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Retrospective histomorphological analysis of bone and soft tissue tumors and tumor-like lesions over 32 years in a tertiary healthcare facility

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ABSTRACT

Aims: Clinicopathological features of bone and soft tissue tumors/tumor-like lesions have been shown to vary geographically. This study aims to analyze the clinicopathological features of bone and soft tissue lesions in Ilorin, including both neoplastic and non-neoplastic diseases derived from mesenchymal cells, thus addressing a notable data gap.

Methods: We retrospectively reviewed histopathologically diagnosed cases of bone and soft tissue lesions over thirty-two years (1985 to 2016) at the University of Ilorin Teaching Hospital, Ilorin, Nigeria. Data were extracted from pathology reports and case files.

Results: A total of 970 cases of bone and soft tissue lesions were recorded. The age distribution of the study group ranged from 0 to 81 years with a mean age of 34.5±0.5 years and the male-to-female ratio was 1:1. The lesions of adipose tissue origin constituted the most common (38.4%; 373/969) followed by blood vessels (20.6%; 200/969) and fibrous tissue lesions (18.8%; 182/969) among others. The majority of these bone and soft tissue lesions were benign 80.4%. The most common soft tissue neoplasm was lipoma (32.1%; 311/970). Fibrosarcoma was the most common malignant soft tissue neoplasm (7.8%; 76/970).

Conclusions: Adipocytic tumors were the most prevalent soft tissue lesions, with lipoma being the most frequent specific lesion. Fibrosarcoma was the predominant malignant soft tissue neoplasm, while giant cell tumor was the most commonly diagnosed bone neoplasm. Clinically, these findings highlight the necessity for heightened vigilance and tailored diagnostic strategies for these prevalent tumors in healthcare settings.

Introduction

Neoplastic and non-neoplastic disorders originating from mesenchymal cells, including fibroblasts, adipocytes, muscle cells, and osteoblasts, are responsible for bone and soft tissue tumors (STTs) as well as tumor-like lesions (1-3). Although these lesions can occur in any section of the body, soft tissue lesions are most common in the extremities (1,2,4-14). Among adult soft tissue neoplasms, fewer than 4% are soft tissue sarcomas (1,3,10,15-18), while 90% are considered benign (2,4,12-14,17-20). Compared to soft tissue neoplasms, primary bone neoplasms are less prevalent (5-9,14,17,18).

The prevalence of primary bone sarcomas as a subset of malignant neoplasms is relatively low, constituting only 0.2% of cases (5-9,17,18). Interestingly, despite their rarity, bone sarcomas exhibit variability in gender distribution, with women representing a significant proportion, comprising 46% of cases in the United Kingdom (1,17,18). This suggests that while bone sarcomas are infrequent overall, they display distinct epidemiological patterns that warrant further investigation. Malignant bone neoplasms are frequently found (1,17,18). Chondrosarcoma, osteosarcoma, and Ewing sarcoma are the most frequently occurring histological subtypes of bone sarcomas (1,5-9,16-18).

Soft tissue neoplasms are more prevalent than bone neoplasms among lesions (2,3,14,17,18,20). Soft tissue neoplasms exhibit histological categorization into benign, intermediate, and malignant subtypes, with the incidence of benign variants surpassing that of malignant ones (1,2,21-23). Malignant soft tissue neoplasms represent only 0.7% of all malignant neoplasms and account for 6.5% of malignancies in children under 15 years (1-3,5-14,16-18,20,23). Notably, lipoma emerges as the most prevalent soft tissue neoplasm, constituting nearly 50% of soft tissue neoplasms (2,12-14,20,23). Concurrently, liposarcoma claims the position of the most common soft tissue sarcoma, while osteosarcoma holds this distinction among bone sarcomas.

Bone and soft tissue neoplasms can occur throughout the body, with specific predilections. Lipoma frequently manifests in the neck, shoulder, abdomen, and thigh, whereas soft tissue sarcomas predominantly localize in the arms, legs, and abdomen (2-14,16,20). The etiology of these neoplasms remains largely elusive; however, factors such as radiation exposure, positive family history, and neurofibromatosis have been linked to their development (1,3,13,23). Crucially, the conclusive diagnosis of bone and soft tissue lesions hinges on histopathological evaluation following a biopsy. The diagnostic process is compounded by the relative rarity of primary soft and bone lesions, and the diverse array of histological subtypes, posing a significant challenge (1,2,6,8,10,12-14,20-23). Consequently, the distribution and comprehensive evaluation of these histological subtypes within our environment are particularly sparse.

Therefore, this study aimed to retrospectively analyze the clinicopathological features of bone and soft tissue lesions in Ilorin, Southwestern Nigeria. Specifically, it sought to determine the age and gender distribution, tissue of origin, histopathological subtypes, and relative frequencies of these lesions, and to compare the findings with those reported in the literature.

Methods

Study population and recruitment

This retrospective study was conducted at the Department of Histopathology, University of Ilorin Teaching Hospital, Ilorin, Nigeria, spanning 32 years from 1985 to 2016. Inclusion criteria encompassed all lesions originating from mesenchymal cells managed during the specified period, while exclusion criteria included patients with incomplete information and those with secondary bone and soft tissue neoplasms. The study was approved by the Rasheed Shekoni Federal University Teaching Hospital, Dutse Institutional Ethics Committee (decision number: RSFUTH/GEN/226/V.II, date: 28.11.23).

Variables and data collection

Original histopathological slides of the cases were retrospectively reviewed. Data collected from re-examined slides, laboratory request forms, and pathology reports included information on age, gender, tissue of origin, histopathological subtypes, and anatomical location of the lesions. In cases where original slides were unavailable, new slides were prepared from archival formalin-fixed paraffin-embedded tissue blocks. The data collection process ensured that all subjects within the study period who met the inclusion criteria were included.

Statistical Analysis

We performed all our statistical analyses using IBM SPSS Statistics® version 23.0 (IBM Corporation, 1 New Orchard Road, Armonk, New York, United States). As the study utilized a convenience sampling technique, no sample size calculation was performed, recognizing that sample size calculations are based on principles of probability sampling techniques. Descriptive statistics were used to summarize the data, and the results were presented in text, tables, and figures. A p-value of less than 0.05 was considered statistically significant.

Results

Case analysis and demographics

During the 32-year study period from 1985 to 2016, a total of 970 cases of bone and soft tissue lesions were analyzed. The age distribution of the subjects ranged from 0 to 81 years, with

a mean age of 34.5±0.5 years. The majority of the lesions were observed in individuals aged 21-30 years. The study population had an equal male-to-female ratio (M:F) of 1:1 (Table 1).

Tissue derivatives and lesion frequency

Among the seven observed bone and soft tissue derivatives, lesions of adipose soft tissue origin had the highest frequency, accounting for 38.5% (373/969) of cases, followed by blood vessels at 20.6% (200/969). The least frequent were lesions originating from bone, cartilage, and tendon sheath tissues, comprising 3.7% (36/969) of cases (Table 1).

The histopathological categories

The histopathological analysis of 969 lesions revealed that benign cases predominated (80.4%), with 2.4% classified as borderline and 17.2% as malignant, showing significant variation across tissue types. Adipose (94.9%), neural (94.6%), and vascular (96.0%) tissue derivatives were mostly benign, whereas smooth muscle tissue derivatives exhibited a notably high malignancy rate (84.0%, p=0.001). Fibrous tissue derivatives showed a diverse distribution with 46.7% benign, 12.6% borderline, and 40.7% malignant cases, emphasizing the importance of histopathological evaluation for accurate lesion categorization (Table 2).

Neoplasm types and prevalence

The most commonly diagnosed specific soft tissue neoplasm was lipoma, which accounted for 32.1% (311/970) of cases, followed by capillary haemangioma at 16.3% (158/970), and the least common was myxoma, with only 0.1% (1/970) of cases. These neoplasms were derived from adipose, blood vessels, and fibrous tissue, respectively (Table 3 and Figure 1). The study revealed that benign lesions constituted 80.4% of all cases, whereas malignant lesions made up 17.2%. Lipoma was identified as the most common benign soft tissue neoplasm, while fibrosarcoma was the most common malignant soft tissue neoplasm, accounting for 7.8% of cases. Among malignant bone neoplasms, osteosarcoma was the most frequent, constituting 1.8% (17/970) of cases; whereas giant cell tumors were the most common benign bone neoplasms, representing 2.9% (28/970) of cases (Table 3).

Table 1. Frequency distribution of derivatives/origins of bone and soft tissue lesions with respect to the sex and age of our study subjects at University of Ilorin Teaching Hospital

Derivatives	Frequency	Percentage (%)	Male n (%)	Female n (%)	M:F n	Age (years) range	Age (years) mean±SD	p-value
Adipose	373	38.4	175 (46.9)	198 (53.1)	1:23	31-40	39.0±0.8	**0.001**
Neural	56	5.8	34 (60.7)	22 (39.3)	17:11	21-30	26.1±2.5	
Smooth muscle	50	5.2	23 (46.0)	27 (54.0)	23:27	31-40	34.2±2.9	
Fibrous tissue	182	18.8	99 (54.4)	83 (45.6)	99:83	31-40	35.2±1.3	
Blood vessels	200	20.6	114 (57.0)	86 (43.0)	57:43	21-30	29.9±1.3	
Bone, cartilage, and tendon sheath	36	3.7	18 (50.0)	18 (50.0)	1:1	21-30	29.3±1.8	
Bone	73	7.5	31 (42.5)	42 (57.5)	31:42	31-40	32.1±1.9	
Total	970	100.0	494 (50.9)	476 (49.1)	1:1		34.5±0.5	

The results are significant where p<0.05 at 95% confidence interval
SD: Standard deviation, M: Male, F: Female

Table 2. Frequency distribution of the histopathological categories of our study subjects at University of Ilorin Teaching Hospital

The histopathological categories					
Derivatives	**Frequency**	**Benign n (%)**	**Borderline n (%)**	**Malignant n (%)**	**p-value**
Adipose	373	354 (94.9)	-	19 (5.1)	**0.001**
Neural	56	53 (94.6)	-	3 (5.4)	
Smooth muscle	50	8 (16.0)	-	42 (84.0)	
Fibrous tissue	182	85 (46.7)	23 (12.6)	74 (40.7)	
Blood vessels	199	191 (96.0)	-	8 (4.0)	
Bone, cartilage, and tendon sheath	36	29 (80.6)	-	7 (19.4)	
Bone	73	59 (80.8)	-	14 (19.2)	
Total	969	779 (80.4)	23 (2.4)	167 (17.2)	

The results are significant where p<0.05 at 95% confidence interval

Anatomical distribution and temporal trends

The anatomical distribution of these lesions showed that the majority were located in the trunk (254/769), followed by the head and neck region (214/769) (Table 4). The frequency of soft tissue lesions peaked in 2009, with 10.6% (103/970) of cases, and was lowest in 1989, with 0.9% (9/970) (Table 5). Throughout the study, results demonstrated statistically significant associations, with all p-values below 0.05, which indicates the robustness of the findings.

Discussion

Tumors and tumor-like lesions of bone and soft tissue origin occur across a wide age range. In this study, participants ranged in age from 0 and 81 years with a mean of 34.5±0.5 years.

Table 3. Frequency distribution of specific bone and soft tissue lesions with respect to the sex and age of the study subjects at University of Ilorin Teaching Hospital

Specific lesions	Class	Frequency	Percentage (%)	Male n (%)	Female n (%)	M:F (n)	Age (years) range	Age (years) Mean±SD	p-value
Lipoma	Benign	311	32.1	144 (46.3)	167 (53.7)	1:23	31-40	39.5±0.9	**0.002**
Fibrolipoma	Benign	50	5.2	25 (50.0)	25 (50.0)	1:1	31-40	35.3±2.8	
Liposarcoma	Malignant	13	1.3	6 (46.2)	7 (53.8)	6:7	31-40	39.0±4.2	
Neurofibroma	Benign	46	4.7	30 (65.2)	16 (34.8)	15:8	21-30	24.1±2.5	
Plexiform neurofibroma	Benign	5	0.5	3 (60.0)	2 (40.0)	3:2	31-40	30.6±9.8	
Schwannoma	Benign	3	0.3	-	3 (100.0)	0:3	51-60	50.3±12.9	
Malignant peripheral nerve sheath tumor	Malignant	3	0.3	2 (66.7)	1 (33.3)	2:1	21-30	27.3±12.6	
Glomus tumour	Benign	3	0.3	1 (33.3)	2 (66.7)	1:2	31-40	30.6±9.8	
Rhabdomyosarcoma		35	3.6	18 (51.4)	17 (48.6)	18:17	21-30	28.3±3.2	
Dermatofibroma	Benign	28	2.9	16 (57.1)	12 (42.9)	4:3	21-30	29.4±3.0	
Fibroma	Benign	18	1.9	10 (55.6)	8 (44.4)	5:4	21-30	23.3±3.5	
Ossifying fibroma	Benign	3	0.3	1 (33.3)	2 (66.7)	1:2	31-40	30.3±11.8	
Fibromatosis	Benign	6	0.6	4 (66.7)	2 (33.3)	2:1	21-30	28.6±5.5	
Granular cell tumour	Benign	2	0.2	2 (100.0)	-	2:0	21-30	27.0±3.0	
Myxoma	Benign	1	0.1	1 (100.0)	-	1:0	11-20	18.0±0.0	
Fibromyxoma	Benign	4	0.4	1 (25.0)	3 (75.0)	1:3	11-20	12.0±3.4	
Dermatofibrosarcoma protuberans	Borderline	26	2.7	12 (46.2)	14 (53.8)	6:7	41-50	41.0±3.1	
Fibrosarcoma	Malignant	76	7.8	46 (60.5)	30 (39.5)	23:15	41-50	41.0±1.9	
Capillary haemangioma	Benign	158	16.3	85 (53.8)	73 (46.2)	85:73	31-40	31.1±1.5	
Lymphangioma	Benign	7	0.7	4 (57.1)	3 (42.9)	4:3	11-20	15.5±8.6	
Angiosarcoma	Malignant	4	0.4	3 (75.0)	1 (25.0)	3:1	21-30	24.7±7.3	
Giant cell tumour	Benign	28	2.9	13 (46.4)	15 (53.6)	13:15	31-40	31.0±2.2	
Osteosarcoma	Malignant	17	1.8	7 (41.2)	10 (58.8)	7:10	21-30	29.4.5±3.9	
Chondrosarcoma	Malignant	6	0.6	4 (66.7)	2 (33.3)	2:1	21-30	23.6±2.1	
Ganglion cyst	Benign	57	5.9	24 (42.1)	33 (57.9)	8:11	31-40	32.8±2.1	
Angiomyolipoma	Malignant	3	0.3	3 (100.0)	-	3:0	31-40	35.6±9.7	
Cavernous haemangioma	Benign	26	2.7	17 (65.4)	9 (34.6)	17:9	21-30	28.2±4.1	
Leiomyosarcoma	Malignant	13	1.3	4 (30.8)	9 (69.2)	4:9	41-50	50.7±4.0	
Pyogenic granuloma	Benign	18	1.9	8 (44.4)	10 (55.6)	4:5	31-40	32.1±4.1	
Total		970	100.0	494 (50.9)	476 (49.1)				

The results are significant where p<0.05 at 95% confidence interval
SD: Standard deviation, M: Male, F: Female

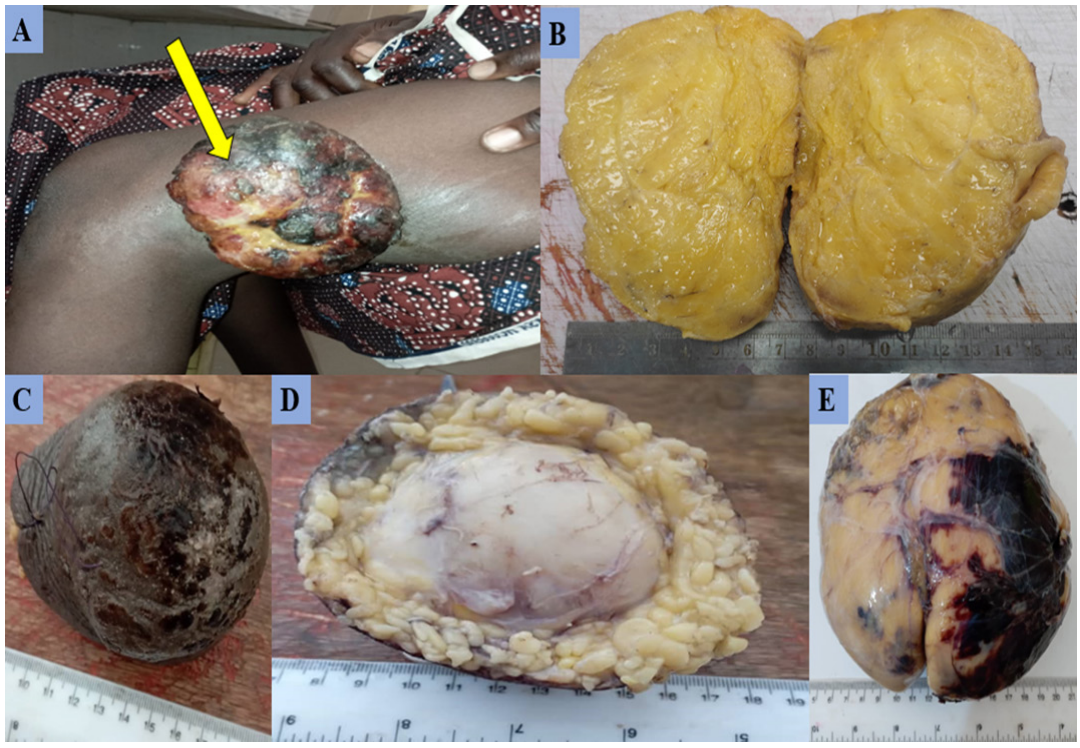

Figure 1. (A) This photograph shows an ulcerated ovoid firm multilobulated neoplasm (thick yellow arrow) with a variegated color on the lateral aspect of the lower half of the left thigh (histopathologic evaluation revealed a malignant soft tissue neoplasm consistent with angiosarcoma). (B) This photograph shows the solid homogenously yellow cut surface of a firm ovoid mass (histopathologic evaluation revealed a benign soft tissue neoplasm consistent with lipoma). (C-D) These photographs are of the same specimen; (C) shows the anterior surface while (D) shows the posterior surface. This was a skin mass, which had a patchy, scaly and ulcerated surface, weighing 550 g and measuring 10.1 x 8.3 x 5.6 cm in its longest dimensions. Its cut-section revealed a partially encapsulated firm dermal-based greyish white tumor which measured 7.5 x 5.6 x 3.9 cm in its longest dimensions and is surrounded by multilobulated fatty tissue (histopathologic evaluation revealed a benign soft tissue neoplasm consistent with dermatofibroma). (E) This photograph shows an ovoid, soft to firm, fatty specimen with subcapsular hemorrhage, weighing 1,200 g and measuring 17.4 x 16.1 x 7.4 cm in its longest dimensions. Its cut-section revealed a soft to firm, golden yellow, and multilobulated solid tissue (histopathologic evaluation revealed a benign soft tissue neoplasm consistent with lipoma).

This finding was consistent with those of other researchers who have also reported broad age ranges (2-20). In our study, STTs were commonly seen in the middle-aged group. This is similar to findings by Vhriterhire et al. (14), who reported a mean age of 43.1 years. Notably, we found that benign STTs were common in the younger population, whereas malignant STTs were more common in the fifth and sixth decades. Similarly, Singh et al. (23) reported that there was a significant correlation with age, thus implying that the frequency of malignant neoplasms increases with age.

We observed no gender predominance, with the male to female ratio 1:1. This was in contrast to Harpal et al. (2) study where the prevalence of soft tissue lesions was reported to be higher in the male gender. In studies by Vhriterhire et al (14), and Ikeri et al. (24), male-female ratios of 1:1.2 and 1:1.3, respectively, were reported. The discrepancies might be due to the sample size.

Over the study period, 28 specific neoplasms of bone and soft tissue lesions were diagnosed and they were classified into benign, intermediate, and malignant subtypes with frequencies of 80.4%, 2.4%, and 17.2%, respectively. This indicates that the majority of these lesions were benign, consistent with findings reported in the literature. Our findings were also similar to Singh et al. (23) study which showed that most of their study cases were benign mesenchymal neoplasms. This might be because neoplasms of adipose tissue origin constituted the majority of soft tissue neoplasms studied. This finding has been attributed to the relative abundance of adipose tissue in the human body (25).

In our study, the trunk was the most common site involved in the occurrence of soft tissue lesions followed by the head and neck region. Notably, benign lesions were significantly associated with the trunk and the head and neck region. In contrast, malignant soft tissue neoplasms had a predilection for the lower extremities.

Table 4. Frequency distribution of specific bone and soft tissue lesions and site of occurrences at University of Ilorin Teaching Hospital

Specific lesions	Frequency	Head and neck n (%)	Trunk n (%)	Upper extremity n (%)	Lower extremity n (%)	p-value
Lipoma	229	53 (28.4)	99 (39.0)	34 (26.8)	43 (24.7)	**0.001**
Fibrolipoma	39	15 (7.0)	14 (5.5)	2 (1.6)	8 (4.6)	
Liposarcoma	12	1 (0.5)	7 (2.8)	-	4 (2.3)	
Neurofibroma	31	6 (2.8)	14 (5.5)	2 (1.6)	9 (5.2)	
Plexiform neurofibroma	5	1 (0.5)	1 (0.4)	2 (1.6)	1 (0.6)	
Schwannoma	3	1 (0.5)	1 (0.4)	-	1 (0.6)	
Malignant peripheral nerve sheath tumor	2	-	1 (0.4)	-	1 (0.6)	
Glomus tumour	3	-	1 (0.4)	2 (1.6)	-	
Rhabdomyosarcoma	29	8 (3.7)	7 (2.8)	3 (2.4)	11 (6.3)	
Dermatofibroma	23	2 (0.9)	8 (3.1)	5 (3.9)	8 (4.6)	
Fibroma	15	7 (3.3)	6 (2.4)	1 (0.8)	1 (0.6)	
Ossifying fibroma	2	2 (0.9)	-	-	-	
Fibromatosis	5	-	4 (1.6)	-	1 (0.6)	
Granular cell tumour	2	1 (0.5)	-	1 (0.8)	-	
Myxoma	1	1 (0.5)	-	-	-	
Fibromyxoma	4	2 (0.9)	-	1 (0.8)	1 (0.6)	
Dermatofibrosarcoma protuberans	24	3 (1.4)	14 (5.5)	4 (3.1)	3 (1.7)	
Fibrosarcoma	65	4 (1.9)	33 (13.0)	2 (1.6)	26 (14.9)	
Capillary haemangioma	135	77 (36.0)	21 (8.3)	21 (16.5)	16 (9.5)	
Lymphangioma	6	3 (1.4)	1 (0.4)	-	2 (1.1)	
Angiosarcoma	4	1 (0.5)	-	1 (0.8)	2 (1.1)	
Giant cell tumour	23	-	1 (0.4)	17 (13.4)	5 (2.9)	
Osteosarcoma	15	-	1 (0.4)	1 (0.8)	13 (7.5)	
Chondrosarcoma	5	1 (0.5)	-	-	4 (2.3)	
Ganglion cyst	36	-	3 (1.2)	25 (19.7)	8 (4.6)	
Angiomyolipoma	2	-	2 (0.8)	-	-	
Cavernous haemangioma	22	15 (7.0)	5 (2.0)	1 (0.8)	1 (0.6)	
Leiomyosarcoma	10	-	8 (3.1)	-	2 (1.1)	
Pyogenic granuloma	17	10 (4.7)	2 (0.8)	2 (1.6)	3 (1.7)	
Total	769	214 (100.0)	254 (100.0)	127 (100.0)	174 (100.0)	

The results are significant where $p<0.05$ at 95% confidence interval

In our study, adipose tissue-derived lesions were the most common, constituting 38.4% of the cases, followed by vascular tissue-derived and fibroblastic tissue-derived lesions constituting 20.6% and 18.8% of the cases, respectively. These observations were consistent with the findings of the study conducted by Singh et al. (23).

Also, we found that lipoma was the most common benign soft tissue neoplasm, accounting for 32.1% of our study cases. This finding is consistent with that of Singh et al. (23), who reported lipomas in 29.3% of their cases. Furthermore, we found that liposarcoma, the malignant counterpart of lipoma, accounted for 1.3% of all soft tissue lesions studied. Our finding aligns with the results of Vhriterhire et al. (14), who reported that liposarcoma constituted 2.1% of all soft tissue lesions they studied.

Notably, the vascular tissue-derived lesions found in our study were primarily hemangioma and angiosarcoma. Hemangioma was the most common vascular tissue-derived lesion, with capillary hemangioma being the most common benign vascular neoplasm, accounting for 16.3% of the cases in our study. Our observation was in agreement with that of Singh et al. (23). Interestingly, malignant vascular tissue-derived neoplasms were rare in our study, with angiosarcoma

Table 5. Yearly fluctuation in the incidence of derivatives of bone and soft tissue lesions in University of Ilorin Teaching Hospital

Yearly fluctuation	Frequency	%	Adipose n (%)	Neural n (%)	Smooth muscle n (%)	Fibrous tissue n (%)	Blood vessels n (%)	Bone, cartilage, and tendon sheath n (%)	Bone n (%)	p-value
1985	23	2.4	7 (1.9)	-	1 (2.0)	4 (2.2)	9 (4.5)	2 (5.6)	-	**0.001**
1986	27	2.8	6 (1.6)	1 (1.8)	1 (2.0)	9 (4.9)	9 (4.5)	-	1 (1.4)	
1987	41	4.2	8 (2.1)	5 (8.9)	2 (4.0)	12 (6.6)	9 (4.5)	1 (2.8)	4 (5.5)	
1988	24	2.5	4 (1.1)	1 (1.8)	2 (4.0)	6 (3.3)	9 (4.5)	1 (2.8)	1 (1.4)	
1989	9	0.9	1 (0.3)	-	-	4 (2.2)	2 (1.0)	1 (2.8)	1 (1.4)	
1990	26	2.7	10 (2.7)	-	3 (6.0)	8 (4.4)	4 (2.0)	-	1 (1.4)	
1991	20	2.1	11 (2.9)	-	1 (2.0)	5 (2.7)	2 (1.0)	-	1 (1.4)	
1992	28	2.9	10 (2.7)	2 (3.6)	1 (2.0)	5 (2.7)	5 (2.5)	2 (5.6)	3 (4.1)	
1993	15	1.5	3 (0.8)	-	2 (4.0)	4 (2.2)	-	2 (5.6)	4 (5.5)	
1994	26	2.7	7 (1.9)	2 (3.6)	6 (12.0)	4 (2.2)	2 (1.0)	-	5 (6.8)	
1995	20	2.1	3 (0.8)	2 (3.6)	1 (2.0)	9 (4.9)	2 (1.0)	2 (5.6)	1 (1.4)	
1996	18	1.9	6 (1.6)	1 (1.8)	2 (4.0)	1 (0.5)	7 (3.5)	1 (2.8)	-	
2001	45	4.6	22 (5.9)	6 (10.7)	3 (6.0)	3 (1.6)	9 (4.5)	-	2 (2.7)	
2003	37	3.8	19 (5.1)	6 (10.7)	2 (4.0)	5 (2.7)	3 (1.5)	1 (2.8)	1 (1.4)	
2006	78	8.0	33 (8.8)	3 (5.4)	2 (4.0)	11 (6.0)	20 (10.0)	5 (13.9)	4 (5.5)	
2007	99	10.2	34 (9.1)	5 (8.9)	5 (10.0)	21 (11.5)	19 (9.5)	6 (16.7)	9 (12.3)	
2008	88	9.1	36 (9.7)	3 (5.4)	5 (10.0)	20 (11.0)	12 (6.0)	1 (2.8)	11 (15.1)	
2009	103	10.6	41 (11.0)	6 (10.7)	4 (8.0)	19 (10.4)	24 (12.0)	4 (11.1)	5 (6.8)	
2012	65	6.7	35 (9.4)	3 (5.4)	2 (4.0)	5 (2.7)	9 (4.5)	-	11 (15.1)	
2013	59	6.1	28 (7.5)	1 (1.8)	2 (4.0)	11 (6.0)	10 (5.0)	3 (8.3)	4 (5.5)	
2014	61	6.3	26 (7.0)	6 (10.7)	2 (4.0)	5(2.7)	18 (9.0)	1 (2.8)	3 (4.1)	
2016	58	6.0	23 (6.2)	3 (5.4)	1 (2.0)	11(6.0)	16(8.0)	3 (8.3)	1 (1.4)	
Total	970	100	373 (100.0)	56 (100.0)	50 (100.0)	182 (100.0)	200 (100.0)	36 (100.0)	73 (100.0)	

The results are significant where p<0.05 at 95% confidence interval

accounting for 0.4% of our study cases. Similarly, Singh et al. (23), reported two cases of angiosarcoma among 270 STTs studied.

Schwannomas, and neurofibromas were the most common benign peripheral nerve sheath tumors (PNSTs) observed in our study, and this finding is consistent with other relevant studies (4,19). The common sites for benign PNST were the trunk, followed by the head and neck region. This finding was comparable to the findings of Singh et al. (23). Interestingly, only two cases of malignant PNST were seen in the trunk and lower extremities in this study.

In our study, the neoplasms of skeletal muscle tissue-derivation were all malignant, being mainly rhabdomyosarcoma, which accounted for 3.6% of all soft tissue lesions studied. Rhabdomyosarcomas were commonly found in the lower extremities. Interestingly, our findings contrast sharply with those of Singh et al. (23), who reported that the head and neck region was the most common site for rhabdomyosarcoma occurrence.

The major malignant soft tissue neoplasm in our study was fibrosarcoma. This finding contrasts with the incidence of malignant soft tissue neoplasms in Europe, where leiomyosarcoma was found to be the most common malignant soft tissue neoplasm (17,18). Also, a similar study conducted in Thailand revealed that the most common malignant soft tissue neoplasm was unspecified sarcoma (accounting for 24% of their cases) followed by leiomyosarcoma and liposarcoma (26). Our finding is, however, in agreement with previous bone and soft tissue studies conducted in our center by Adeniji et al. (27) and Wemimo et al. (28).

In our study, the primary benign bone lesions were more common than malignant bone lesions. This finding is consistent with the results of Obalum et al. (7), and Aina et al. (6). Also, we found that the most common benign bone neoplasm was giant cell tumour, and this contrasts with the findings of some researchers who found osteochondroma as the most common benign bone neoplasm (6-9). Notably, osteosarcoma and

chondrosarcoma were the most common malignant primary bone neoplasms in our study, and this finding is consistent with results from other relevant studies (5-9).

The limitations of our study were derived from its retrospective nature in that we could not find the histopathology registers and files, for archiving pathology laboratory request forms and reports, for ten years within the study period of 1985 to 2016. The missing years were 1997 to 2000, 2002, 2004 to 2005, 2010 to 2011, and 2015. Also, we could not carry out ancillary histopathological studies of the bone and soft tissue lesions, such as immunohistochemistry, cytogenetics/karyotypic studies, and polymerase chain reaction studies, because of a lack of resources. Furthermore, the findings of our study cannot be generalized to the entire country because it is a single-center study. Thus, for further study, we would like to conduct a more robust multi-center study and include ancillary histopathological studies. Additionally, we would like to conduct both single-center and multi-center prospective bone and soft tissue studies with the inclusion of ancillary histopathological studies where all the quality control variables will be managed by the authors.

Conclusion

Our study identified seven soft tissue derivatives, with adipose tissue being the most prevalent. Lipoma emerged as the most common specific soft tissue lesion, while fibrosarcoma was the most frequent malignant soft tissue neoplasm. Among bone neoplasms, giant cell tumor was the most common. Clinically, these findings highlight the importance of focusing on diagnostic and therapeutic efforts on these prevalent tumors to improve patient outcomes.

Ethics

Ethics Committee Approval: The study was approved by the Rasheed Shekoni Federal University Teaching Hospital, Dutse Institutional Ethics Committee (decision number: RSFUTH/GEN/226/V.II, date: 28.11.23).

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: U.B.E., N.A.I., I.S., A.A.H., Concept: M.W.R., E.A.A., Design: M.W.R., U.B.E., I.S., E.A.A., Data Collection or Processing: M.W.R., U.B.E., A.A.A., N.A.I., I.S., A.A.H., Analysis or Interpretation: M.W.R., U.B.E., A.A.A., A.A.H., E.A.A., Literature Search: M.W.R., U.B.E., A.A.A., N.A.I., I.S., E.A.A., Writing: M.W.R., U.B.E., A.A.A., N.A.I.

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