



The analysis of operative metastatic tumors in the skeleton İskelet sistemi tutulumu nedeniyle cerrahi tedavi edilen metastatik tümörlerin analizi

Alper Cirakli¹, Nevzat Dabak², Hasan Gocer²

¹Kayseri Research and Training Hospital, Orthopedic and Traumatology Clinic, Kayseri, Turkey

²Ondokuz Mayıs University Faculty of Medicine Department of Orthopedic and Traumatology, Samsun, Turkey

Abstract

Objective: The purpose of the study was to examine the cases followed and surgically treated due to metastatic bone tumor with skeletal system involvement.

Materials and Methods: 209 cases who were followed and surgically treated due to metastatic bone tumor with skeletal system involvement between January 1987 and January 2012 were examined retrospectively. The cases which did not receive surgery were not included. The cases were evaluated in terms of age, gender, localization and primary focus. The data obtained were analyzed through SPSS 15.0.

Results: Of the 209 cases, 122 (58.4%) were men, while 87 (41.6%) were women and the average of ages was 59.2. 61 (29.2%) of the tumors were located in proximal femur, 44 (21.1%) in femur shaft, 39 (18.7%) in pelvis and 31 (14.8%) in humerus. Of the metastatic tumors, 70 (33.5%) were found to originate from lungs while 36 (17.2%) were found to originate from breasts and primary was not observed clearly in 58 (27.7%).

Conclusion: Metastatic tumors are most common in spine, then pelvis, upper and lower extremity bones proximal and ribs. We are of the opinion that gathering such studies from centers which perform bone and soft tissue tumor surgery and forming wider series will provide significant information in terms of public health.

Keywords: Orthopedic Oncology; Metastasis; Analysis.

Öz

Amaç: Kliniğimizde iskelet sistemi tutulumlu metastatik kemik tümörü nedeniyle takip ve cerrahi tedavi edilen olguların incelenmesi amaçlandı.

Gereç ve Yöntemler: Ocak 1987-Ocak 2012 yılları arasında iskelet sistemi tutulumlu metastatik kemik tümörü nedeniyle takip ve cerrahi tedavi edilen 209 olgu retrospektif olarak incelendi. Cerrahi uygulanmayan olgular çalışmaya dahil edilmedi. Olgular yaş, cinsiyet, lokalizasyon ve primer odak açısından değerlendirildi. Elde edilen veriler SPSS 15.0 sistemine aktarılarak analiz edildi.

Bulgular: 209 olgunun 122'si (%58.4) erkek, 87'si (%41.6) kadın ve yaş ortalaması 59.2 idi. Tümörlerin 61'i (%29.2) femur proksimalinde, 44'ü (%21.1) femur cisminde, 39'u (%18.7) pelviste, 31'i (%14.8) de humerusta yerleşmiş idi. Metastatik tümörlerin 70'inin (%33.5) akciğer, 36'sının (%17.2) meme kaynaklı olduğu saptanırken, 58'inde (%27.8) ise primerinin net belirlenemediği gözlemlendi.

Sonuç: Metastatik tümörler en sık omurgada daha sonra pelviste, üst ve alt ekstremitelerde kemikleri proksimalinde ve kaburgalarda görülür. Yine de bu tip çalışmaların kemik ve yumuşak doku tümörleri cerrahisi yapılan merkezlerden toplanarak daha geniş serilerin oluşturulmasının halk sağlığı açısından önemli bilgiler sağlayacağını düşünüyoruz.

Anahtar Kelimeler: Ortopedik Onkoloji; Metastaz; Analiz.

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Correspondence/İletişim

Alper Cirakli
Kayseri Research and Training
Hospital, Orthopedic and
Traumatology Clinic, Kayseri,
Turkey
E-mail: alperomu@gmail.com

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INTRODUCTION

Since cancer and the metastases caused by cancer are among the reasons for death, they are seen as an important medical and social problem. About 25% of primary cancer cases tend to cause metastasis (1). Bone is the most frequent metastasis area in the body after lung and liver (2). When all these are considered, bone metastases have an important place in orthopedic practice. The organs which spread metastasis to the bone most frequently are breast, prostate, thyroid, gastrointestinal system and kidney (1). These metastases that form involve the spine most frequently in the skeletal system. Apart from the spine, they involve femur (61%) most frequently and the pertrochanteric area of the tumor (70-80%) (3-5). This involvement in the femur generally makes the patient bound to bed and this situation increases morbidity and mortality.

In orthopedic surgery, the purpose of treatment is removing the pain and increasing the quality of life by providing function. In the past, while the bone metastasis in a patient with cancer was accepted as terminal finding, today life expectancy has increased through chemotherapy, radiotherapy and developing surgical techniques.

In this study, skeletal system metastasis cases followed and surgically treated by our clinic were evaluated with literature.

MATERIAL and METHODS

After permission was taken from local ethical board, 209 cases who had been followed and surgically treated between January 1987 and January 2012 were examined retrospectively in terms of epidemiology. The cases which did not receive surgery were not included in the study. The cases were evaluated in terms of age, gender, localization and primary focus.

Planning

The patients who were admitted to our clinic due to metastatic bone tumor with skeletal system involvement were evaluated in the skeletal system tumors council which consisted of experts of orthopedic oncology, medical oncology, radiation oncology, pathology and nuclear medicine for the determination of their diagnosis and the planning of their suitable treatment.

Statistical Analysis

The data obtained were analyzed with SPSS 15.0 (SPSS Inc., Chicago, IL, USA) program. Shapiro-Wilk test was used to find out whether the data were distributed normally. The data which were normally distributed were expressed as average±standard deviation, while the data which weren't normally distributed were expressed as mean (min-max).

RESULTS

122 (58.4%) of the metastatic bone tumors with skeletal system involvement were male, while 87 (41.6%) were female and the average age was found as 59.2. 61 (29.2%) of the tumors were located in proximal femur,

44 (21.1%) in femur shaft, 39 (18.7%) in pelvis and 31 (14.8%) in humerus (Table 1) (Fig.1).

Table 1. Localization of metastatic bone tumors.

Localization	Number (n)	Percentage (%)
Hip joint	69	33
Femur	44	21
Pelvis/Vertebra	43	20.5
Humerus	19	9
Shoulder joint	14	6.6
Knee joint	10	4.7
Tibia/Fibula	4	1.9
Radius/Ulna	4	1.9
Anterior thoracic wall	1	0.4
Foot/Ankle	1	0.4
Total	209	100

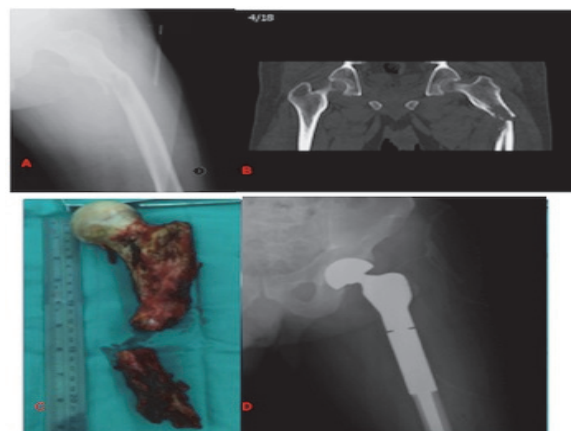


Figure 1. Left femur subtrochanteric pathological fracture developed in a 50-year-old male case as a result of lung cancer metastasis. A-B. Preoperative C. Intraoperative D. Postoperative images.

Of the metastatic tumors, 70 (33.5%) were found to originate from lungs while 36 (17.2%) were found to originate from breasts and primary was not observed clearly in 58 (27.7%) (Table 2). When the 209 cases in our series were analyzed, it was found that metastatic tumors were more in men when compared with women, they were most frequent in the 51-60 age group and they were located around the hips at the most.

Table 2. Primary focus of tumors which cause metastasis to skeletal system.

Diagnosis	Number (n)	Percentage (%)
Lung	70	33.5
Breast	36	17.2
Renal	14	6.7
Prostate	10	4.8
Neuroendocrine	7	3.3
Gastrointestinal system	6	2.9
Thyroid	3	1.4
Larynx	3	1.4
Bladder	2	1
Unknown primary	58	27.8
Total	209	100

DISCUSSIONS

Skeletal system metastases make up 70-80% of all malignant bone lesions (6). Skeletal system metastases show clinical differences based on the involvement. They impair the quality of life by causing pain, limitation of movement ability, pathological fractures, spinal cord compression and skeletal morbidities such as hypercalcemia and shorten the life expectancy of patients (7). Recently, life expectancy has risen as a result of multidisciplinary approach and chemotherapy and radiotherapy, early diagnosis and treatment possibilities through developing surgical techniques.

Most of the carcinomas which cause metastasis to the bone originate from breast or prostate; in addition, lungs, kidneys, thyroid and gastrointestinal system are other metastasis sources (1). Breasts, prostate, lungs, kidneys and thyroid make up 80% of metastases (6). While the rate of developing bone metastasis is 85% in breast cancer, this rate is between 50 and 70% in prostate cancer (8-10). This rate is one third in other tumors which frequently cause bone metastasis. Metastases the primary of which are not clear have been reported as 3-15% by Mirra (11). In our series, it was found that the tumor which caused metastasis to the bone most was lung with 70 cases, followed by breast with 36 cases, kidney and prostate. The primary of 27.8% (58 cases) were not found and this rate is very high when compared with the literature.

Metastatic tumors generally spread to bones hematogenously, but they can also be seen to through lymphatic and direct spread (12). Tumors spread to ribs, spine, pelvis and femur proximal the most, while they spread less frequently to upper extremities and bones of the head (6). Metastatic involvement was found as 69% in the vertebra, 40% in the pelvis, 25% in the femur and 14% in the cranium (3,13). Lung originated metastases are rarely seen in hands and feet (6,14). When the literature is reviewed, Harrington (15) reported hip involvement in 241 cases from a series of 375 cases. Upper extremity involvement has been reported as between 10-15% in literature and the area most involved is humerus (6). Since the cases in our series had undergone surgery, the number of spinal metastasis which is most frequent in literature and most of which is treated non-surgically is very few. When the metastatic tumors in our series are examined, they were found to be located around the hip most frequently. 14.8% humerus involvement found in our study is in line with the literature.

Various factors are determinant in deciding on the type of treatment. These can be summarized as the place and size of the lesion, presence of fracture, presence of extra metastases, pain, the patient's medical condition and life expectancy (5). Considering that involvement is more frequent in pelvis and lower extremity, surgical treatment is more suitable rather than conservative treatment in order to increase the quality of life. The most important complications which require surgical treatment are pathological or possible fractures and vertebra compressions which cause medulla spinalis

pressure (1). According to Harrington (16) criteria, if lytic lesion is >2.5 cm and/or bone destruction is %50>, this shows risk of pathological fracture. The scoring system proposed by Mirels (17) in 1989 is still valid, in this 12 point system, values over 8 show high pathological fracture risk (Table 3). In addition, the protocol defined by Capanna (1) is a guide about patient's getting enough treatment with a suitable approach. A great number of methods and implants have been defined to be used in surgical treatment (4, 18). Most frequently used surgical methods are internal fixation and reconstruction with prosthesis. We performed surgical treatment on our patients by considering all the factors and planning.

Table 3. Mirels scoring system used in the determination of pathological fracture risk.

Parameter	1	2	3
Localization	Upper extremity	Lower extremity	Trochanteric area
Pain	Mild	Moderate	Mechanic
Lesion character	Blastic	Mixed	Lytic
Lesion diameter	<1/3	1/3-2/3	>1/3

CONCLUSIONS

Although the study is retrospective, the sample size is not so large and there are different criteria and methods for surgical bone interventions because of different years and localizations of tumors, when social and economic parameters based on bone metastases are taken into consideration, we believe that conducting such studies by collecting from centers in which bone and soft tissue tumor surgery will provide important information in terms of public health.

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