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REVIEW

The Epidemiology of Bone Metastases in Malignant Diseases

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Introduction

Cancer is a serious health problem leading to death most frequently after cardiovascular diseases. Due to the advancements in the diagnosis and treatment, survival in malignant diseases has improved considerably; today, cancer is considered to be a treatable and controllable chronic disease. Despite these favorable advancements, cancer patients develop metastasis, which has a lifetime negative effect on the quality of life.

The preliminary data on the frequency of bone metastasis development was obtained from post-mortem studies. According to the data, bone metastasis frequency was 73% in breast cancer, 68% in prostate cancer, 42% in thyroid cancer, 35% in renal cell carcinoma, 36% in lung cancer, and 5% in gastrointestinal cancer.[1,2]

The malignant diseases most commonly causing bone metastases are breast cancer in women, and prostate and lung cancer in men. These are followed by renal cell tumors and malignant melanoma. In a study performed using electronic health records of patients, the 10-year bone metastasis incidence was 29.2% in prostate cancer, 8.1% in breast cancer, 12.9% in lung cancer, 9.9% in renal cell carcinoma, and 3.0% in malignant melanoma. When the occurrences of all the cancers were combined, the rate was 8.4%. In the same study, the 10-year bone metastasis incidence at the metastatic stage was found to be increased to 70.7% in prostate cancer, 61.4% in breast cancer, 26.2% in both lung cancer and renal cell carcinoma, and 10.4% in malignant melanoma; the combined rates of all the cancers was 27.6% (Fig. 1).[3]

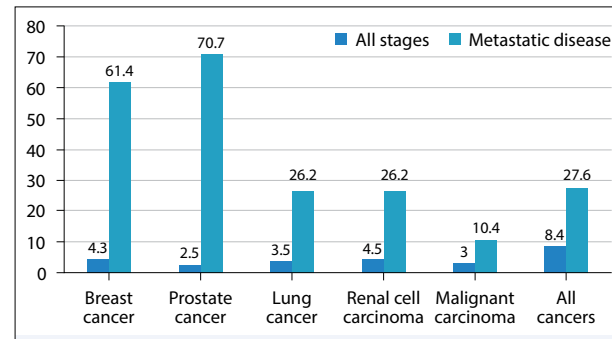

Fig. 1. The incidence of bone metastases over 10 years (%) at all stages and the metastatic disease.

The frequency of bone metastasis at the first diagnosis was the highest for small-cell lung cancer followed by non-small cell lung cancer, renal cell carcinoma, prostate cancer, and breast cancer. The frequency of bone metastasis at the metastatic stage, as stated above, was found to be the highest for prostate cancer, followed by breast, lung, and renal cell cancers.[4]

When data outside of the United States was considered, studies from the United Kingdom, Denmark, and Canada did not show notable differences in the incidence of bone metastases among similar disease groups.[5-8]

When the relationship of bone metastases with age was considered, median age was found to be 65 years in patients with bone metastases. On the other hand, the median age was 72 in prostate cancer patients and 62 in breast cancer patients. This difference was considered to be related to the median age of onset of primary disease.[3]

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In general, the rates of bone metastases in the studies from Turkey were found to be between 9.9% and 27.5%.

Unlike western countries, the frequency ranks were 27.5%, 24.5%, and 4.5% for lung, breast, and prostate cancers, respectively. The difference was probably caused by the inter-country difference in the incidence of these cancers. While prostate cancer ranks first in Western countries, lung cancer ranks first in our country. The median age for bone metastasis development was found to be 57 years, which was probably associated with the lower age of cancer diagnosis in Turkey.[9]

Previous studies from our country had found that the incidence of bone metastasis development was similar to lung cancer (28.4-39.0%), breast cancer (14.3-25.5%), prostate cancer (11.0-14.5%), and gastric cancer (3.8%).[10-13] When the correlation between sex and bone metastasis was analyzed, it was found that bone metastases are more common in men. This might be because cancers with frequent bone metastasis development, such as prostate and lung cancer, are more common in males.[14]

Skeletal-related events constitute the morbidity of bone metastases. Pathological fractures, radiotherapy for bone metastases, surgical approaches for bone metastases, and spinal cord compression are defined as skeletal-related events. In a study on this subject, the 24-month cumulative incidence of the development of skeletal-related events was found to be 54.2%, 47.7%, and 41.9% in breast, lung, and prostate cancers, respectively.[15]

Additional morbidities (pain, movement restriction, etc.) caused by the development of bone metastases and skeletal-related events have indirect negative effects on survival, with considerable negative effects on the quality of life. The survival periods after bone metastasis development were found to be 19-25 months in breast cancer, 12-53 months in prostate cancer, 6-7 months in lung cancer, 6-12 months in other urological cancers, and 6 months in malignant melanoma.[16]

Bone metastases usually cause skeletal-related events in the early stages of advanced diseases and negatively affect the quality of life. Skeletal-related events pose an additional burden on patients with different problems at the metastatic stage (Fig. 2).[17-21]

Thus, the determination of the risk of bone metastasis development in cancer patients, identifying the problems, and performing necessary treatment will help us combat cancer and improve the quality of life.

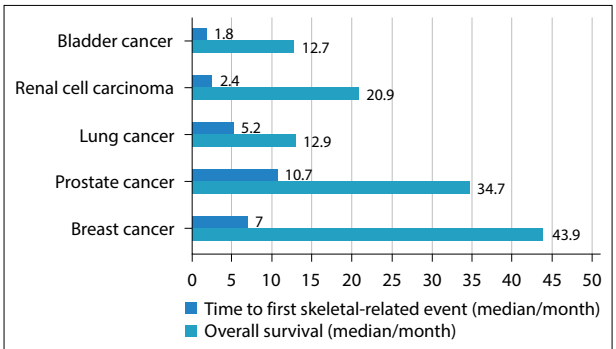

Fig. 2. The correlation between the first occurrence of skeletal-related events and overall survival.

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