

GIANT LIPOMATOUS TUMORS OF THE THIGH

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ABSTRACT

Introduction: Lipomas are the most common soft tissue tumors and they can occur anywhere in the body. They may rarely become to giant dimensions and they are called as “giant lipomas”. Giant lipomas are rare and they may also resemble to malignant soft tissue tumors. In this case they should be differentiated especially from liposarcomas. In this study we evaluated the treatment results of lipomatous tumors (giant lipomas and liposarcomas) of the thigh with their clinical, radiological, and histopathological features.

Materials and methods: Twelve patients with giant lipomatous tumor on thigh who underwent surgical excision were included to the study. Patients were evaluated with magnetic resonance imaging (MRI) preoperatively. To rule out distant metastasis, thoracic and abdominal computed tomography (CT) were performed. Initially, incisional biopsy was performed, and according to the histopathological results, these giant lipomatous tumors were surgically excised.

Results: There were 6 males and 6 females with an average age of 55,6 years. Histopathological examinations revealed the lesions to be giant lipomas in nine patients, and liposarcomas in the remaining three patients. Because of the dimensions or weight of the lipomas, they were accepted as “giant lipomas”. The heaviest lipoma was 1976 g. After surgical excision patients were followed up with an average of 24,3 months. During the follow up of the patients, local recurrences and distant metastasis were not observed.

Conclusion: Giant lipomas are rarely seen tumors. Differential diagnosis of giant lipoma and liposarcoma may cause difficulties. In the presence of suspicion, biopsy should be performed. Surgical treatment modality also should be planned according to the histopathological results. Marginal surgical excision is adequate for giant lipomas, but as wide as possible surgical excision with negative surgical margins should be performed for liposarcomas to reduce the rate of local recurrences.

Key words: Lipoma, Liposarcoma, Magnetic resonance imaging, Biopsy.

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Introduction

Lipomas are among the most common benign mesenchymal tumors that are composed of mature adipose cells. With an estimated incidence near 10%, they are the most mesenchymal tumor. They can occur in any part of the body where there are adipose cells, particularly in the subcutaneous tissue. However, lipomas can also be subfascial and further classified as parosteal, interosseous, or visceral as well as intermuscular and intramuscular^(1,2).

Lipoma is rare during the first two decades of life and usually makes its appearance when fat begins to accumulate in inactive individuals. Most

become apparent in patients 40-60 years of age. Statistics as to gender incidence vary, but most report a higher incidence in men. There seems to be no difference in regard to race; and in the United States, Whites and African Americans are affected in proportion to their distribution in the general population⁽³⁾.

Lipomas are usually small soft tissue masses and rarely reach to an exceptionally large dimension. They can also be classified according to their dimensions. A lipoma is considered “giant” when it is greater than 10 cm in any dimension or weighs more than 1000 g⁽²⁾. Giant lipomas are rare and should be differentiated from liposarcomas, which

are usually in close relationship with tumor dimensions⁽⁴⁾. It is difficult to differentiate low-grade liposarcomas from benign lipomas based solely on imaging findings. A definitive diagnosis of giant lipoma can be made only by histopathological examination^(5,6).

Most of the lipomas present as small subcutaneous swellings without any symptom. But the clinical features of giant lipomas and liposarcomas depend on the dimension of the tumor. Because of their deep location and hidden clinical presentation, they are difficult for the clinician as well as the patient to diagnose early until they reach to large sizes. They may cause pain because of the stretching or compression of adjacent nerves, compartment syndrome, restriction in movements of the joint involved, and social embarrassment or inability to wear clothing⁽⁷⁻⁹⁾.

We report the treatment results of 12 cases of giant lipomas and liposarcomas of the thigh (9 cases lipomas, 3 cases liposarcomas) with their clinical, radiological, and histopathological features.

Materials and methods

Twelve patients admitted to Erciyes University Medical Faculty, Department of Orthopedics and Traumatology with the symptoms of swelling and pain on the thigh between January 2011 and June 2014. All of the patients were hospitalized with the diagnosis of soft tissue mass on the thigh. Routine laboratory tests and radiological examinations were performed. All cases were evaluated by contrast-enhanced MRI preoperatively. Also, incisional biopsy guided by the MRI was performed. Accordingly, these lipomatous masses underwent surgical excision, and histopathological examination of the specimens confirmed diagnosis. Patients were followed up regularly after the surgical treatment. Ethics Committee of Erciyes University Medical Faculty approval and informed consent were obtained (2015/98).

Results

There were six males and six females with an average age of 55,6 years (range: 14 to 84). The main presenting symptoms were pain and swelling. Five of them presented both pain and swelling, four of them presented only swelling, and three of them presented only pain on their thighs. The average

duration of symptoms were 24,5 months (range: 4 to 120). Six of them were in the medial, four of them were in the anterior, and two of them were in the posterior fascial compartment of thigh.

Preoperatively contrast-enhanced MRI was performed for all of the patients. MRI scans of patient 1 revealed both lipid and solid components, and irregular, thickened septa formations (figure 1a). MRI scans of patients 2, 3, 4, 5, 6, 7, 11, 12 revealed large, high signal mass containing multiple mildly thickened septa. Especially, MRI scans of patient 7 revealed high signal intensity on T1 weighted image with thickened internal septa formations (figure 2a).

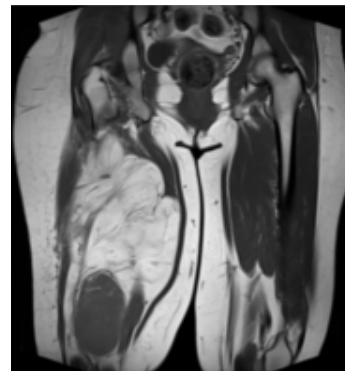


Fig. 1a: MRI (Magnetic resonance imaging) scans of well-differentiated liposarcoma (Patient 1). T1 weighted image (on the left) indicates both lipid and solid components, and thickened septa formations.



Fig. 2a: MRI (Magnetic resonance imaging) scan of giant lipoma (Patient 7). High signal intensity on T1 weighted image with thickened internal septa formations.

MRI scans of patient 8, 9, and 10 revealed heterogeneous appearance. They included low rate of adipose tissue, and on contrast-enhanced MRI scans with fat saturation, high signal intensity in the mass was observed.

Further radiological examinations such as thoracic and abdominal CT excluded distant metastasis for all patients.

Patient	Diagnosis	Age (Years)	Gender	Symptoms	Duration of symptoms (months)	Dimensions (cm)	Weight (g)	Follow up (months)
1	Liposarcoma	52	F	Pain, swelling	6	32x17x8	1128	24
2	Lipoma	57	M	Pain	12	23x19x4	1400	26
3	Lipoma	65	F	Swelling	10	10x7x6	448	32
4	Lipoma	59	F	Pain, swelling	12	10x8x5	386	34
5	Lipoma	45	M	Swelling	20	20x14x4	738	36
6	Lipoma	52	M	Pain	24	19x14x6	820	12
7	Lipoma	84	F	Pain, swelling	58	28x16x10	1976	15
8	Liposarcoma	54	M	Pain, swelling	4	15x15x6	694	16
9	Liposarcoma	45	M	Pain	6	16x12x5	440	18
10	Lipoma	72	M	Pain, swelling	12	21x14x6	840	7
11	Lipoma	69	F	Swelling	120	18x13x8	700	25
12	Lipoma	14	F	Swelling	10	22x15x2	550	47
Mean	-	55,6	-	-	24,5	-	843,3	24,3

Table 1: Characteristic features of the patients with lipomas and liposarcomas.

By incisional biopsies, histopathological examinations revealed the lesions to be well-differentiated liposarcoma (atypical lipoma) (patient 1), pleomorphic liposarcoma (patient 8), myxoid liposarcoma (patient 9), spindle cell lipoma (patient 10), and lipomas in other patients. According to the histopathological results, marginal surgical excision was planned for lipoma cases, and wide surgical excision was planned for liposarcoma cases (patient 1, 8, and 9). Excised specimens also were examined histopathologically, and the same histopathological results were obtained in accordance with the biopsies. The microscopic histopathologies revealed clear margins of the tumors in patients diagnosed as well-differentiated liposarcoma (patient 1), pleomorphic liposarcoma (patient 8), myxoid liposarcoma (patient 9).

The smallest tumor size was 10 x 8 x 5 cm (lipoma), and the largest was 32 x 17 x 8 cm (liposarcoma) by gross pathology. The weights of the tumors ranged from 386 g to 1976 g (Table 1).

Intraoperative and postoperative any complications did not occur. Postoperative suction drains were used for all patients. Also, wound healing problems were not seen during the follow up of patients.

Radiotherapy was given after six weeks to the patient 8 and patient 9 to whom histopathologically took the diagnosis of myxoid liposarcoma and pleomorphic liposarcoma, respectively.

The average duration of follow up of patients was 24,3 months (range: 7 to 47). During the follow

up of patients local recurrences, and distant metastasis were not observed by performing radiologic imaging studies.

Discussion

Lipomas are the most common lipomatous tumors of mesenchymal tissue. Lipomas are usually small solitary lesions, and they are usually located on the trunk or extremities. They can also be in different locations, such as; posterior cervical region, and rarely grow to an exceptionally large size^(10, 11). In order for a lipoma to be called “giant”, the tumor must be at least 10 cm in one dimension or weigh a minimum of 1000 g⁽²⁾. In our series, all of the cases responded to this criteria, and all of them were located on thigh. Despite being a rare condition, giant lipomas have been reported in the literature. Most of them are case reports including different locations such as upper extremity, thigh or posterior cervical region⁽⁵⁻¹²⁾. Intramuscular lipoma of the lower limb was reported. But this study includes the whole lower limb, not specific to the thigh. And some of the cases in this study do not provide the definition of giant lipoma⁽¹³⁾.

In an another study, series of giant lipomas were reported, but also in this study giant lipomas were located in different parts of the body such as back, thigh, posterior cervical, forearm, anterior cervical⁽⁹⁾. Series of giant lipomas of the lower limb, especially only location of thigh is very rare in the literature. The series of patients in this study

includes giant lipomas and liposarcomas of only the thigh.

Lipomas occur more frequently in female patients, because of adipose tissue accumulation. In our series, five of the patients were female, and four of them were male. It was found slightly more often in females in accordance with the literature. However, among the patients diagnosed with liposarcoma, two of them were male, and one of them was female. Also, liposarcomas typically arise in the fourth to sixth decade of life⁽¹²⁾. In our series, patients with liposarcoma (patients 1, 8, and 9) were 52, 54, and 45 years old (Table 1).

Lipomas are usually asymptomatic and present themselves as small subcutaneous swellings. They usually grow slowly and the etiology of rapid growth into giant lipomas is still a matter of debate^(6,12). However, it has been suggested that proliferation of adipose tissue may occur due to traumatic rupture of the fibrous septa and anchorage connections between the skin and deep fascia⁽¹⁴⁾. But, in our series none of the patients described trauma history. Most common symptoms were pain and swelling. The heaviest tumor of our series (patient 7) had duration of nearly 5 years (58 months). However, the other giant lipomas had long durations. In contrast, liposarcoma cases had shorter durations: patient 1 - 6 months, patient 8 - 4 months, and patient 9 - 6 months. Accordingly, a giant lipomatous tumor that grows up in a short duration (6 months or lower than 6 months), and causes symptoms such as pain or swelling should be considered suspicious for liposarcoma.

Very large lipomas have been reported in the literature, but they are extremely rare. They can be located in different anatomic regions, and different prevalent sites have been reported^(2, 9, 15, 16). Because of the anatomic site and proximity to neurovascular structures, the giant lipomatous tumors may cause functional limitations, lymphedema, pain, nerve compression syndromes^(7, 8, 15, 17). In our series, giant lipomatous tumors of two patients (patients 1 and 12) were located in the posterior fascial compartment of thigh, and they were adjacent to the sciatic nerve. But they did not have any symptoms related with nerve compression syndrome. Lymphedema was not seen in any of the patients. Especially, patient 7 showed impaired gait because of the size and the weight of the giant lipoma (figure 2 b).

Liposarcoma is the most common malign mesenchymal neoplasm in adults, and categorized into five distinct histologic subtypes: well-differentiated,

myxoid, pleomorphic, dedifferentiated and mixed type. The round cell liposarcoma belongs to the myxoid subtype. Well-differentiated liposarcomas (atypical lipomas) exhibit low malignant potential, myxoid liposarcomas display intermediate malignant behavior, and pleomorphic liposarcomas exhibit aggressive behavior with early metastasis⁽¹²⁾.

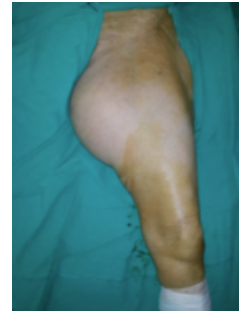


Fig. 2b: Preoperative appearance of the giant lipoma on the medial aspect of the thigh (Patient 7).

The malignant transformation of lipoma to liposarcoma is relatively uncommon. Large tumors (> 10 cm) are more at risk of containing sarcoma cells, especially in the presence of sudden rapid growth^(9, 18-20). In our series, liposarcoma cases had short durations of symptoms.

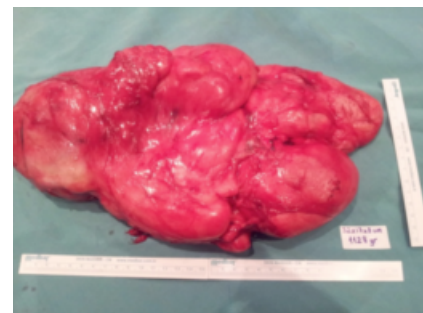


Fig. 1b: Macroscopic appearance of well-differentiated liposarcoma (Patient 1).

Lower extremity is one of the most common location for liposarcomas. It was also reported that proximal lower extremity is the primary site of location^(21, 22). They may also reach to large sizes as reported in the literature^(9, 23). In our series, the heaviest liposarcoma case was well-differentiated liposarcoma (patient 1) with a weight of 1128 g (figure 1 b). The weight and the dimensions of the others were 694 g- 15 x 15 x 6 cm, 440 g- 16 x 12 x 5 cm, respectively.

Therefore, they can be considered as “giant”.

Spindle cell or pleomorphic lipomas are a group of benign lipogenic tumors composed of primitive spindle cells, multinucleated giant cells, and mature adipocytes. Although they are recog-

nized as lipomatous tumors, they may cause difficulty to diagnose for the pathologist⁽²⁴⁾. MRI scans may resemble to liposarcoma as in our patient 10. Contrast-enhanced MRI scans displayed heterogeneous appearance and in this case it is difficult to rule out liposarcoma. Also, spindle cell or pleomorphic lipoma also may cause difficulty to diagnose for the radiologist.

The evaluation of a large soft tissue mass in the extremities should include radiological examinations or tissue sampling to rule out malignancy. Currently, MRI and biopsy are the best two options⁽¹²⁾. MRI examination is a highly reliable method in the diagnosis of these tumors. Consequently, in our series all of the patients evaluated by contrast-enhanced MRI. MRI of four patients (patient 1, 8, 9, and 10) in T2 weighted images with fat-saturation displayed heterogeneous appearance, multiple high signal foci. Imaging features that suggest malignancy include increased patient age, large lesion size, presence of thick septa, presence of nodular and/or globular or nonadipose mass like areas, and decreased percentage of fat composition⁽²⁵⁾. Although homogeneous appearance in the rest of the patients, because of their large sizes and existence of mildly thickened septa formations they were also considered suspicious for liposarcoma (figure 2 a), and incisional biopsy was performed. Because fine needle aspiration biopsy and core needle biopsy usually do not provide sufficient material to allow the pathologist to differentiate between lipoma and liposarcoma⁽²⁶⁾.

Treatment for giant lipomas is complete excision⁽⁸⁾. It was claimed that the bigger size of the tumor, the higher the possibility that the tumor is malignant⁽²⁷⁾. It is important to select the most appropriate operative technique because of the risk of malignancy. Surgical excision modalities were chosen according to the histopathological results. Marginal surgical excisions for giant lipomas, and as wide as possible surgical excisions for liposarcomas were carried out. Histopathological analysis of surgical specimens revealed clear margins. Currently, the principle of treating low grade and well-differentiated liposarcoma is to perform a surgical total excision with a negative margin, and for intermediate to high grade and poorly differentiated liposarcomas, if safety margins were not acquired, adjuvant radiotherapy should have been performed⁽²⁸⁾.

It is a known fact that although histopathologic type is effective, there is a high incidence of local

recurrence in liposarcomas⁽²¹⁾. Well-differentiated liposarcomas are slow-growing tumors with a propensity to recur locally; thus, long-term follow up is recommended⁽²⁹⁾. During the follow up of the patient no local recurrences or distant metastasis were observed. Pleomorphic liposarcoma is generally considered to be a high-grade sarcoma, and myxoid liposarcoma is considered to be also highly malignant. It has been suggested that radiotherapy is often helpful in decreasing the local recurrence⁽³⁰⁾. A local recurrence largely depends on the surgical margins. In our patients surgical margins were clear. Nevertheless, adjuvant radiotherapy was performed to these patients to decrease the local recurrence rates postoperatively. During the follow up of these patients local recurrences or distant metastasis also were not observed.

Conclusion

Giant lipomas are rare neoplasms. They have been described in different anatomic positions. Lower extremity, especially thigh is a common site for this tumors. They may reach to large sizes because of anatomical compartmental features of the thigh. As well as giant liposarcomas of the thigh could be seen. Giant lipomas should be differentiated from liposarcoma, malign fibrous histiocytoma, or other benign conditions. MRI is useful and superior from other radiologic examinations in determining the size, locoregional extension (soft tissue, neurovascular involvement) of the mass. But MRI scans may be inadequate in some cases of giant lipomas differentiating them from liposarcoma. The best way in our knowledge is to perform incisional biopsy from the suspicious area of the tumor according to the MRI scans, and surgical treatment modality should be planned according to the histopathological results.

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Acknowledgments

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