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Prevalence of bone and soft tissue tumors

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Objective: Multidisciplinary approach is a necessity for the appropriate diagnosis and treatment of bone and soft tissue tumors. The Ege University Musculoskeletal Tumor Council offers consultation services to other hospitals in the Aegean region. Since 1988 the Council has met weekly and spent approximately 1,500 hours evaluating almost 6,000 patients with suspected skeletal system tumors. Our objective was to present the data obtained from this patient group.

Methods: A total of 5,658 patients, suspected to have a musculoskeletal tumor, were evaluated retrospectively. Multiple records of the patients due to multiple attendance to the Council were excluded. The prevalance of the bone and soft tissue tumors in these patients were analysed.

Results: Malignant mesenchymal tumors accounted for 39.7% of the total patients, benign tumors for 17%, tumor-like lesions for 17.8% and metastatic carsinomas for 8.6%. Malignant bone tumors were 50.2% and malignant soft tissue tumors were 49.8% of all the sarcomas. Among the malignant bone tumors the most common was osteosarcomas at a rate of 33.6%, followed by Ewing-PNET at 25.5%, chondrosarcomas at 19.4% and haematopoietic tumors at 17.6%. Pleomorphic sarcomas (24.5%), liposarcoma (16.4%), synovial sarcoma (13%) and undifferential sarcomas (8.8%) were the most common types of malignant sof tissue tumors. Benign soft tissue tumors (48%), benign cartilage tumors (28%), giant cell tumor (15%) and osteogenic tumors (9%) were found among the benign tumors. Hemangioma, lipoma, agressive fibromatosis, enchondroma, solitary chondroma and osteoid osteoma were the most common tumors in their groups. Lung (27%), breast (24%), gastrointestinal system (10.5%) and kidney (8.2%) carcinomas were the most common primary sites of the bone metastasis.

Conclusion: Turkey still lacks a comprehensive series indicating the incidence and diagnostic distribution of bone and soft tissue tumors. The presented data would add to our knowledge on the specific rates of the bone and soft tissue tumors in Aegean region.

Key words: Benign tumors; bone tumors; cancer prevalence; malign tumors; musculoskeletal tumors; soft tissue tumors.

Whatever their specialization, it is impossible for a physician to singlehandedly diagnose a patient with a tumor and offer suitable treatment. The close cooperation of a radiologist, surgeon, pathologist, oncologist and radiation oncologist is essential, especially with skeletal system tumors. As surgical treatment, chemotherapy and radiotherapy are generally used in combination in this patient group, their indication and timing are of crucial importance. The objective of musculoskeletal tumor councils is to synchronize the diagnostic and therapeutic approaches of the different specialists.

Founded in 1985, the Ege University Musculoskeletal Tumor Council is one of the pioneers in Turkey focusing on musculoskeletal tumors. In addition to Ege University patients, the Council

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offers consultation services to other hospitals in the region. Since 1988 the Council has met weekly and spent approximately 1,500 hours evaluating almost 6,000 patients with suspected skeletal system tumors. Our objective was to present the data obtained from this patient group.

Patients and methods

Fundamentally, the Council only considers patients with suspected skeletal system tumors. It should be emphasized that the council is not a place to discuss radiology or orthopedics cases. This study excluded patients thought not to have obvious tumors upon first examination, especially those referred by colleagues from neighboring hospitals. Nevertheless, further examinations showed that almost 900 patients (16.6%) considered to have tumors in differential diagnosis, especially according to radiological findings, were actually free of tumors. This strongly indicates the advantages of the Council for physicians experiencing difficulties in diagnosing this condition.

The patients initially submitted their records to the Council by filling out a form. In 2007, a computer program was developed for this purpose and all records were transferred onto this program. Names of tumoral lesions were determined in accordance with the World Health Organization's classification of bone and soft tissue tumors. Updates to the classification were duly considered.[1]

Between 1989-2009, 8,587 patients were evaluated by the Ege University Musculoskeletal Tumor Council. Of the total, 5,658 (65.9%) were new cases (Table 1). In other words, 1/3 of the patients were reviewed more than once. This was predominantly due to the reevaluation of malignant tumor patients in the process of treatment and follow-up. Diagnostic distribution evaluations were based on first application records.

The number of patients discussed by the Council increased over the years (Table 2). In recent years, the average number of patients assessed during weekly meetings stood at around 20-30. Only the first five months of 2009 were taken into consideration in the study.

Table 1. Total number of patients reviewed by the Tumor Council.

Total number of patients	8,587
First-time applicants	5,658 (65.9%)

Results

The diagnostic distribution of the 5,658 cases evaluated at the Council is presented in Table 3. Of all cases, 2,249 (39.7%) were malignant tumors of mesenchymal origin, in other words sarcomas. The number of benign mesenchymal tumors was 967 (17%), whilst the number of tumor-like lesions was 1,011 (17.8%). Although total benign tumors and tumor-like lesions accounted jointly for only 34.8% of cases, malignant tumors were singlehandedly more common at 39.7%.

Table 2. Yearly distribution of patients.

Year	Total	First-time applicants
Before 1993	243	160
1993-1994	288	196
1994-1995	406	273
1995-1996	432	259
1996-1997	416	269
1997-1998	407	252
1998-1999	293	199
1999-2000	414	279
2000-2001	537	346
2001-2002	500	344
2002-2003	476	361
2003-2004	502	375
2004-2005	538	368
2005-2006	623	406
2006-2007	749	421
2007-2008	634	374
2008-2009	682	408
Jan-May 2009	447	368
Total	8,587	5,658

Table 3. Diagnostic distribution of the patients.

Diagnosis	Patients	Distribution
Sarcomas	2,249	39.7%
Benign tumors	967	17%
Tumor-like lesions	1,011	17.8%
Non-tumoral lesions	941	16.6%
Metastasis	490	8.6%
Total	5,658	

However, it is difficult to suggest that malignant tumors are more common in the general population. The possible reason behind this dichotomy could be the fact that neighboring hospitals attempt to treat patients with benign tumors and tumor-like lesions without registering them with the Council. Sixteen percent of tumor-suspected cases evaluated by the Council were diagnosed with purely non-tumor lesions. The number of carcinoma cases presenting bone or soft tissue metastasis was 490 (8.6%). The majority of cases in this group consisted of metastases of unknown primary origin and metastases with the risk of pathological fractures. Oncology councils do not usually bring cases with widespread metastasis, especially breast and prostate cancer, to the attention of skeletal tumor councils unless the risk of fracture is imminent. This is why the number of bone and soft tissue carcinoma metastasis patients discussed at skeletal tumor councils is less than expected.

The number of malignant bone tumors (50.2%) and soft tissue tumors (49.8%) was almost equal amongst sarcoma patients (Table 4). Although the Council has, to a great extent, persuaded orthopedists working in the region to consult their cases with the Council, it is difficult to say the same for general surgeons and plastic surgeons. Soft tissue tumor prevalence is presumably greater, considering cases that are not referred to the Council by this group, who favor dealing with soft tissue tumors.

Malignant osteogenic tumors accounted for 33.6% of malignant bone tumors (Table 5), which were types of osteosarcoma. Of these, 75.5% were conventional central osteosarcomas, and 8.5%, parosteal osteosarcomas. The occurrence in men and women were approximately equal (Table 6).

The occurrence of Ewing sarcoma and primitive neuroectodermal tumors (PNET) was respectively 204 and 20 in bone tissue, and 23 and 41 in soft tissue (Table 7). The 288 cases of Ewing sarcoma and PNET accounted for 25.5% of all malignant bone tumors.

Malignant cartilage tumors accounted for 19.4% of all malignant bone tumors. Eighty-three percent of malignant cartilage tumor patients were diagnosed with central chondrosarcoma (Table 8). Malignant cartilage tumors were more common in men (57%).

Table 4. Sarcomas.

Diagnosis	Patients	Distribution
Malignant bone tumors	1,129	50.2%
Malignant soft tissue tumors	1,120	49.8%

Table 5. Malignant bone tumors.

Diagnosis	Patients	Women	Men	Distribution
Malignant osteogenic tumors	379	182	197	33.6%
Ewing + PNET	288	129	159	25.5%
Malignant cartilage tumors	219	95	124	19.4%
Hematopoietic system tumors	199	73	126	17.6%
Chordoma	32	15	17	2.8%
Secondary malignant tumors	12	8	4	1.1%
Total	1,129	502	627	

Table 6. Malignant osteogenic tumors.

Diagnosis	Patients	Female	Male	Distribution
Osteosarcoma (central)	286	137	149	75.5%
Osteosarcoma (parosteal)	32	19	13	8.5%
Osteosarcoma (telengiectatic)	21	6	15	5.5%
Osteosarcoma (periosteal)	16	6	10	4.2%
Osteosarcoma (chonroblastic)	13	8	5	3.4%
Osteosarcoma (high grade)	8	4	4	2.1%
Osteosarcoma (soft tissue)	3	2	1	0.8%
Total	379	182	197	

Table 7. Ewing / PNET.

Bone				Soft tissue			
Ewing sarcoma		PNET		Ewing sarcoma		PNET	
204		20		23		41	
Women	Men	Women	Men	Women	Men	Women	Men
92	112	2	18	13	10	22	19
224				64			
288							

Hematopoietic system tumors accounted for 17.6% of malignant bone tumors (Table 9). Amongst these, the occurrence of multiple myelomas, lymphomas and solitary plasmacytomas were 40%, 38% and 19%, respectively. Male occurrence was pronounced (63%).

Table 8. Malignant cartilage tumors.

Diagnosis	Patients	Women	Men	Distribution
Chondrosarcoma (central)	181	80	101	83%
Chondrosarcoma (clear cell)	8	2	6	3.7%
Chondrosarcoma (heterogenous)	8	3	5	3.2%
Chondrosarcoma (indifferent)	7	4	3	1.1%
Chondrosarcoma (juxtacortical)	7	2	5	3.1%
Chondrosarcoma (mesenchymal)	4	3	1	1.8%
Chondrosarcoma (soft tissue)	3	1	2	1.6%
Malignant chondroblastoma	1	0	1	1.4%
Total	219	95	124	

We encountered 12 secondary sarcomas, one Paget and the rest, post-radiation sarcomas (Table 10).

Pleomorphic cell sarcomas prevailed amongst malignant soft tissue tumors (24.5%) (Table 11). Looking at older council records we see that malignant fibrous histiocytoma (MFH) was considered as a distinct group. However, MFH was included in the malignant soft tissue tumors group following a review made to the World Health Organization classification in 2002. Liposarcoma ranked second with a prevalence of 16.4%. Liposarcoma is considered as one of the most problematic tumors for neighboring hospitals. Failing to perform biopsies, specialists frequently attempt to remove liposarcomas based on lipoma pre-diagnosis, and refer these cases to the Council in panic after receiving pathological diagnosis. This is why we relentlessly emphasize the importance of a simple tru-cut biopsy.

Synovial sarcoma (13%), indifferent malignant mesenchymal tumors (8.8%), malignant neurogenic tumors (6.6%), leiomyosarcoma (4.9%) and malignant vascular tumors (4.6%) accounted for the remaining cases. Malignant nerve sheath tumor (previously known as malignant schwannoma) prevailed amongst malignant neurogenic tumors, whilst angiosarcoma prevailed amongst vascular tumors. Soft tissue sarcomas were more common in men (55%).

The total number of patients with benign tumors was 967, 17% of all cases. Benign tumors of soft tissue origin accounted for the largest portion (48%). This was followed by cartilaginous tumors (28%), giant cell tumors (15%) and bone tumors (9%) (Table 12).

Vascular lesions accounted for the largest group amongst benign soft tissue tumors (37.5%), followed by lipoma (21.5%), aggressive fibromatosis (19.9%) and neurogenic tumors (14%) (Table 13).

Table 9. Hematopoietic system tumors.

Diagnosis	Patients	Women	Men	Distribution
Multiple myeloma	80	32	48	40%
Lymphoma	76	23	53	38%
Solitary plasmacytoma	38	16	22	19%
Leukemia	5	2	3	3%
Total	199	73	126	

Table 10. Secondary sarcomas.

Diagnosis	Patients	Women	Men
Post-radiation sarcomas	11	8	3
Paget sarcomas	1	0	1
Total	12	8	4

Table 11. Malignant soft tissue tumors.

Diagnosis	Patients	Women	Men	Distribution
Pleomorphic cell sarcoma	275	125	150	24.5%
Liposarcoma	184	87	97	16.4%
Sinovial sarcoma	146	78	68	13%
Indifferent malignant Mesenchymal Tm.	99	39	60	8.8%
Malignant neurogenic Tm.	74	32	42	6.6%
Leiomyosarcoma	55	26	29	4.9%
Malignant vascular Tm.	52	24	28	4.6%
Rhabdomyosarcoma	50	20	30	4.4%
Spindle cell sarcoma	46	25	21	4.1%
Fibrosarcoma	44	12	32	3.9%
Dermatofibrosarcoma protuberans	21	7	14	1.8%
Malignant melanoma	18	7	11	1.6%
Squamous cell carcinoma	17	8	9	1.5%
Epitheiloid cell carcinoma	16	4	12	1.4%
Soft tissue non-Hodgkin	16	8	8	1.4%
Soft tissue Hodgkin	5	1	4	0.1%
Myofibrosarcoma	2	1	1	0.1%
Total	1120	504	616	

Enchondromas accounted for the largest group amongst benign cartilage tumors (42%), followed by solitary osteochondromas (28%) and chondroblastomas (15%) (Table 14).

Table 15 presents the distribution of benign vascular lesions.

Osteoid osteomas (68.3%) and osteoblastomas (18.2%) were the most common among benign osteogenic tumors (Table 16).

Table 17 presents the distribution of benign neurogenic tumors.

As underlined from the beginning, such a low number of total benign tumors cases over the past 20 years was largely due to the fact that benign tumor patients are predominantly treated at nearby hospitals instead of oncology centers. In fact, looking at council cases individually, it is apparent that patients with suspected malignancy or those with tumors located where surgical intervention isdifficult were in majority. For instance, most of the lipomas were in excess of 10 cm diameter. Similarly, in most of the osteoid osteoma cases, the tumors were located in surgically difficult areas, like acetabulum, vertebra or posterior part of the tibia.

Aneurismal bone cysts accounted for most tumor-like lesions (15.9%) (Table 18). The higher frequency of such lesions results from their resemblance to malignant tumors in appearance. We have always considered the probability of a malignancy, such as telangiectatic osteosarcoma, in aggressive lesions. On the other hand, the high ratio of recurrence amongst individuals undergoing interventions at other centers results in these patients being referred to the council.

Fibrous dysplasia, ranking second amongst cases diagnosed with tumor-like lesions (15.3%), is another condition that can present alarming radiological findings for inexperienced physicians. Surprisingly, osteomyelitis was the third most common diagnosis at a rate of 14%. This is probably due to its radiological and clinical similarities to Ewing sarcoma.

The rate of simple bone cysts (5%) and fibrous cortical defects (5%), the most easily diagnosed and treated conditions at other centers, was low in this group.

Similarly, soft tissue infections and abscesses were most frequently referred to the council (19%) (Table

Table 12. Benign musculoskeletal tumors.

Diagnosis	Patients	Women	Men	Distribution
Benign soft tissue Tm.	466	270	195	48%
Benign cartilage Tm.	272	141	132	28%
Giant cell Tm.	147	85	62	15%
Benign osteogenic Tm.	82	34	48	9%
Total	967	530	437	

Table 13. Benign soft tissue tumors.

Diagnosis	Patients	Women	Men	Distribution
Vascular lesions	175	100	75	37.5%
Lipoma	100	67	33	21.5%
Aggressive fibromatosis	92	47	45	19.9%
Benign neurogenic Tm.	66	35	31	14%
Benign fibrous hystiocytoma	10	3	7	2%
Desmoplastic fibroma	10	4	6	2%
Myxoma	6	6	0	1.5%
Desmoid Tm.	6	5	1	1.5%
Total	466	266	200	

Table 14. Benign cartilage tumors.

Diagnosis	Patients	Women	Men	Distribution
Enchondroma	114	77	37	42%
Solitary osteochondroma	76	30	46	28%
Chondroblastoma	41	14	27	15%
Multiple hereditary osteochondroma	15	6	9	5.5%
Chondromyxoid chondroma	13	8	5	4.8%
Soft tissue chondroma	7	4	3	2.6%
Periosteal chondroma	6	2	4	2.2%
Total	272	141	132	

Table 15. Benign vascular lesions.

Diagnosis	Patients	Women	Men	Distribution
Hemangioma	141	79	62	80.6%
A-V malformations	20	10	10	11.5%
Hemangiomatosis	5	5	0	2.9%
Lymphocele	4	2	2	2.3%
Glomus Tm.	4	4	0	2.3%
Angiodysplasia	1	0	1	0.5%
Total	175	100	75	

Table 16. Benign osteogenic tumors.

Diagnosis	Patients	Women	Men	Distribution
Osteoid osteoma	56	26	30	68.3%
Osteoblastoma	15	1	14	18.2%
Osteoblastoma (aggressive)	6	2	4	7.3%
Osteoma	5	3	2	6.2%
Total	82	32	50	

Table 17. Benign neurogenic tumors.

Diagnosis	Patients	Women	Men	Distribution
Periferic neural sheath Tm.	23	11	12	35%
Neurofibroma (soliter)	11	7	4	16.7%
Neuroma	9	4	5	13.6%
Neurofibromatosis	9	5	4	13.6%
Neuroblastoma	6	3	3	9.1%
Ependymoma	4	3	1	6.1%
Others	4	2	2	6.1%
Total	66	35	31	

Table 18. Tumor-like lesions (bone).

Diagnosis	Patients	Distribution
Aneurysmal bone cysts	114	15.9%
Fibrous dysplasia	110	15.3%
Osteomyelitis	100	14%
Simple bone cysts	36	5%
Fibrous cortical defect	35	5%
Eosinophilic granuloma	34	5%
Brown tumor	31	4.2%
Paget	31	4.2%
Bone avascular necrosis	29	4%
Histiocytosis-X (Langerhans cell histiocytosis)	25	3.5%
Osteoporose fracture	24	3.5%
Bone marrow edema	19	2.7%
Stress fracture	18	2.6%
Bone tuberculosis	16	2.3%
Intraosseous lipoma	14	2%
Bone hydatic cyst	8	1%
Others	73	10%
Total	717	

19). Undoubtedly, these cases were atypical and deep lesions impossible to diagnose with only radiological and clinical findings. With all the current diagnostics tools, such as MR, CT and simple needle biopsies available, one cannot merely rely on antibiotic treatment. Although the 8 bone and 11 soft tissue hydatic cyst cases accounted for only a small percentage of total cases, they should also be mentioned as they require treatment similar to malignant tumors.

The number of carcinoma metastasis patients was 490 (8.6%). Approximately half were cases with an unknown primary tumor, which were diagnosed following the the Council's diagnostic research.

The most common metastatic lesion was the lung carcinoma metastasis (27%) followed by breast carcinoma metastasis (24%) (Table 20). The rate of prostate carcinoma, a frequent cause of bone metastasis, was relatively low (4.3%) as patients without the risk of fracture or those with pathological fractures are not referred to musculoskeletal tumor councils.

Discussion

Although cancer has been included in the Turkish "diseases of mandatory notification" list since 1982, the accurate incidence of cancer cases is not yet known. For this reason, the national notification-based passive data collection system was replaced in 1991 with a regional active cancer registry system. The "Izmir Cancer Registry Center", a part of this network, published data from 34,134 cancer patients diagnosed and treated at Ege University Hospital between 1992-2004.[2] As 90% of patients in the registry system were from the Izmir Province and Aegean Region,the data should be interpreted as the incidence rate of cancer in the Aegean Region of Turkey. The number of bone and soft tissue sarcomas within the total number of cancer cases in this series was 1,067 (3.1%).

Turkey still lacks a comprehensive series indicating the incidence and diagnostic distribution of bone and soft tissue tumors. Covering the years 1990-2000, Solakoğlu et al. published a series of 937 cases with bone tumors.[3] Far from being adequate as a national study, the findings from the 5,658 patients examined based on 20 years of data accumulated by the Ege University Musculoskeletal System Tumor Council nonetheless present a comprehensive demographic study resource for the Izmir and Aegean Region in the field of Musculoskeletal System Tumors.

In 2009, United States official cancer statistics (National Cancer Institute, SEER Cancer Statistics)

reported 2,570 new bone and joint cancer related patients and 1,470 deaths induced by this disease group, accounting for 0.2% of all cancers.[4] For the soft tissue sarcoma group (including heart) 10,660 new patients and 3,820 deaths were reported (0.8%). In conclusion, bone and soft tissue tumors accounted for approximately 1% of all cancers. Based on Izmir Cancer Registry Center data, the prevalence of bone and soft tissue tumors reached 3.1%. This discrepancy is not due to a higher prevalence of bone and soft tissue tumors in this specific regionbut the Ege University Musculoskeletal System Tumor Council being one of the few reference centers for these patients in Turkey. On average, 250-280 new bone and soft tissue malignant tumor patients apply to the Ege University hospital on an annual basis.

Analyzing the general diagnostic distribution of 5,658 patients registered with the Council, it can been seen that sarcomas accounted for 39.7% of all patients. The number of patients with soft tissue sarcoma was 1,120 (49.8%). The World Health Organization (WHO) classification groups osteogenic tumors, cartilage tumors, Ewing-PNET group tumors and hematopoietic system tumors under the heading of Bone Tumors.[1] The total number of patients in this group was 1,129 (50.2%).

In our series, osteogenic malignant tumors of osteosarcoma types accounted for 33.6% of malignant bone tumors (379 patients), followed by the Ewing-PNET group (25.5%), malignant cartilage tumors (19.4%), and hematopoietic system tumors (17.6%). Malignant bone tumors emerged predominantly at young ages; incidence information was more commonly encountered in pediatric cancer literature. According to SEER statistics on pediatric tumors, soft tissue tumor incidence was 12.2 in a million and malignant bone tumor incidence 8.6 in a million. Osteosarcomas ranked first within malignant bone tumors, followed by Ewing-PNET tumors.[4]

Although it is currently impossible to provide incidence rates based on the general population, our figures for osteosarcoma (33.6%) and Ewing-PNET (25.5%) were close to literature findings.[4-9]

In our series, the prevalence of malignant cartilage tumors within malignant bone tumors was 19.4%. Central chondrosarcomas accounted for 83% of this portion.

Table 19. Tumor-like lesions (soft tissue).

Diagnosis	Patients	Distribution
Infection (Abscess+Diffuse)	54	19%
Synovitis	27	9.5%
Bursitis	27	9.5%
Myositis ossificans	22	7.7%
Pigmented villonodular synovitis	15	4.5%
Synovial chondromatosis	13	4.5%
Granuloma	13	4.5%
Hematoma	12	4.2%
Ganglion	12	4.2%
Elastofibroma dorsi	11	3.9%
Xantoma	11	3.9%
Soft tissue hydatic cyst	11	3.9%
Epidermoid cyst	9	3.2%
Others	49	17.5%
Total	286	

Table 20. Carcinoma metastasis.

Diagnosis	Patients	Women	Men	Distribution
Lung Ca. met.	133	26	107	27%
Breast Ca. met.	117	112	5	24%
Adenocarcinoma met.	51	13	38	10.5%
Renal cell Ca. met.	40	15	25	8.2%
Thyroid Ca. met.	37	21	16	7.6%
Epidermoid Ca. met.	23	1	22	4.7%
Prostate Ca. met.	21	0	21	4.3%
Urinery Ca. met.	13	2	11	2.7%
Others	55	29	26	11%
Total	490	219	271	

Hematopoietic system tumors accounted for 17.6% of malignant bone tumors, of which 40% were multiple myelomas and 38% lymphomas. These tumors are predominantly mentioned within pediatric tumor literature.[4,5,7] Cases referred to the Musculoskeletal System Tumor Council were generally those with the risk of bone fracture or with extensive bone involvement, accounting for the small number of hematopoietic system tumors in our series.

Examining the general tumor statistics from large-scale healthcare centers, we see that the percentage of soft tissue sarcomas, including smooth and skeletal muscle tumors, was more prevalent than malignant bone tumors.[4,10,11]

Kransdorf reported that 80% of soft tissue sarcomas originated within 8 diagnostic categories.[12] Out of the 39,179 mesenchymal origin lesions examined by the Armed Forces Institute Pathologists, 12,370 cases were identified to be malignant soft tissue tumors. Sequenced according to their histological diagnosis, 24% were malign fibrous histiocytomas (or nowadays referred as pleomorphic cell sarcoma), 14% liposarcomas, 8% leiomyosarcomas, 6% malignant schwannomas, 12% undifferentiated sarcomas and 5% synovial sarcomas. In our series, 24.5% were pleomorphic cell sarcomas, 16.4% liposarcomas, 13% synovial sarcomas, 8.8% undifferentiated sarcomas and 4.9% leiomyosarcomas. Excepting synovial sarcomas, the results show great consistency. Similarly, pleomorphic celled sarcoma – MFH (31.5%) and liposarcoma (19%) were most prevalent in Gutierrez et al.'s series consisting of 8,249 cases.[10]

Benign tumors accounted for 17% of all our patients. The "Miscellaneous Lesions" of the WHO classification system were classified as tumor-like lesions in our series and accounted for 17.8% of all our cases. Out of the 967 benign tumor cases, 48% were soft tissue, 28% cartilage and 9% bone origin. There were also 147 giant cell bone tumors (15%).

Amongst soft tissue benign tumors, vascular lesions were most prevalent (37.5%). Hemangiomas accounted for 81% of this group, followed by lipomas (21.5%) and aggressive fibromatoses (19.9%). Lipomas were most prevalent (16%) in Kransdorf's series of 18,677 cases based on radiological analysis, followed by fibrous histiocytomas (13%) and hemangiomas (8%).[13] Radiological examination and biopsy can be frequently overlooked in Turkey, especially for suspected cases of benign soft tissue lesions. The frequency of the referral of hemangiomas to tumor councils is greater as their clinical appearance is more alarming than lipomas. We believe this to be the reason for the difference in our series.

Enchondromas were most prevalent amongst benign cartilage tumors in our series (42%), followed by solitary osteochondromas (28%) and chondroblastomas (15%). According to literature, osteochondroma is reported to be most prevalent.[6,14] Osteochondroma is relatively easy to diagnose and does not require referral to a tumor council for diagnosis and treatment. The appearance of enchondroma, on the other hand, is always a cause for suspicion of malignancy. These facts are behind the discrepancy in our series.

Osteoid osteoma was most prevalent amongst benign bone tumorswith 56 cases on record accounting for 68% of benign osteogenic tumors.

The total number of giant cell tumor cases was 147, accounting for 15% of all benign tumors.

Amongst tumor-like bone lesions, the prevalence of aneurismal bone cysts was 15.9%, followed by fibrous dysplasia (15.3%) and simple bone cysts (5%). Berg et al.'s comprehensive series investigating pediatric bone tumors reported that aneurismal bone cysts were the most prevalent lesion type after osteochondromas.[6]

It must be stated that osteomyelitis may radiologically and clinically imitate abscesses and infections developing between soft tissues, making it one of the lesions most frequently confused for tumors. Our series included many tumor-like bone and soft tissue infections where definitive diagnosis was only possible after biopsy.

Carcinoma metastases seen in bone or soft tissue accounted for 8.6% of all our cases. The most prevalent were lung (27%), breast (24%), gastrointestinal (10.5%), and kidney (8.2%) carcinoma metastases. The prevalence of prostate carcinoma metastasis was relatively low (4.3%). Considering that the most prevalent types of cancers are lung and gastrointestinal in men and breast and gastrointestinal in women, the distribution of metastatic cases in our series were in line with general statistics.[2,4,7] Though prostate cancer patients develop extensive bone metastasis, it is believed that due to early investigation, oncological treatment begins in these cases before the occurrence of bone fracture risk, and are thus not referred to the Musculoskeletal System Tumor Council.

Conflicts of Interest: No conflicts declared.

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