Relationship between estrogen hormone as risk factor and development of breast and endometrial cancer

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Abstract

Breast cancer is a complex disease and may be sub-divided into hormone-responsive [estrogen receptor (ER) positive] and non-hormone-responsive subtypes (ER-negative), and remains a common disease throughout the world and endometrial cancer is the most common gynecological malignancy.

This study aimed to detect the relationship between estrogen hormone as a risk factor and development of breast and endometrial cancer.

Out of (156) cases, only (62) cases of breast cancer depended upon data collection of patients and (94) cases with reports during from first of January to last of march 2014.

The result revealed that at the age (40-49) years was (38.3%), P<0.005 followed by the age (50-59) years (22%), P<0.005 ,so that the results were significant.

Ductal type of breast cancer recorded (86.8%) while lobular type recorded (13.1%).Left side of breast cancer recorded (56.36%) while right side (43.63%) .Endometrial cancer was recorded at the age (40-49) years (75%) followed by (50-59) years (12.5%) P<0.005, so it is significant.

It was concluded that the estrogen status effects on development of breast cancer mainly.

Keywords: Breast cancer ,estrogen, endometrial cancer

Introduction

Breast cancer is the second most common cancer in women worldwide[1].The connection between a woman's hormonal statuses and the risk of developing breast cancer has been discovered in 1713[2].

Human female breast under control of different hormone[3].The role of estrogen is central which is responsible for development of Ductal system where progesterone responsible for lobular development therefore; the etiology of breast cancer has strong hormonal component[1].

Women with a family history of breast cancer should obtain as much information as possible about those relatives, including age at onset and type of cancer[4] .The causes are still unknown, but there is probably a combination of factors including life style factors, environmental factors and hormone factors [5].

Estrogen hormone is one of hormones that regulate the menstrual cycle playing an special vital role in building up the blood rich lining of the uterus (endometrial) every month in preparation for pregnancy[1,2,6]. Approximately 70-80 % of tumor from postmenopausal women have estrogen receptor, 30-50% of tumor from premenopausal women have estrogen receptor positive[4].

Estrogen influence cells by interacting with nucleus, eliciting a cascade of Transcriptional regulatory activity, Breast cancer risk is enhanced by increasing Exposure to endogenous ovarian estrogen [1].

Estradiol effects target tissues by interacting with two nuclear hormone receptors called estrogen receptor α (ERα) and estrogen receptor β (ERβ) [7,8]. One of the functions of these estrogen receptors is gene expression. Once the hormone binds to the estrogen receptors, the hormone-receptor complexes then bind to specific DNA sequences, possibly causing damage to the DNA and an increase in cell division and DNA replication eukaryotic cells respond to damaged DNA by stimulating or impairing G1, S, or G2 phases of the cell cycle to initiate DNA repair as a result, cellular transformation and cancer cell proliferation occurs[9].

The aim of the study is to detect the relationship between estrogen hormone as a risk factor and development of breast and

endometrial cancer.

Materials and Methods

Out of (156) cases (148) cases are breast cancer including (62) cases of them depended upon only data collected directly from the patients without reports (Table 1), and (86) cases with either hormonal or histopathological reports, while the remain (8) cases are endometrial cancer reports. All of them were collected from (General Kirkuk & Azadi education) hospitals further than some special laboratories. The main methods which followed in this study to diagnose the breast and endometrial cancer are histopathological and Immmunohistochemical diagnosis.

Immunohistochemical reports were read depending upon Allred scoring system and histopathology reports on Tumor Node Metastasis (TNM) system.

Results

The study revealed that the incidence of breast cancer increased with the aggressive of the age significantly and showed that the incidence at the age (40-49) years was (33) cases (38.3%), ($P<0.005$) followed by the age (50-59) years (19) cases (22%), $P<0.005$ (table 2) .

Out of (86 cases) the study showed that the breast cancer have a high incidence in the menopause period (Table 3). Out (33 cases) of hormonal results showed that the levels of estrogen hormone receptors (ER) increased mainly (3-7) (ER) of (8 cases), ER levels as a high level in the age group (40-49) years in (13 cases) (39.3%) followed by age group (50-59) years with (3-7) ER levels in (6 cases) (18.1%), while in the age groups (30- 39 & 60-69) years (3-6) and (4-6)ER levels consequently in (3 cases) (9%) and only one case with 3 ER level (3%) (Table 3).

The study revealed that there are two main types of breast cancer included ductal and lobular types. Out of (38 cases) the ductal carcinoma was more dominant which account 33 case (86.8%) while lobular carcinoma account was5 cases (13.1%) while the remain 48 case were not recorded as ductal or lobular carcinoma (Table 4) .

This study revealed that the incidence in the left side was (31 cases) (56.36%)while the right side was (24 cases) (43.63%) and the difference between them was (12.73%).(Table 5).

Endometrial cancer according to age

The results showed the higher incidence of endometrial cancer was appeared in age

(40-49years) (75%) followed by one case in age (50-59 years) (12.5%) which means that the cases concentrated in menopause period. (Table 6).

Discussion

The study showed that a high incidence of breast and endometrial cancer concentrated in the menopause period in the age group 40-49 years and post menopause period in age group 50-59 years, which have significant value ($P<0.005$) to be agreement with [2,12,13] who recorded that Approximately 70-80 % of tumor from postmenopausal women have estrogen receptor, 30-50% of tumor from premenopausal women have estrogen receptor positive and according to [10] who reported that the breast cancer and endometrial cancer are influenced by endogenous and exogenous estrogens. Other studies that have reported the actual percentage of positive cells that stain for the estrogen receptor have ranged from less than 5% positive cells among premenopausal women [14] to 26% positive cells among postmenopausal women . Examination of presented by Khan et al. [15] for premenopausal women

The levels of estrogen receptors increased to reach the level +7 in the age group (40-49) years in 13 cases of 33 cases (39%) followed by the age group (50-59) years in 6 cases (18.1%) and this agreement with [2]who pointed that there is connection between a woman's hormonal statuses and the risk of developing breast cancer. This is agree with [16,17] who recorded that estrogen receptors must be present for estrogen to influence the biologic activity and increase the growth rates of breast epithelial cells.

The study also showed that 6 cases of 8 cases of endometrial cancer happened in group age 40-49 years which is the menopause period that include rising the positive estrogen levels, while just one case of endometrial cancer in each of groups (50-59 and 70-79) years, which indicate that estrogen hormone may play a role in the incidence of endometrial cancer[18] and this agreements with [6].

The study revealed that the ductal type of breast cancer was (86.8%) while the lobular type was (13.1%) accordance with [1] who reported that the role of estrogen is central which is responsible for development of Ductal system where progesterone responsible for lobular development therefore, and prolonged stimulation of breast ductal epithelium by estrogen, can contribute to the development and progression of breast cancer [11]. The result was accordance with [19] who recorded 75% of ductal carcinoma and 15% of laboular carcinoma.

The study showed that the left side breast cancer was (56.36 %), while the right side breast cancer was (43.63 %) and the difference between them was (12.73 %), because differences in breast size were considered a contributing factor. It has been suggested that the a symmetry of breast carcinoma reflects differences in the sensitivity of mammary glands to hormone stimulation, resulting unequal volume of tissue at risk to develop carcinom[20] this is agree with[21] .

The main conclusion was that the estrogen status effects on development of breast cancer mainly and there was relationship between estrogen hormone as a risk factor and development of breast cancer and endometrial cancer.

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Table 1: (Questioner) patients who have not reports illustrating the concerning of the breast cancer according to age:.

Age	Total number of case N=62	%
20-29	-	-
30-39	6	9.6
40-49	23	37
50-59	16	25.8
60-69	10	16.1
70-79	7	11.2

Table 2: Breast cancer incidence according to the age:

Age	Total N=86	Types of diagnosis		%
		Hormone diagnosis N/33	Histopathology diagnosis N/53	
20-29	2	1	1	2.3
30-39	11	3	8	12.7
40-49	33	15	18	38.3
50-59	19	6	13	22
60-69	15	7	8	17.4
70-79	6	1	5	6.9

Table 3:-Hormonal results according to immunohistochemical method .

Age	Hormone reports Positive result N/33	Estrogen Receptor level	%	Hormone reports Negative result N/33	Estrogen Receptor level	%
20-29	1	3	3	0	0	-
30-39	3	3-6	9	0	0	-
40-49	13	3-7	39.3	2	0-2	6
50-59	6	3-7	18.1	0	0	
60-69	3	4-6	9	4	0-2	12.1
70-79	0	0		1	0-2	3

Table 4: Types of breast cancer which is more dominant.

Age	*Type of breast Ductal types total /38*	*Types of breast Lobular types total/38*
20-29	*1*	*o*
30-39	*7*	*o*
40-49	*11*	*2*
50-59	*7*	*2*
60-69	*4*	*o*
70-79	*3*	*1*
%	*86.8*	*13.1*

Table 5: Demonstrate the site of breast cancer

Age	Left side Total /55	Right side Total /55
20-29	1	-
30-39	3	6
40-49	10	11
50-59	11	4
60-69	3	3
70-79	3	-
%	56.36	43.63

Table 6: Endometrial cancer according to age:

Age	Total N=8	%
20-29	-	-
30-39	-	-
40-49	6	75
50-59	1	12.5
60-69	-	-
70-79	1	12.5