production of sex hormone

binding globulin [22]. Where results are showed significant increase in biologically active unbound from of estradiol ,but also result in the increased production of oestrone, which is produced by aromatization of androstenedione in peripheral adipose tissue .Therefore leads to an overall increase in the estradiol level which may promote the growth and metastatic potential of breast tumor in larger women [23].

Nevertheless, the present study was appeared that the premenopausal and control were matched on weight, where the average level of estradiol was don't differ, this finding is inconsistent with a study conducted by (England et.al., 1999) who found a 15% average elevation of total plasma oestrogen in small study consisting of 40-45year old patients [24]. During the postmenopausal phase of current study was demonstrated a significant increase in the level of estradiol in comparison to the control. This finding which in agreement with other studies [25], which suggested increased levels of estradiol in thus cases. It has been hypothesized that the risk of breast cancer is essentially determined by the intensity and duration of exposure of breast epithelium to menopausal oestrogen [26].

CONCLUSION:

In conclusion, with regard of the differences data of present study was indicated there is believed to exist between pre and postmenopausal cancer, but this observation requires further many investigation.

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