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Relationship between Anthropometric Measurements and Survivors of Breast Cancer

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ABSTRACT

Introduction

In this study, we aimed to evaluate the correlation between anthropometric measurements and breast cancer survival.

Material & Methods

In this prospective study, we evaluated patients who underwent operation because of cancer within the last 3 years or patients with breast cancer diagnosed in postoperative histopathological examination. Patients were divided into four groups based on their body mass index (BMI) values.

Results

A total of 160 patients underwent surgery due to breast cancer. The mean age was 54.16 (21-88) years. The mean duration of follow-up was 51 months. Weight of the patients was found as ≤ 50 Kg in 7 patients, between 51-70 Kg in 51 patients, between 71-90 Kg in 51 patients, and > 90 Kg in 7 patients. The mean height was 158 cm. According to BMI classification, there was no statistically significant difference between the incidences of tumor/estrogen receptor ($p>0.05$). However, rate of tumor estrogen receptor positivity was increased with BMI.

Mortality occurred in 2 patients from tumor, and in 2 patient due to non-tumoral reasons. The mean overall survival was 125 months. The mean tumor free survival was 91.5 months. Whereas tumor free survival was better taller patients, no significant difference was found between tumor free survivals according to weight. Overall survival was better in patients with a high between 151-161 cm, compared to those with a height < 151 cm and the patients with a height > 161 cm.

Conclusion

There is an association between anthropometric measurements such as weight and height and breast cancer. Effects of toxins and carcinogens increase with the increase of adipose tissue.

KEYWORDS: Anthropometric, measurement, breast cancer, height, weight

Introduction

Breast cancer is the most common cancer type in women worldwide and the second common cause of deaths from cancer, and even the most common cause in some countries. Its incidence is increasing, and breast cancer is an important problem especially in Western countries. Many factors play an important role in the etiology. Some studies have associated breast cancer with body size (1, 2). Many studies have demonstrated a negative correlation in premenopausal women, and a positive correlation in postmenopausal women between the risk of breast cancer and a high body mass index BMI value, and most of these studies have been conducted in Western countries (3). In this study, we aimed to evaluate the correlation between anthropometric measurements and breast cancer survival.

Body Text

In this prospective study, we evaluated patients who underwent operation in our General Surgery Clinic because of cancer within the last 3 years or patients with breast cancer diagnosed in postoperative histopathological examination. In addition to follow-up in outpatient clinic, patients were called by phone to confirm their treatments and information. Patients were divided into four groups based on their body mass index (BMI) values. Group 1 consisted of patients with a BMI < 18 Kg/m2, Group 2 with a BMI value between 18-24 Kg/m2, Group 3 with a BMI

value between 25-35 Kg/m2, and Group 4 with a BMI value ≥ 35 Kg/m2. Patients were staged following 2010 TNM staging system published by the American Joint Committee on Cancer (AJCC).

Results

Patients were divided into four groups based on their BMI values. Patients with a BMI value < 18 Kg/m2 were grouped as Group 1, with a BMI value between 18-24 Kg/m2 as Group 2, with a BMI value between 25-35 as Group 3, and with a BMI value ≥ 35 Kg/m2 as Group 4. A total of 160 patients underwent surgery due to breast cancer. The mean age was 54.16 (21-88) years. The mean duration of follow-up was 51 (45-67) months. Twenty-one (18%) of the patients had a family history of breast cancer. Weight of the patients was found as ≤ 50 Kg in 7 patients (6%), between 51-70 Kg in 51 patients (44%), between 71-90 Kg in 51 patients (44%), and > 90 Kg in 7 patients (6%). The mean height was 158 cm. Height of the patients was < 150 cm in 15, 151-160 cm in 70, 161-170 cm in 29, and > 170 cm in 2 patients. According to the weight classification, there was a statistically significant correlation between Tumor/ER conditions ($p<0.05$). Tumor ER ratios were significantly lower in patients weighed ≤ 50 Kg.

The mean body mass index (BMI) value was found as 28.9 (17.3 – 41.1) Kg/m2. BMI value was ≤ 24 Kg/m2 in 24 (21%), between 25-35 Kg/m2 in 79 (68%), and ≥ 35 Kg/m2 in 13 (11%) patients. According to BMI classification, there was no statistically significant difference between the incidences of tumor/estrogen receptor ($p>0.05$). However, rate of tumor estrogen receptor positivity was increased with BMI (Table 1).

Table 1. Relationship between tumor estrogen receptor and BMI

Tumour ER	**BMI**			**p***
	18-25 (n=22)	25-35 (n=69)	>35 (n=12)	
	n (%)	n (%)	n (%)	
Negative	12 (%54,5)	14 (%20,3)	2 (%16,7)	0,005**
Pozitive	10 (%45,5)	55 (%79,7)	10 (%83,3)	

** Chi-sqare test* ***p<0,01*

Of patients with breast cancer, 52 (45%) were in premenopausal period and 64 (55%) were in postmenopausal period. Estrogen receptor was negative in 28 (24%) patients and positive in 75 (65%) patients. Progesterone receptor was negative in 31 (27%) patients and positive in 72 (62%) patients. Estrogen and progesterone receptors were not studied in 13 (11%) patients (Table 2). C-erbB2 was negative in 51 (44%) patients, positive or score 3 in 28 (24%) patients, score 1 in 1 (1%) patient, and score 2 in 13 (11%) patients. C-erbB2 was not studied in 23 (20%) patients. There were eight patients with triple negative.

Distant metastasis was found in 5 (4%) patients. Mortality occurred in 2 patients from tumor, and in 2 patient due to non-tumoral reasons. The mean overall survival (OS) was 125 (range: 6.5-184.3) months. The mean tumor free survival was 91.5 (range: 37.7-145.2) months. Whereas tumor free survival was better taller patients, no significant difference was found between tumor free survivals according to weight. Overall survival was better in patients with a high between 151-161 cm, compared to those with a height < 151 cm and the patients with a height > 161 cm.

Discussion

Besides breast cancer, anthropometric measurements are associated with all common cancer types including ovarian, prostate, and colon cancer (4). Increased risk of breast cancer with obesity has been attributed to that the rate of conversion of androgenic precursors into estrogens is increased by peripheral aromatization in adipose tissue (5). High levels of insulin and insulin like growth factor in response to obesity and increased estrogen levels increase the development and growth of cancer cells in women in pre- and postmenopausal periods (5, 6). There is an association between anthropometric measurements such as weight, height, and BMI and the risk of breast cancer. It has been reported that, besides increased risk for breast cancer, incidence of common cancer types such as ovarian and colon cancers increases in tall persons (1). Previous studies have proposed that taller women only in populations that had experienced significant caloric restriction in this century were at increased risk for breast (7). It has been suggested that in populations where nutritional insufficiency is not common, height is predominantly under genetic control, and thus height is unlikely to be associated with the development of breast cancer in these populations (8). Consistently with this opinion, height has not been found to be a strong predictor of breast cancer risk in most studies conducted in industrialized Western countries (8). Height was not associated with breast cancer among premenopausal women in some of these studies, although height predicted slight increases in the risk of breast cancer among postmenopausal women. In addition, in a study from the United States with a greater proportion of women at increased risk of malnutrition, women taller than 169 cm had a 90% higher risk of breast cancer than women shorter than 153 cm (9). In our study, the mean height of patients was 158 cm. Adiposity cause an increase in body adipose tissue, which is the source of toxin storage and carcinogens. Adipose tissue

play a role as endogenous estrogen production and storage. Therefore it increases the risk of breast cancer. There is evidence that free estrogen levels are increased in obese persons, and particularly in those with abdominal obesity (5, 10). In our study, no statistically significant difference was found between BMI classification and tumor estrogen receptor positivity ($p>0.05$). However, rate of tumor estrogen receptor positivity increased by BMI. In a randomized clinic study by Miriam et al., adiposity has been reported to have effect on long term survival in cancer patients. In our study, weight of the patients was found as ≤ 50 Kg in 7 patients (6%), between 51-70 Kg in 51 patients (44%), between 71-90 Kg in 51 patients (44%), and > 90 Kg in 7 patients (6%). High number of overweight patients in our study may be explained by that most of them were housewives, and in general women in our country have no sporting habit.

Conclusion

there is an association between anthropometric measurements such as weight and height and breast cancer. Effects of toxins and carcinogens increase with the increase of adipose tissue.

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