

Original Article

Benign and Malignant Soft Tissue Tumors of Extremities in Adults at Thammasat University Hospital

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Abstract

- Objectives:** To study the number of cases and the clinicopathological correlation of soft tissue tumors in extremities in adults at Thammasat University Hospital.
- Method:** Descriptive retrospective study, 187 cases of soft tissue tumor in extremities of adult patients (more than 14 years old) whom undergone at least marginal excisions, and been diagnosed with soft tissue tumors, as per the World Health Organization classification of tumors of soft tissue and bone (2013), during the 3-year period, 1 January 2016 - 31 December 2018.
- Result:** Benign soft tissue tumors accounted for 95.7% of cases, while only 4.3% were attributed to malignant ones. The ratio of female to male patients in the study was 1.03:1, while the female to male ratio among those patients with malignant tumors was 1.67:1. The mean age of patients was 52.3 years. The common age of those with malignant tumors was over 40 years old. Malignant tumors were predominant in the lower extremities, with the size of more than 5 cm in greatest dimension, and located in the deep-seated layer.
- Conclusion:** The number of benign soft tissue tumors is greater than the of sarcomas. The most common benign tumor is lipoma, while the most common malignant one is leiomyosarcoma.
- Keywords:** Soft tissue tumors, Extremities, Adults

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Introduction

Soft tissue tumors are relatively rare and difficult to diagnose. There are more than 50 different entities of soft tissue tumors which require different treatment. Therefore, the services of a medical specialist are sometimes necessary. Nowadays, many diagnostic methods are available, such as radiography, ultrasonography, computed tomography, magnetic resonance imaging, and biopsy or excision. The incidence of benign tumors outnumbers malignant ones by approximately 100:1,^{1,2} but the incidence of benign or malignant tumors is difficult to identify.^{2,3} Symptoms of soft tissue tumors are slow-growing mass. One of the important clinical features of a soft tissue lesion is its size.¹ If lesion size is over 5 cm in maximum dimension, it has a likelihood of being malignant.^{1,2} Soft tissue tumors can occur anywhere, but most (> 75%) are arose in the extremities.² Benign tumors have been estimated to occur in more than 3,000 cases per million population, whereas sarcomas occur in only about 50 cases per million. Neither Thailand nor Thammasat University Hospital has collected data of patients with soft tissue tumors. The purpose of this Thammasat University Hospital study is to determine the number of cases and clinicopathological features of soft tissue tumors with respect to age groups, gender, sites, locations, and sizes of tumors in the extremities of adults.

Methods

This descriptive retrospective study is based on the collected data from adult patients, more than 14 years of age, who have soft tissue tumors in their extremities, and who have undergone at least marginal excision at Thammasat University Hospital. All cases were received in the Department of Pathology during the three-year period, 1 January 2016 to 31 December 2018. The final pathologic diagnosis has been in accordance with the WHO classification of tumors of soft tissue and bone (2013). The data from all benign and malignant cases were obtained from the hospital's electronic database, and included ages, gender, site distribution, locations, sizes, and pathological diagnoses, recorded in the Case Recorded form. All cases were reviewed by one general pathologist and one bone and soft tissue pathologist. The immunohistochemical studies were used to diagnose all of the malignant cases and some benign cases including SMA, desmin, caldesmon, S100, myogenin, myoD1, CD34, CD31, and AE1/AE3. STATA version 12.0 was used in this study. The factors were analyzed by using the Fisher Exact test. The $P < 0.05$ was determined to statistically significant. The data were reported as percentages and mean.

Results

In total, 187 cases of soft tissue tumors were collected by the Department of Pathology, Thammasat University Hospital, Bangkok, during the three-year period 1 Jan 2016 – 31 Dec 2018 (Table 1).

Table 1 Clinicopathologic characteristics of study cases (N = 187)

Factors	Benign (%)	Malignant (%)	Total (%)	P value
Gender				-
Female	90 (50.3)	5 (62.5)	95 (50.8)	
Male	89 (49.7)	3 (37.5)	92 (49.2)	
Age				0.165
Range (year)	17 - 83	41 - 81	17 - 83	
Mean (year)	52.1	57.1	52.3	
Tumor site				< 0.001
Upper extremity	136 (76)	1 (12.5)	137 (73.3)	
Lower extremity	43 (24)	7 (87.5)	50 (26.7)	

Table 1 Clinicopathologic characteristics of study cases (N = 187) (Cont.)

Factors	Benign (%)	Malignant (%)	Total (%)	P value
Tumor location				< 0.001
Superficial	171 (95.5)	2 (25)	173 (92.5)	
Deep-seated	8 (4.5)	6 (75)	14 (7.5)	
Tumor size (range 0.5 - 31 cm)				< 0.001
< 5 cm	125 (69.8)	0 (0)	125 (66.8)	
≥ 5 cm	54 (30.2)	8 (100)	62 (33.2)	
Total	179 (100)	8 (4.3)	187 (95.7)	

Benign soft tissue tumors accounted for 95.7% of the cases of all soft tissue tumors. In contrast, the malignant soft tissue tumors constituted only 8 cases (4.3%), with the benign to malignant ratio of 22:3. In the soft tissue tumors of the extremities, the ratio of females to males was 1.03:1. The malignant soft tissue tumors had a slight female predominance. The benign and malignant soft tumors had a female to male ratio of 1.01:1 and 1.67:1, respectively. The mean age was 52.3 years (age range: 17 - 83 years). 75% of malignant soft tissue tumors had a peak age was in the 5th and 7th decades. 72.7% of the benign soft tissue tumors had a predilection to upper extremities; 69.8% had a size less than 5 cm; and 95.5% arose in the superficial layer. The benign tumors that arose in the deep layer were intramuscular lipomas, intramuscular hemangiomas, and synovial hemangiomas.

87.5% of the malignant soft tissue tumors had a predisposition to the lower extremities. All the malignant tumors were more than 5 cm in size, and the 75% of them were predominantly located in the deep-seated layer. The remaining 25% of sarcomas that arose in the superficial layer were two cases of myxofibrosarcoma.

The most common benign soft tissue tumors in our study were adipocytic tumors (86%) followed by vascular tumors (9.5%), nerve sheath tumors (2.2%), and others (2.3%) (Figure 1). The majority (50%) of malignant soft tissue tumors were smooth muscle tumors, followed by fibroblastic/myofibroblastic tumors (25%), adipocytic tumors (12.5%), and undifferentiated sarcomas (12.5%) (Table 2). The tumors that arose in the lower extremities, have a large size (greater than or equal to 5 cm), and were located in the deep-seated layer, are at significant risk of malignancy ($P < 0.001$).

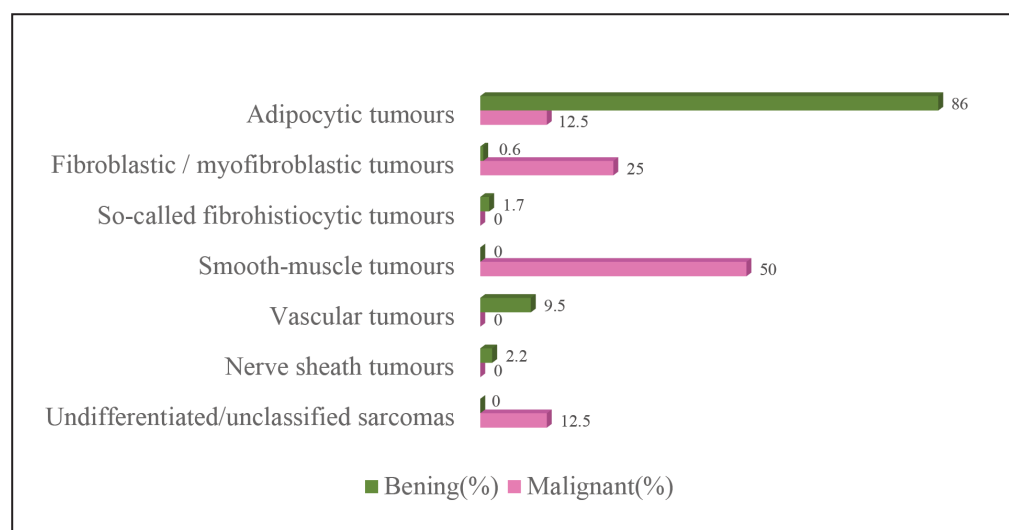
**Figure 1** Histologic groups of soft tissue tumor in extremities.

Table 2 Clinicopathologic features of malignant cases

No	Diagnosis	Age (year)	Gender	Site	Location	Size (cm)
1	Leiomyosarcoma	62	Female	Thigh	Deep	9
2	Leiomyosarcoma	62	Male	Ankle	Deep	9
3	Leiomyosarcoma	47	Female	Thigh	Deep	7
4	Leiomyosarcoma	44	Female	Thigh	Deep	7.5
5	Myxofibrosarcoma	81	Male	Forearm	Superficial	8.7
6	Myxofibrosarcoma	66	Female	Knee	Superficial	9
7	Dedifferentiated/ well-differentiated liposarcoma	54	Male	Thigh	Deep	26.5
8	Undifferentiated pleomorphic sarcoma	41	Female	Leg	Deep	11

Discussion

The benign soft tissue tumors were 95.7%, while only 4.3% were malignant tumors, which related to the studies of Myhre Jensen et al,⁴ Baste BD et al,⁵ Umarani MK et al,⁶ and other studies which reported that benign cases (25.2 - 94.9%) outnumbered malignant cases (5 - 14.8%). Krandorf, M.J. et al^{7, 8} reported 60.2% benign and 39.8% malignant soft tissue tumor cases, respectively.

There was a similar number of female and male cases in this study at 50.8% and 49.2% respectively. In malignant tumors, females were predominant over males with a ratio of 1:1.67, which is similar to the studies of Reshadi H. et al⁹ and Toro J.R.¹⁰ However, some studies have revealed an excess of male cases over female ones.^{4, 5, 11-15} The relationship between soft tissue tumors and gender is difficult to estimate accurately due to the difference in diverse populations and various natural regions.

In our present study, the common age range was 41 - 70 years (87.5%) in the malignant group, while Umarani M.K.⁶ reported the typical age group of 40 - 60 years, and Basted B.D.⁵ and Jain P.¹¹ stated the age group of patients at 50 - 60 years.

82.9% of the adipocytic tumors were the most common extremity soft tissue tumors. The majority of the benign group were lipomas and its variants. Leiomyosarcoma was the major group of sarcomas (see Figure 1). Batra P. et al¹³ reported that adipocytic tumors were the most common benign tumor, while leiomyosarcoma was the most

frequent malignant tumor. Various studies have been reported that benign adipocytic tumors were the most common soft tissue tumor.

All soft tissue and benign tumors were common in the upper extremities, whereas the majority of malignant soft tissue tumors occurred in the lower extremities. Baste B.D.,⁵ Jain P.,¹¹ and Batra P.¹³ reported the common sites of sarcomas was lower extremities.

Most benign soft tissue tumors were small (< 5 cm in size), and located in the superficial layer, whereas the malignant tumors were large and located in the deep-seated layer. The remaining cases (25%) of malignant tumors were myxofibrosarcoma, which is a malignant tumor arising in the superficial layer. Deepak, M.B.⁵ reported a benign tumor size of < 5 cm (75%). The study of Myhre Jensen, O.⁴ showed 95% of benign tumors were small, and 99% were located in the superficial layer, whereas more than 50% of malignant tumors were > 5 cm in size, and 73% were deep-seated.

The limitation of this study is a small number of samples and few cases of sarcomas that were performed in a single center.

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