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Pathology

STUDY OF THE HISTOPATHOLOGICAL SPECTRUM OF SOFT TISSUE TUMORS IN A TERTIARY CARE CENTRE IN GWALIOR

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ABSTRACT **Introduction:** Soft tissues are the supporting component of the body comprising of fibrous (connective) tissue, adipose tissue, skeletal muscle, blood vessels, lymph vessels and peripheral nervous system. Soft tissue tumors have extensive discrepancy with respect to their benign or malignant nature which can be detected by microscopic examination. Hence histopathological examination plays a crucial role in their further management. **Material And Methods:** A study of 222 cases of soft tissue tumour was carried out from 1st January2018 to 30th June 2019. Soft tissue specimens which were received at the Pathology Department of Gajra Raja Medical College, Gwalior were studied by routine histopathological examination. All the data relevant to the cases were collected and compared. **Results:** The incidence of soft tissue tumors was found to be more in males with male: female ratio of 1.3:1. Most common affected age group in our study is 31-40 years. Out of total 222 cases, 213 were benign lesion and 9 were malignant.Most common benign soft tissue tumor in present study was lipomatous followed by peripheral nerve sheath tumors(PNST, 24.32%), followed by vascular tumor (23.42%). Schwannoma and neurofibroma were seen among the PNST.There were 2 cases each of malignant rhabdomyosarma, synovial sarcoma and undifferentiated pleomorphic sarcoma. **Conclusion:** Soft tissue malignancy ranges from a broad spectrum of histogical types of benign and malignant tumors. Hence, histopathological examination plays a key role as identification of various premalignant lesions and malignant lesions on time can improve patient's prognosis.

KEYWORDS :

INTRODUCTION

Soft tissues are mesenchymal in origin that support or surround other structures and organs of the body. It comprises of fibrous (connective) tissue, adipose tissue, skeletal muscle, blood vessels, lymph vessels and peripheral nervous system;[1] Soft tissue tumors can be benign and malignant in nature. Soft tissue tumors have extensive discrepancy which can be detected by microscopic examination. Most common soft tissue tumors are benign in nature as compared to malignant. Slight male predominance is seen and this tumor can occur at any age[2]**.** Most common soft tissue tumors are lipoma (30%), whereas fibrohistiocytic tumors and fibrous tumors account for 30% cases, other being vascular tumors (10 %) and are peripheral nerve sheath tumors PNST(5%). Lipomas are benign painless tumor which is located most commonly in hand, lower limb and are foot and are infrequent in children[3]. Angiolipoma is a painful tumor seen in young men, whereas angioleiomyomas are tumors of middle aged woman. Vascular tumors are seen in young age [4]. Among benign tumors95% are superficially located and 95% are less than 5cm in size. Soft tissue sarcoma incidence is rare when we compare it with carcinoma, and it constitutes around 1% of all malignancy [5]. Etiology of benign and malignant soft tissue tumor is unknown. However few studies suggest genetic and environmental factors, irradiation, viral infections and immunodeficiency to be linked to the progression to malignant soft tissue tumors. Few cases suggest that sarcoma arise in scar tissue, at fracture sites and close to surgical implants [6]. Soft tissue sarcoma is a rare entity which constitutes less than 1% of all cancer. It is most commonly seen in muscles of extremities, chest wall, mediastinum and the retroperitoneum. Sarcomas are mostly seen in old age and most common age group affected is around 55 years of age.

MATERIAL AND METHODS

The Present study comprises 222 cases of soft tissue specimens that were received in the Pathology Department of G.R.Medical College, Gwalior during a period of 18 months i.e. from 1st January 2018 to 30th June2019. Study includes all the patients admitted in the Department Of Surgery of JAH Group of Hospitals, Gwalior (MadhyaPradesh) and were operated. Their specimens were sent to Pathology Department for histopathological examination during the study period. All the relevant data were recorded from requisition recieved along with soft tissue specimen during the study period. A detailed clinical history with respect to their age, sex, site, and microscopic findings were recorded. Follow up of this study was not possible, as majority of patients did not come back for follow up. Specimens without proper labeling and documentation and autolysed specimen were not included in this study. Approval from ethical review committee of institutional ethical committee Gajra Raja Medical College was taken prior to the start of the study. Specimens were fixed by 10% neutral buffered formalin for 8-10 hours at room temperature and volume of formalin used was 10-20 times of the volume of the specimen. Gross examination of soft tissue tumors specimens were done and gross findings as well as findings during sectioning were noted. After that blocks were prepared according to site, size and any abnormal areas(i.e. other areas showing necrosis, hemorrhage, cystic, myxoid and others specific features). For tissue sectioning microtome was used. Before sectioning blocks were put on ice plate or tray for 10-15 min. Microtome cuts thin sections of 5 µm thickness using the block. Sections were carefully transferred to warm water bath. Floated tissue was scooped onto a slide placed under the water level. Slides were labeled and allowed to dry on the 37°C hot plate for melting excess wax present in the tissue. Routine histological sections were prepared using Hematoxylin and eosin stain.

OBSERVATION AND RESULTS

In this study total 222 soft tissue specimens / biopsy were included that were received in department of pathology. Clinical history, age, sex, their morphological appearance, gross and microscopy were recorded. The frequency of different soft tissue lesions during the study period, their categorization, and their histo-pathological correlations were done in this study.

Most common age group in our study is 31-40 years (25.22%), followed by 21-30 years (20.72%), and 41-50 years (17.56%) (table 1)

Table 1: Age Group Wise Distribution Of Soft Tissue Tumor (Total 222 Cases Of STT)

Age group	No. of cases	Percentage
0-10 years	12	5.40%
11-20 years	30	13.51%
21-30 years	46	20.72%
31-40 years	56	25.22%
41-50 years	39	17.56%
51-60 years	20	9.0%
61-70 years	11	4.95%
>70 years	8	3.60%
Total	222	100%

Table 2 : Distribution Of Benign And Malignant Soft Tissue Tumor

Category of tumor	Total cases	Benign tumor	Malignant tumor
Adipocytic tumors	83	81	2
Vascular tumor	52	52	-
Peripheral nerve sheath tumor	54	54	-

Fibrous tumor	24	23	1
Fibrohistiocytic tumor	2	2	-
Skeletal muscle tumor	2	-	2
Smooth muscle tumor	1	1	-
Synovial sarcoma	2	-	2
Unclassified tumors (UPS)	2	-	2
Total	222	213(95.94%)	9(4.06%)

Out of 222 soft tissue specimens, 213(95.94%) were benign tumors and 9(4.06%) were malignant tumors. Category wise distribution of benign and malignant soft tissue tumor have been depicted in table 2.

Out of 222 soft tissue specimens, lipomatous tumor was found in 83 cases in which 81 were benign and 2 were malignant. In benign lesions most common tumor was lipoma (73 cases), followed by Fibrolipoma (6 cases), Angiolipoma (1 case), and Angiomyolipoma (1 case). In malignant tumor 2 cases of Liposarcoma were found (table 3)

Table 3:distribution Of Various Lipomatous Tumors (Total 83 Cases)

Name of tumor	Total cases	Percentage
Lipoma	73	87.95%
fibrolipoma	6	3.61%
Angiolipoma	1	1.20%
Angiomyolipoma	1	1.20%
Liposarcoma	2	2.40%
Total	83	100%

In this study 52 cases of vascular tumor were seen and it was found that most common lesion was capillary hemangioma (32 cases), followed by pyogenic granuloma (18 cases), 1 case of lymphangioma and 1 case of cavernous hemangioma were seen (table 4).

Table 4 : Distribution Of Various Vascular Tumors(Total 52 Cases)

Name of vascular tumor	No. of cases	Percentage
Capillary hemangioma	32	61.53%
Pyogenic granuloma	18	34.61%
Lymphangioma	1	1.92
Cavernous hemangioma	1	1.92%
Total	52	100%

There were 54 cases of peripheral nerve sheath tumor in which most common tumor was Schwannoma (39cases) and 15 cases of neurofibroma were seen (table 5).

Table 5 : Distribution Of Various PNST (Total 54 Cases)

Name of tumor	No. of cases	Percentage
Schwannoma	39	72.22%
Neurofibroma	15	28.84%

Total 24 cases of Fibrous tumor were seen, in which 23 were benign and one case was malignant. Most common tumor was fibroma (13 cases), followed by benign fibromatosis (5 cases), nodular fascitis (3 cases), proliferative fascitis (1 case) and one case of calcifying fibrous tumor . There was one case of fibrosarcoma. Two cases of Fibrohistiocytic tumor are also observed in which both were benign in nature (table 6).

Table 6: Distribution Of Various Fibrous And Fibrohistiocytic Tumors (Total 26 Cases)

Name of tumor	No. of cases	Percentage
Fibroma	13	50%
Benign fibromatosis	5	19.23%
Nodular fasciitis	3	11.5%
Proliferative fasciitis	1	3.84%
Calcifying fibrous tumor (CFT)	1	3.84%
Fibro sarcoma	1	3.84%
Benign Fibrohistiocytic tumor	2	7.69%
Total	26	100%

One case of smooth muscle tumor known as leiomyoma and 2 cases of malignant rhabdomyosarcoma which is a skeletal muscle tumor were also observed. In tumors of uncertain differentiation category 2 cases of synovial sarcoma were found. Among undifferentiated/unclassified category, 2 cases of undifferentiated pleomorphic sarcoma (UPS) were reported (table 2).

Site wise distribution of soft tissue tumors have been depicted in table no 7.

Table 7 : Site Wise Distribution Of Soft Tissue Tumors

Name of tumor	Upper limb	Lower limb	Abdomen and retroperitoneum	Chest	Back	Pelvis	Head and neck	Total
Adipocytic	24	10	15	4	16	-	14	83
Vascular	17	4	2	1	2	-	26	52
PNST	8	4	2	1	10	-	29	54
Fibrous tumor	13	3	2	1	2	1	4	26
Skeletal muscle tumor	-	-	-	-	-	-	2	2
Smooth muscle tumor	-	-	1	-	-	-	-	1
Synovial sarcoma	1	1	-	-	-	-	-	2
Undiffrentiated pleomorphic sarcoma(UPS)	-	2	-	-	-	-	-	2
Total	63	24	22	7	30	1	75	222

Out of total 213 cases of benign STT, males were 124 and females were 89 (table 8). There were 9 cases in total of malignant STT , which was seen in 5 males and 4 female patients (table 9).

Table 8: Male: Female Distribution Of Benign STT

Total cases	Male	Female
213	124	89

Table 9: Male: Female Distribution Of Malignant STT (Total cases 9)

Name of tumor	Male	Female	Total
Liposarcoma	1	1	2
Rhabdomyosarcoma	1	1	2
Synovial sarcoma	1	1	2
Fibrosarcoma	-	1	1
Undifferentiated pleomorphic sarcoma	2	-	2
TOTAL	5(55.55%)	4(44.45)	9

DISCUSSION

Soft tissue tumors are represented in our body by skeletal muscle tumor, smooth muscle tumor, adipose tissue tumors, and tumors of fibrous tissue and blood vessels tumor. Aim of this study is to assess frequency of benign and malignant soft tissue tumor with respect to age and gender, site distribution, and compare with other related studies.

Majority of soft tissue tumors were benign in comparison to malignant. Out of 222 cases of soft tissue tumors 213(95.94%) were benign and 9 cases (4.05%) were malignant which is almost similar to study of Jain P et al (90.6% benign and 9.4% malignant)[7], Batra P et al (89.2% benign and 10.8% malignant)[8], Makino Y (96% benign and 4% malignant) [9] (table no. 10).

Table 10: Comparison Of Benign Verses Malignant STT Among Various Studies

Name of study	Benign	Malignant
Jain P et al	90.6%	9.4%
Batra P et al	89.2%	10.8%
Makino Y	96%	4%
Present study	95.94%	4.05%

Table 11: Comparison Of M:F Ratio Seen In STT Among Various Studies

Name of study	Male: Female ratio
Jain P et al	1.2:1
Batra P et al	2.1:1
Kransdorf MJ et al	1.2:1
Beg S et al	1.8:1
Jobanputra GPet al	1.37:1.

Present study	1.3:1

Tumors are frequent in male population than female. Male to female ratio was 1.3:1 in present study which was compared with different studies like Jobanputra GP et al(1.37:1)[10] Jain P et al(1.2:1)[7], Batra P et al(2.1:1)[8], Kransdorf MJ et al(1.2:1)[11], Beg S et al(1.8:1)[12] (table no 11).

Most common age group affected in our study is 31-40 years (25.22%), followed by 21-30 years (20.72%), and 41-50 years (17.56%), which was similarly found in study of Ramnani B.G et al[13]. However, in a study of Bera K et al, most common age group was 30-50 years[14]. Jain P et al reported most common age group as fifth to sixth decade in his study [7].

Most common benign soft tissue tumor in present study is lipomatous (36.48%), which is also observed in study of Jensen OM et al (48.1%), and Dev G et al (31.3%)[15,16], whereas second most common tumor was PNET (24.322%), followed by vascular tumor(23.42%) Dr.VaideheeNai et al in his study shows vascular tumors (19.46%) to be more common than peripheral nerve sheath tumors (13.27%)[17] and his study findings are also consistent with Dr. Bera K et al[14].

In the lipomatous category total 83 tumors were found in which 81 tumors were benign and 2 were malignant. Most common lipomatous tumor was lipoma (87.95%), followed by Lipofibroma (7.22%), Angiolipoma (1.20%), and Angiomyolipoma (1.20%). In malignant lipomatous tumor 2 cases (2.40%) of Liposarcoma were found. In our study most common site of lipomatous tumor was upper extremities (24 cases), which was similar to study of Dr. Bera K et al[14], Ramnani BG et al[13] and Chakrabarti PR et al. [18]. The age group for this category was 11-60 years in our study.

Two cases of malignant Liposarcoma were found that were seen in a 20 year female on left leg and another one was seen in 45 year male at thigh region both tumors were myxoid variant, The results were almost similar to study by Chakrabarti PR et al reported one case of atypical lipomatous tumor in her study. [18].

In this study 54 cases of PNST (24.32%) were found. All of them were benign in nature. These findings are almost similar to study of Sundar BS et al [19] whose incidence of peripheral nerve sheath tumors to be 21.9%, while Bera et al [14] and Jain P et al reported an incidence of 20.2% and 19.72% respectively. Schwannoma was most common benign tumor in our study seen in 39 cases (72.22%), whereas neurofibroma was seen in 15 cases (27.78%). The age group for PNST is 11-50 years in our study which is also similar to study done by Chakrabarti PR et al. She reported 17(89.47%) cases of PNST among 11-50 yrs age group patients in her study[18].

There were 54 cases of peripheral nerve sheath tumor. Among them, most common was Schwannoma 39(72.22%) and 15(27.77%)cases of neurofibroma. The study done by Naike et al[17] reported 80% neurofibroma and 20% schwannoma in their study. Chakrabarti PR et al[18] reported 63.2% neurofibroma and 36.8% schwannoma in their study.

In this study 52 cases of vascular tumors were found. all were benign in nature. Most common site for these tumor was head and neck region, and age group was 0-40 years. Most common vascular tumor was capillary hemangioma (61.53%), followed by pyogenic granuloma (34.61%), Lymphangioma (1.92%), and cavernous hemangioma (1.92%). These findings were similar to study conducted by Jain P. et al (20%) [7]and RamnaniBG et al (23.3%)[13]. No malignant vascular tumor was seen in present study which is also similar to study done by Chakrabarti PR et al[18] reported 19 vascular tumor to be benign.

In this study 24cases of fibrous tumor were observed in which 25 cases were benign and 1 case was malignant . For benign tumor most common site was upper limb whereas for malignant, it was found on pelvic region. Most common fibrous tumor was fibroma (13 cases), followed by benign fibromatosis (5 cases), nodular fascitis (3 cases), proliferative fasciitis (1 cases), Calcifying Fibrous Tumor(1 cases). Along with this 2 cases of benign Fibrohistiocytic tumors were also found, which nowadays accounted in a separate group of tumors. In study of Singh Harpal et al fibrous tumor constitute 11% of benign tumor and 1% of malignant soft tissue tumor.

One case(0.45%) of smooth muscle tumor known as leiomyoma was observed in this study. Agravat et al [20]was found its incidence to be 1% and 2% in study of Singh Harpal et al[21]. Age of this patient was 70 year old and it was localized on abdomen in our study.

Two cases (0.90%) of malignant rhabdomyosarcoma were seen in this study which was comparable with the study done by Sharma B.K. et al(1.8%)[22].One tumor was located at head region in a was 44year female and another tumor was located at thigh region in a 40 year female in present study.

Two cases (0.90%) of uncertain differentiation category tumors were also seen. Both were synovial sarcoma. One tumor was observed in 41 year old female at popliteal fossa, and another one was observed in 55 year old female at shoulder region. The study is almost similar to study of Agravat et al (2010) [20] which showed incidence of uncertain tumor to be 1%.

In this study 2 cases (0.90%) of undifferentiated pleomorphic sarcoma were observed in which both were male patients one patient was 22 year old and another one was 60 year old.

CONCLUSION:

Histopathological examination of every soft tissue specimen is a necessity and prerequisite to identify benign and malignant pathology. A good clinical assessment, along with grossing of specimen, and microscopic evaluation of hematoxylin eosin stained sections are basic aspects in diagnosisof soft tissue tumors. Various premalignant lesions if identified timely can improve patient's prognosis.

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