

Short Communications

Is Height of Prognostic Significance in Breast Cancer Cases?

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Abstract

Objective: The objective of this study was to investigate the correlation of height with prognosis and other prognostic factors in Turkish breast cancer cases. **Materials and Methods:** We retrospectively reviewed a total of 393 women aged between 26 and 88 years, diagnosed with stage 1-3 invasive ductal breast cancer, treated and followed-up in Kayseri Education and Research Hospital. **Findings:** The mean age at admission was 55.7 years; 77.6% were aged under 65, 56.7% were postmenopausal, 97.4% had undergone modified radical mastectomy, 47.3% were AJCC stage II, 36.8% N0, 46.0% grade II, 95.4% had received chemotherapy, 81.1% radiotherapy and 71.5% hormonotherapy. Height was under 151 cm in 20.8 %, 151-160 cm in 57.3 % and over 161 in 21.9 %. Follow-up duration differed between 0.3 and 195.3 months. Mean overall survival (OS) was 125.0 (65.6-184.3) months and progression free survival was 91.5 (37.7-145.2) months, with a tendency for better survival in taller individuals but no significant variation between height groups. The 5 and 10-year OS rates were 74.5% and 56.4%, and PFS rates were 64.5% and 49.2%. Regarding association of height with other prognostic factors, a significant correlation was found between height and AJCC stage ($p=0.011$) and estrogen status (ER) ($p=0.043$). **Conclusion:** In conclusion, overall survival was found to be longer in patients with a height between 151 and 160 cm than those under 151 cm and over 161 cm. The reason for not obtaining significant results might be a relatively small number of patients and lack of the evaluation of clinical and pathologic characteristics together with anthropometric measurements in the patient population. Further studies are warranted to clarify any association.

Keywords: Breast cancer- height- prognostic

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Introduction

Until today, numerous epidemiological studies have been carried out investigating height and the risk for development of breast cancer and many predictions have been made. There is an association regarding the risk for breast cancer tends to be higher in tall women, although reason for this link is yet to be (McEligot et al., 2008; Kabat et al., 2013; Zhang et al., 2015). In a meta-analysis performed on more than 5 million women (of whom 110,000 women had been diagnosed with breast cancer) each 10 cm increment in height has been observed to increase the risk for cancer by 17% (Zhang et al., 2015). A total of 62,328 women with breast cancer and 83817 control subjects have been evaluated. Each 10 cm increment in genetically predicted height was associated with 21-22% increase in the risk to get breast cancer (Zhang et al., 2015). Looking to the results from these epidemiological studies, it does not mean that all tall women will definitely get cancer. Although the factors associating height and breast cancer are not fully determined, many risk factors are thought to be effective on this association (Kabat et al., 2013).

With underscoring risk of height in development

of breast cancer, studies investigating effect of height on progression free survival and overall survival have become a current issue. Recent studies emphasized that anthropometric measurements including neck and waist circumferences and body mass index have prognostic features, although whether height independently influence prognosis is yet to be clarified. The objective of this study is to investigate the correlation of height with prognosis and other prognostic factors in total 393 women aged between 26 and 88 years, diagnosed with stage 1-3 invasive ductal breast cancer and followed-up and treated in Kayseri Education and Research Hospital.

The mean age at admission was 55.7 of the patients; 77.6 % aged under 65, 56.7 % were postmenopausal, 97.4 % undergone modified radical mastectomy, 47.3 % were AJCC stage II, 36.8 % N0, 46.0 % grade II, 95.4 % received chemotherapy, 81.1 % radiotherapy and 71.5 % hormonotherapy. Height was under 151 cm in 20.8 %, 151-160 cm in 57.3% and over 161 in 21.9% of patients (Table 1). Follow-up duration differed between 0.3 and 195.3 months. Mean overall survival (OS) was found as 125.0 (65.6-184.3) months and progression free survival (PFS) as 91.5 (37.7-145.2) months. The rates of 5 and 10-year OS were found as 74.5% and 56.4%, and PFS as

Table 1. Patient and Tumor Characteristics According to Their Pretreatment Height (n=393)

Patient and tumour characteristics	Height (<151 cm)	Height (151-160cm)	Height (>160 cm)	P value (<0.05)
Age (years)				0.214
<65	58	177	70	
=>65	24	48	16	
Menopausal status				0.429
premenopausal	29	96	42	
postmenopausal	52	128	43	
Tumor localization				0.854
right	43	115	47	
left	39	110	39	
AJCC stage				0.011
stage I	3	30	16	
stage II	48	107	31	
stage III	31	88	39	
Tumor size				0.078
I	7	49	21	
II	57	132	42	
III	12	29	16	
IV	6	15	7	
Lymph node status				0.13
0	39	74	32	
I	21	70	18	
II	12	47	24	
III	10	34	12	
Histologic grade				0.525
I	16	43	21	
II	43	100	38	
III	20	60	19	
ER status				0.043
positive	37	73	40	
negative	41	147	43	
unknown	4	5	3	
PR status				0.072
negative	37	95	27	
positive	38	123	55	
HER2				0.387
positive	22	58	21	
negative	52	158	59	
Perinodal involvement				0.669
no	32	78	28	
yes	50	146	58	
Lymphovascular invasion				0.918
no	29	71	29	
yes	52	149	56	

Table 1.Continued

Patient and tumour characteristics	Heigh (<151 cm)	Height (151-160cm)	Height (>160 cm)	P value (<0.05)
Surgery				0.535
mastectomy	79	221	83	
lumpectomy	3	4	3	
Chemotherapy				0.562
yes	80	213	82	
no	2	12	4	
Radiotherapy				0.583
yes	13	42	19	
no	69	183	67	
Hormonotherapy				0.129
yes	48	162	59	
no	29	56	22	

64.5%and 49.2%.

Looking at the association of height with other prognostic factors, a significant correlation was found between height and AJCC stage and estrogen status (ER) (Table 1). When OS and PFS were assessed according to height, it was found that mean OS was 82.8 and PFS was 86.9 months in cases with height <150 cm; 160.3 and 86.1 months in cases with height of 151-160 cm; 128.4 and 125.9 months in cases with >161, respectively.

When in the present study, association of height with other clinico-pathologic factors was examined, a significant correlation was found with stage and estrogen receptor. Although OS was found to be better in patients with a high between 151 and 160 cm than those under 151 cm and over 161 cm, the difference did not reach to statistical significance. Studies report that growth and insulin-like growth factor (IGF1) hormones, genetic, life style and environmental factors impact the effects of height both on the risk for breast cancer and survival. Furthermore, at the cellular level tall people are thought to have more cells, thus the risk for unnatural cell division, namely development of cancer cells may play a role in this condition (McEligot et al., 2008; Kabat et al., 2013; Kawai et al., 2014; Zhang et al., 2015). IGF-1 regulates growth both in utero and in childhood. Furthermore, it may present mitotic effect in patients with breast cancer, causing poor prognosis (Zhang et al., 2015). Increased serum level of estrogen may cause increase frequency of both DNA mutation and mitosis, playing a role initiation and progression of breast cancer. In addition, endogenous estrogen which is a hormone playing a central role in the etiology of breast cancer influence timing of puberty, thus affecting height. A positive correlation was found between height and the risk of breast cancer in postmenopausal women, while no such a link was established in premenopausal women (Kabat et al., 2013; Zhang et al., 2015). Looking to anthropometric measurements, in our previous study OS was found to be statistically significantly longer in breast cancer patients with a normal body mass index compared to the low weight and obese patients groups (Cihan, 2014). McEligot et al studied

anthropometric measurements (weight and height) on breast cancer patients. The authors found that, overweight was significantly correlated with clinicopathologic/prognostic factors of cancer and suggested that etiologic factors that could be associated with trends, incidence and survival of cancer should be monitored (McEligot et al., 2008).

In conclusion, overall survival was found to be longer in patients with a height between 151 and 160 cm than those under 151 cm and over 161 cm. The reason to not obtain a significant result might be explained by the small number of patients and lack of the evaluation of clinical and pathologic characteristics together with anthropometric measurements in patient population. Further studies are warranted to clarify this association.

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