



Original article

Men and women show similar survival outcome in stage IV breast cancer



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ABSTRACT

Purpose: To evaluate the clinicopathological features, patterns of distant metastases, and survival outcome between stage IV male breast cancer (MBC) and female breast cancer (FBC).

Methods: Patients diagnosed with stage IV MBC and FBC between 2010 and 2013 were included using the Surveillance, Epidemiology, and End Results program. Univariate and multivariate Cox regression analyses were used to analyze risk factors for overall survival (OS).

Results: A total of 4997 patients were identified, including 60 MBC and 4937 FBC. Compared with FBC, patients with MBC were associated with a significantly higher rate of estrogen receptor-positive, progesterone receptor-positive, unmarried, lung metastases, and a lower frequency of liver metastases. Univariate and multivariate analyses showed no significant difference in OS between MBC and FBC. In the propensity score-matched population, there was also no difference in survival between MBC and FBC. Multivariate analysis of MBC showed that OS was longer for patients aged 50–69 years and with estrogen receptor-positive disease.

Conclusions: There was no significant difference in survival outcome between stage IV MBC and FBC, but significant differences in clinicopathological features and patterns of metastases between the genders.

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1. Introduction

Male breast cancer (MBC) is a rare breast cancer subtype, accounting for 1% of all breast cancer [1]. More than 40% of MBC patients were presented with advanced stage at the initial diagnoses, including larger tumor size and higher risk of lymph node involvement. This was most likely due to the absence of routine screening, delayed identification of the disease, and anatomical differences that predispose to local invasion in MBC [2–4].

Compared with female breast cancer (FBC), MBC has different clinicopathological features, including older age, lower tumor grade, estrogen receptor (ER)/progesterone receptor (PR)-positive

status, and advanced stage [5–9]. The survival outcome between MBC and FBC remains controversial. Some studies have found that MBC has poor survival compared with FBC [9–12]. In contrast, several population-based studies showed similar survival between the genders [13–15]. Approximately 7–10.9% of MBC patients presented with stage IV disease at the initial diagnosis, which was higher than that in FBC (4.9–5.6%) [5,7,8]. In this study, we used the dataset from the Surveillance, Epidemiology, and End Results (SEER) program to evaluate the clinicopathological features, patterns of distant metastases, and survival between patients with stage IV MBC and FBC.

2. Materials and methods

2.1. Patients

Patients diagnosed with stage IV MBC and FBC between 2010 and 2013 were included based on the SEER program database [16].

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The SEER program, which is maintained by the National Cancer Institute and covers approximately 28% of the cancer cases in the United States population. We included patients who met the following inclusion criteria: 1) positive histologically confirmed primary breast cancer; 2) stage IV disease at initial presentation; 3) complete data for demographic and clinicopathological features, local treatment, and sites of distant metastases. The ethics committees of the First Affiliated Hospital of Xiamen University and Sun Yat-sen University Cancer Center approved this study.

2.2. Demographic and clinicopathological variables

The following demographic and clinicopathological variables

were included: age, race, tumor grade, tumor size, lymph node status, ER/PR status, human epidermal growth factor receptor-2 (HER2) status, marital status, and local treatment. The sites of distant metastases, including bone, brain, liver, and lung, were also included. The primary study endpoint of this study was overall survival (OS).

2.3. Statistical analysis

Propensity score matching analysis was performed using logistic regression for each patient with the following variables: age, race, tumor grade, tumor size, lymph node status, ER/PR status, HER2 status, marital status, local treatment, and sites of distant

Table 1
Patient characteristics.

Variable	All				PSM			
	n	Male (%)	Female (%)	p	n	Male	Female (%)	p
Age (years)								
≤49	1196	7 (11.7)	1189 (24.1)	0.056	14	7	7 (11.7)	0.733
50–69	2560	33 (55.0)	2527 (51.2)		62	33	29 (48.3)	
≥70	1241	20 (33.3)	1221 (24.7)		44	20	24 (40.0)	
Race								
White	3815	43 (71.7)	3772 (76.4)	0.117	87	43	44 (73.3)	0.222
Black	816	15 (25.0)	801 (16.2)		25	15	10 (16.7)	
Other	366	2 (3.3)	364 (7.4)		8	2	6 (10.0)	
Histological subtype								
IDC-NOS	3933	51 (85.0)	3882 (78.6)	0.023	—	—	—	—
LC-NOS	429	0 (0)	429 (8.7)		—	—	—	
Mixed	326	3 (5.0)	323 (6.5)		—	—	—	
Other	309	6 (10.0)	303 (6.1)		—	—	—	
Grade								
G1–2	2476	30 (50.0)	2446 (49.5)	0.944	58	30	28 (46.7)	0.715
G3–4	2521	30 (50.0)	2491 (50.5)		62	30	32 (53.3)	
Tumor size (cm)								
≤2	816	8 (13.3)	808 (16.4)	0.235	18	8	10 (16.7)	0.825
2–5	2371	35 (58.3)	2336 (47.3)		67	35	32 (53.3)	
>5	1810	17 (28.3)	1793 (36.3)		35	17	18 (30.0)	
Nodal status								
Node negative	1141	14 (23.3)	1127 (22.8)	0.926	28	14	14 (23.3)	1
Node positive	3856	46 (76.7)	3810 (77.2)		92	46	46 (76.7)	
ER status								
Negative ^a	1222	5 (8.3)	1217 (24.7)	0.003	9	5	4 (6.7)	1
Positive	3775	55 (91.7)	3720 (75.3)		111	55	56 (93.3)	
PR status								
Negative ^a	1918	10 (16.7)	1908 (38.6)	0.001	18	10	8 (13.3)	0.799
Positive	3079	50 (83.3)	3029 (61.4)		102	50	52 (86.7)	
HER2								
Negative ^a	3761	48 (80.0)	3713 (75.2)	0.392	91	48	43 (71.7)	0.394
Positive	1236	12 (20.0)	1224 (24.8)		29	12	17 (28.3)	
Marital status								
Single	2625	23 (38.3)	2602 (52.7)	0.027	46	23	23 (38.3)	1
Married	2372	37 (61.7)	2335 (47.3)		74	37	37 (61.7)	
Treatment								
Surgery	1133	18 (30.0)	1115 (22.6)	0.174	41	18	23 (38.3)	0.09
Radiotherapy	894	7 (11.7)	887 (18.0)		22	7	15 (25.0)	
Both	1004	16 (26.7)	988 (20.0)		26	16	10 (16.7)	
Neither	1966	19 (31.7)	1947 (39.4)		31	19	12 (20.0)	
Bone								
No	1522	15 (25.0)	1507 (30.5)	0.355	32	15	17 (28.3)	0.837
Yes	3475	45 (75.0)	3430 (69.5)		88	45	43 (71.7)	
Brain								
No	4657	58 (96.7)	4599 (93.2)	0.436	116	58	58 (96.7)	1
Yes	340	2 (3.3)	338 (6.8)		4	2	2 (3.3)	
Liver								
No	3667	54 (90.0)	3613 (73.2)	0.003	105	54	51 (85.0)	0.582
Yes	1330	6 (10.0)	1324 (26.8)		15	6	9 (15.0)	
Lung								
No	3404	30 (50.0)	3374 (68.3)	0.003	65	30	35 (58.3)	0.360
Yes	1593	30 (50.0)	1563 (31.7)		55	30	25 (41.7)	

ER, estrogen receptor; G1, well-differentiated; G2, moderately differentiated; G3, poorly differentiated; G4, undifferentiated; HER2, human epidermal growth factor receptor-2; IDC-NOS, infiltrating duct carcinoma not otherwise specified; LC-NOS, lobular carcinoma not otherwise specified; PR, progesterone receptor; PSM, propensity score matching.

^a Including patients with borderline results.

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