PS1-09-10: Effect of Primary Breast Surgery on Prognosis in Breast Cancer Patients with Isolated Bone Metastases

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Background

Breast cancer patients presenting with isolated bone metastases represent a distinct subgroup with relatively favorable prognosis compared to those with visceral metastases. The role of primary breast surgery in this population remains controversial, with limited consensus on its impact on survival outcomes. Clarifying the prognostic effect of surgical intervention on the primary tumor may guide optimal treatment strategies. In this study, we evaluated the impact of primary breast surgery on survival prognosis and other prognostic factors in patients with isolated bone metastases.

Methods and Materials

This retrospective study analyzed data from the Surveillance, Epidemiology, and End Results (SEER) database, including patients with isolated bone metastatic breast cancer, between 2000 and 2021. Relevant demographic and clinicopathological variables were extracted to assess their association with overall survival. Survival analyses were conducted using Kaplan-Meier estimates, and independent prognostic factors were identified through multivariate Cox proportional hazards modeling.

Results

A total of 6,500 patients were identified who met the study criteria. 3398 (52.3%) of the patients were under the age of 65. Breast cancer subtype rates were determined as follows: HR+/HER2- (77.2%), HR+/HER2+ (12.8%), HR-/HER2- (6.5%), and HR/HER2+ (3.5%). All patients had at least one bone metastasis, and there were no other metastases, including distant lymph node metastasis. Surgery was performed in 1513 patients (23.4%). The number of patients who received breast radiotherapy was 124 (1.9%), and the rate of patients who received chemotherapy was 62.8%. The 5-year survival rate was found to be statistically significantly higher in the patient group who underwent surgery (59.5% versus 38.6%) ($p<0.001$). Other factors were evaluated in terms of prognosis, including age ($p < 0.001$), gender ($p = 0.184$), race ($p < 0.001$), origin ($p = 0.331$), histopathological subtype ($p < 0.001$), radiotherapy ($p < 0.001$), and chemotherapy ($p < 0.001$). Multivariate analysis confirmed that breast surgery had a statistically significant effect on overall survival ($p < 0.001$, HR: 0.40).

Table 1. Baseline Characteristics of the population

Characteristic	n	%
Gender		
Male	96	1.5%
Female	6404	98.5%
Age group (years)		
<65	3398	52.3%
≥65	3102	47.7%
Race		76.5%
White	5095	78.4%
Asian or Pacific Islander	510	7.8%
Black	796	12.2%
Other	99	1.5%
Hormonal Status		
HR+/HER2-	4515	76.5%
HR+/HER2+	748	76.5%
HR-/HER2-	381	76.5%
HR-/HER2+	205	76.5%
Surgery		
Yes	1513	23.3%
No	4960	76.3%
Radiotherapy		76.5%
Yes	124	1.9%
No/Unknown	6376	98.1%
Chemotherapy		
Yes	4083	62.8%
No/Unknown	2417	37.2%

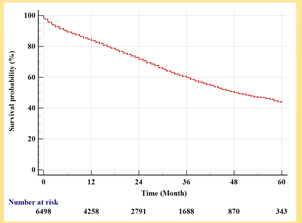


Figure 1. General survival outcomes in breast cancer patients with isolated bone metastases

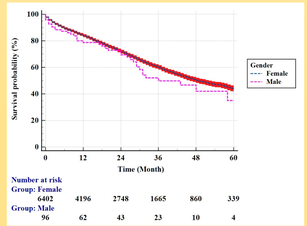


Figure 2. . General survival outcomes in breast cancer patients with isolated bone metastases by gender

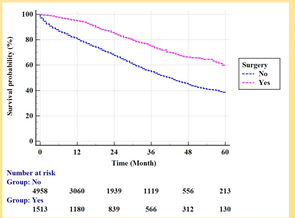


Figure 5. Impact of surgery on survival in breast cancer patients with isolated bone metastases

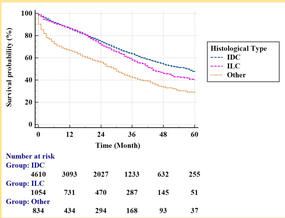


Figure 6. Survival outcomes among breast cancer patients with isolated bone metastases stratified by histologic subtype

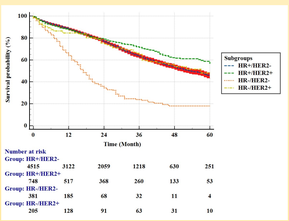


Figure 3. Survival of breast cancer patients with isolated bone metastases according to hormone receptor status

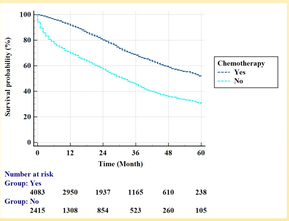


Figure 4. Impact of chemotherapy on survival in breast cancer patients with isolated bone metastases.

Conclusion

Isolated bone metastatic breast cancer is a special subtype in disease presentation. In recent years, new drugs that improve survival compared to chemotherapy have been introduced in breast cancer, and primary breast surgery should also be considered in selected patients with isolated bone metastatic breast cancer.

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