Giant Fibrolipoma in the Leg – A Case Report

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Abstract. *Lipomas are the most common benign tumors of the mesenchyme; they are composed of mature lipocytes. Benign fatty tumours can arise in any location in which fat is present. Most patients affected by such tumours are in their fifth or sixth decade of life. Only rarely are children affected. Lipomas may be single or multiple. Multiple lipomas are more common in women; many are seen in a familial setting. For a lipoma to be referred to as ''giant,'' the lesion should be at least 10 cm in diameter or weigh a minimum of 1,000 g. When very close to vital structures, giant lipomas may, on account of their excessive size, cause functional limitations, such as lymphedema, pain or nerve compression syndromes. Owing to the peculiarity of this condition and the difficulties encountered in its diagnosis and treatment, a case of a giant fibrolipoma in the leg is reported. A 48-year-old woman presented with an enlarging, soft, noduled mass on the right ankle and in the lower third of the right leg and heel; it was decided to remove the mass with all the overlying epidermis and to repair the resulting lesion first with fibroblast culture and subsequently with a meshed dermo-epidermal graft. One year after surgery, both the local and the general condition of the patient were good and there were no signs of recurrence.*

Lipomas are the most common (2.1 per 1,000 people (1)) benign tumors of the mesenchyme; they are composed of mature lipocytes and are usually located subdermally (2, 3). Benign fatty tumours may arise in any location in which fat is present, the majority occurring in the upper half of the body, particularly the trunk and neck, though they may also develop in other sites, including the hand (4, 5). Lipomas may also be subfascial and be further classified as parosteal, interosseous or visceral, as well as intra-muscular (most often in the trunk) and intermuscular (most often in the anterior abdominal wall) (6, 7). Intra- and intermuscular lipomas are also referred to as infiltrating lipomas (1). Most lipomas are small, weighing only a few grams, and are usually less than 2 cm in diameter (8). However, those weighing over 200 g and exceeding 10 cm in diameter have occasionally been encountered in other non-mesenchymal anatomic locations (5, 8-15).

Some lipomas may exhibit morphological variations. These include the fibrolipoma (characterized by the presence of prominent bundles of mature fibrous tissue traversing the fatty lobules); the myxolipoma (which features focally well-devel-oped myxoid changes); the chondroid lipoma (characterized by a component of eosinophilic and vacuolated cells containing glycogen and lipid that resembles brown fat cells, lipoblasts and chondroblasts); the myolipoma (characterized by an admix-ture in variable proportions of mature adipose tissue and bundles of well-differentiated smooth muscle); the spindle cell lipoma (composed of an admixture of mature lipocytes and uniform spindle cells set in a mucinous and fibrous background); the pleomorphic lipoma (containing hyperchromatic multinucleated, "floret-like" tumor cells within the fibrous septa traversing the neoplasm), the angiolipoma (well-circumscribed small tumors occurring shortly after puberty that are often painful, characteristically multiple and located in the subcutis, most commonly on the trunk or extremities) and the lipoblastoma/lipoblastomasis (affects infants and young children, and microscopically closely resembles foetal fat; it looks like a lipoblast and has a plexiform vascular pattern and an abundant myxoid stroma) (16).

For a lipoma to be referred to as ''giant'', the lesion should be at least 10 cm in diameter or weigh a minimum of 1,000 g (2). Giant lipomas should be distinguished from liposarcomas, which are of a similar size (17). Subcutaneous lipomas are generally small, multiple, easily-identifiable tumors that usually occur on the upper limbs and back. Subfascial lipomas, which are among the least common soft-tissue tumours, are usually solitary and lobulated (18).

Most patients affected by lipomas are in their fifth or sixth decade of life, only rarely are children affected. Lipomas can

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Key Words: Giant fibrolipoma, heel, foot, leg fibroblast culture.

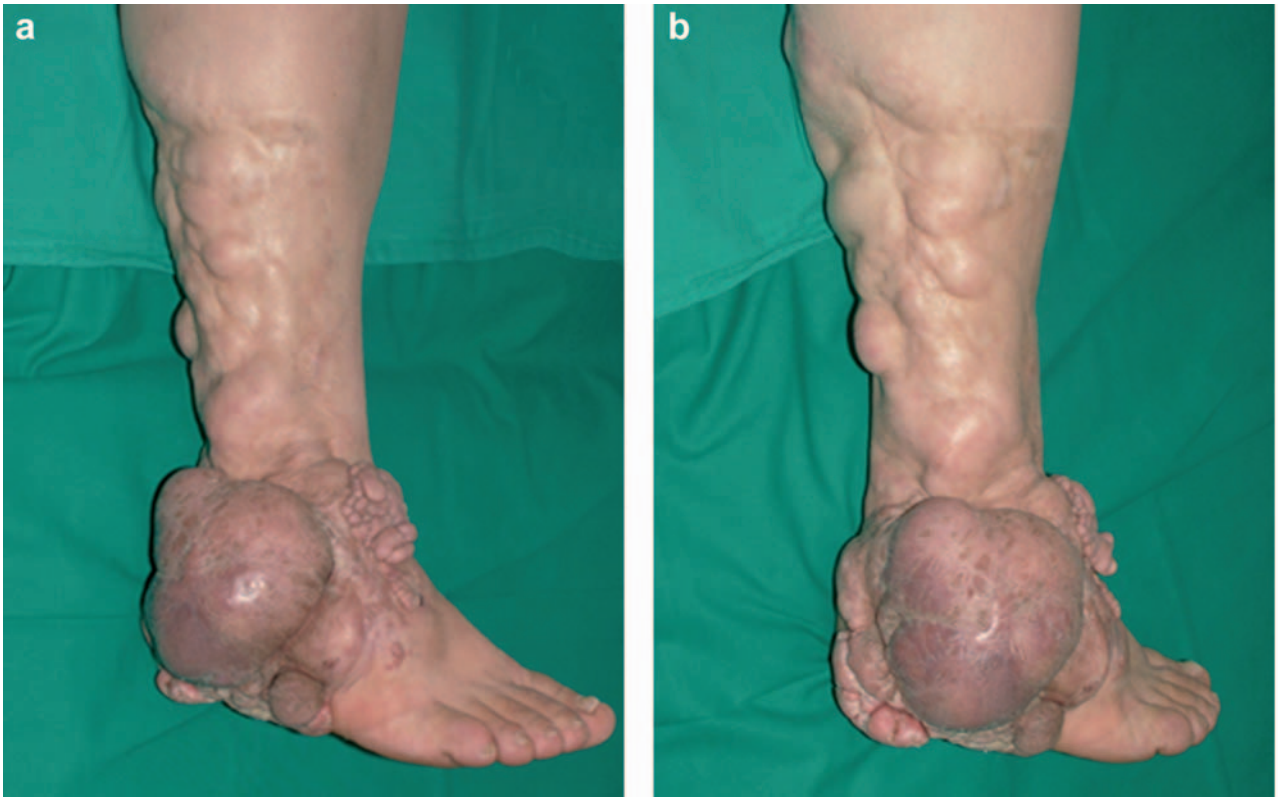

Figure 1. *(a-b) Presence of a large, multinodular lesion involving the right ankle and the inferior third of the right leg and heel.*

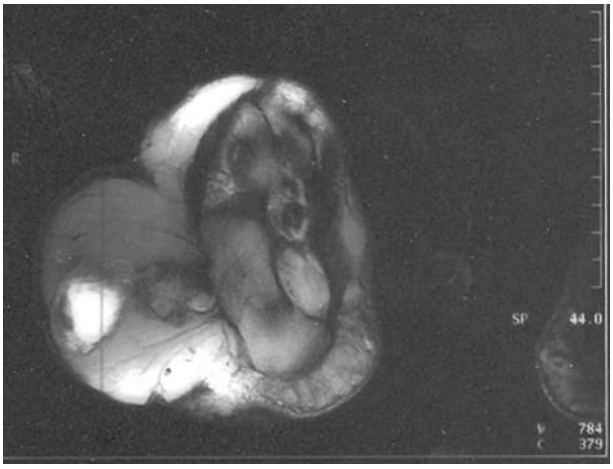

Figure 2. *NMR of the right leg: presence of contiguous multiple nodules involving the subcutaneous tissues but not penetrating the deep fascia or muscle.*

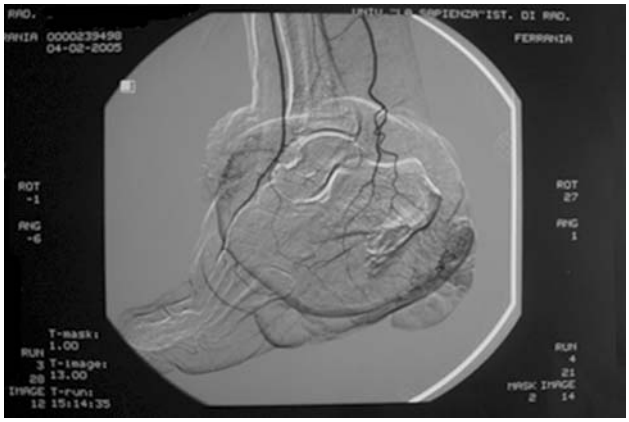

Figure 3. *Arteriography after intravenous administration of contrast medium: presence of pervious and regular calibre arteries in the leg; there was a large swelling on the malleolus with non-hypervascularized arterial afferences, with branches arising from the posterior plantar arch.*

grow to a large size; they are usually encapsulated when located in the superficial soft tissues, but tend to be poorly circumscribed when arising in deeper structures (16). Briefly, lipomas consist of bright, yellow fat separated by fine fibrous trabeculae. Microscopically, they are composed of mature adipose tissue with no cellular atypia.

Rarely, lipomas contain foci of mature metaplastic cartilage and bone (19). Ultrastructurally, only univacuolar mature adipocytes are present in typical lipomas (16). Although the light microscopic and electron microscopic appearance of a lipoma does not differ significantly from that of normal adult fat, its lipid content as determined by

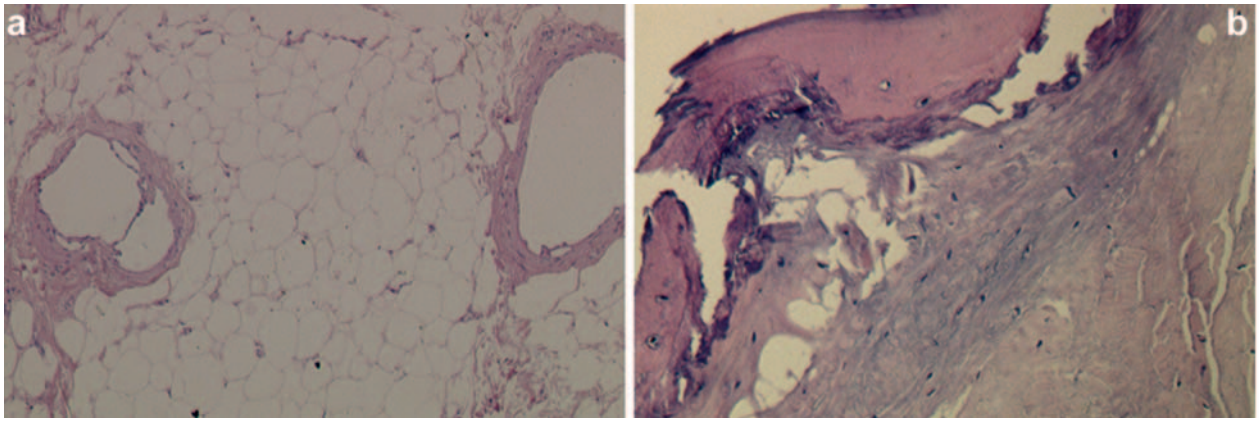

Figure 4. *(a-b) Histopathological investigation: the lesion was totally composed of mature adypocites (a) with myxoid areas as well as other areas of bony and cartilagineous metaplasia. (b). (Haematoxylin and eosin, original magnification x 40).*

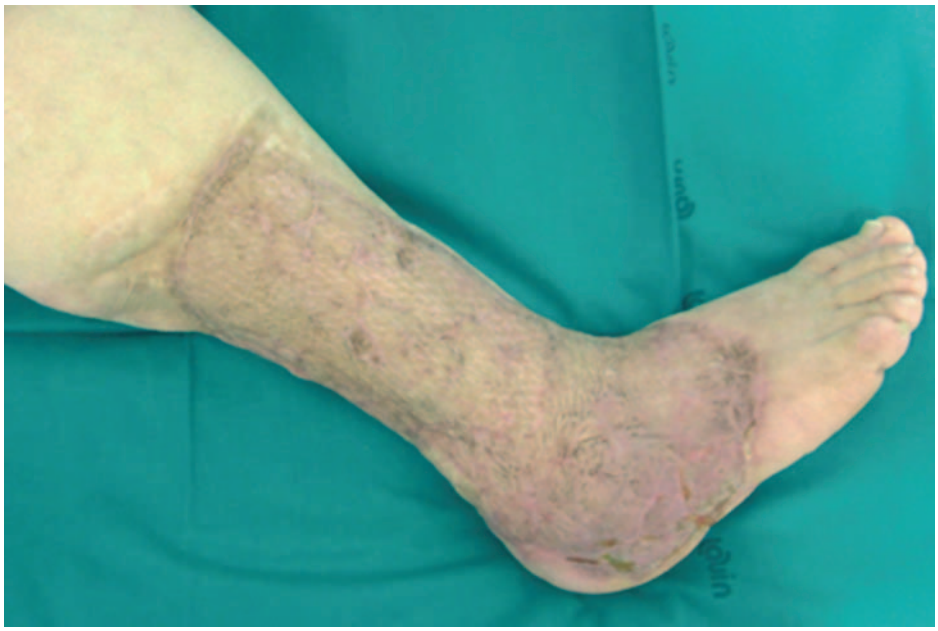

Figure 5. *One year following surgery, the local conditions are good and there is no sign of recurrence.*

biochemical extraction and lipoprotein lipase activity are different (16).

Owing to the peculiarity of this condition and the difficulties encountered in its diagnosis and treatment, a case of a giant fibrolipoma in the leg is presented here.

Case Report

A 48-year-old woman presented in February, 2005, with an enlarging, soft, noduled mass on the right ankle and in the lower third of the right leg and heel; the mass had first been noticed when she was 2 years old. A gradual increase in the size of the mass had been observed by the patient until the age of 18 years. When the patient was 20 years old, a partial surgical excision of the lesion was performed at the level of the leg. No histological exam was performed. The lesion continued to grow slowly but constantly. A biopsy of the mass was performed one year before the patient came to us. The histological examination revealed the presence of an angiolipoma.

Upon admission the multinodular lesion was strongly attached to the overlying epidermis (Figure 1a-b). It was so painful as to prevent normal deambulation. Physical examination revealed that there were no palpable masses

either in the right groin or in any other organs. A standard chest X-ray examination did not reveal any abnormal areas in the pulmonary parenchyma.

A Nuclear Magnetic Resonance (NMR) scan of the right leg revealed the presence of contiguous multiple nodules involving the subcutaneous tissues that did not, however, penetrate the deep fascia or muscle (Figure 2). Arteriography revealed that the arteries in the leg were pervious and regular in calibre; there was a large swelling on the malleolus with non-hypervascularized arterial afferences, with branches arising from the posterior plantar arch (Figure 3).

In view of these clinical conditions, it was decided to remove the entire mass, so as to restore correct, painless deambulation. During surgery, the entire mass was removed and it was found that the deeper tissues had not been invaded. The area was reconstructed in three stages: firstly fibroblast culture was positioned over the entire raw area, this treatment was repeated 10 days later; after a further 10 days, the area was covered using a meshed dermo-epidermal graft taken from the front of the thigh.

The histopathological investigation revealed that the lesion was composed of mature adypocytes with myxoid areas, as well as other areas of bony and cartilagineous metaplasia (Figure 4a-b). The overlying epidermis presented a pseudoepitheliomatous reaction. The results of this histological examination suggested a fibrolipoma.

To date, one year after surgery, both the local and the general condition of the patient are good and there are no signs of recurrence of the lesion (Figure 5).

Discussion and Conclusion

There have been several reports of giant lipomas in the literature (5, 8-14). The aetiology of lipomas is unclear. They have been known to be both sporadic and inherited (20, 21). Endocrine/dysmetabolic (22) and genetic theories (23) have been implicated. In recent years, acute trauma has also been reported to be related to lipoma formation (24, 25). Lipoma cells are believed to arise from mesenchymal primordial fatty tissue cells and are, thus, not of adult fat cell origin and tend to increase in size with body weight gain (26, 27).

Giant lipomas are occasional mesenchymal tumors that are usually located in deep body planes (26). The mechanism for the uncontrolled growth of such lipomas remains unclear. However, it has been suggested that after a blunt trauma, rupture of the fibrous septa, which prevents fat migration, accompanied by tears in the anchorage between the skin and the deep fascia, may result in proliferation of adipose tissue (28).

Very large lipomas (measuring up to 55 cm in diameter and weighing as much as 2.495 kg) have been reported in the literature (2, 15), such lipomas may be found in any part of the body, though they are extremely rare (5).

When located close to vital structures, giant lipomas may cause functional limitations on account of their excessive size and weight (29, 30) or lymphedema, pain or nerve compression syndromes (8, 26, 30). The literature contains some reports of posterior interosseous nerve compression syndromes due to lipomas (31). From their review of the literature, Phalen *et al.* (26) found peripheral nerve compression by lipomas to be rare. Although one would expect peripheral nerve compression to be correlated to the size of the lesion, even rather small lipomas have been reported to cause such compression (31). Thus, it is clear that the mass effect of a lipoma is due not so much to its size as to its location.

The clinical history of our patient suggests that she was affected by a lipoblastoma when younger, and that this lesion subsequently evolved into a lipoma following incomplete excision.

Indeed, lipoblastoma and lipoblastomasis are known to affect almost exclusively infants and young children (below the age of 5 years) (16). These pathologies commonly involve the proximal portion of the lower and upper extremities. The lesions are generally soft and lobulated, as in this case. They are called lipoblastoma (which is benign, and is sometimes also referred to as embryonal or fetal lipoma) when well circumscribed, and lipoblastomatosis when deep-seated and poorly defined microscopically, such lipomas closely resemble foetal fat (16). They may be mistaken for myxoid liposarcoma because of the presence of lipoblasts, a plexiform vascular pattern and an abundant myxoid stroma. Their ultrastructural appearance is also very similar to that of myxoid liposarcoma (16). They can be distinguished from the latter by virtue of the young age of the patient, distinct lobulation and absence of giant cells or pleomorphic nuclei (16). Cytogenetically, lipoblastoma and lipoblastomatosis are often associated with rearrangements of 8q (16). Their clinical course is benign. The recurrence rate in Chung and Enzinger's series (32) was 14% and was attributed to incomplete removal of the tumor.

Lipoblastomas that are not removed in infancy evolve into lipomas, a clue to their primeval nature being the prominent fibrous septa that divide them into distinct lobules (15), as occurred in this case.

The malignant transformation of a lipoma into a liposarcoma is rare (33) as is the sarcomatous transformation of giant lipomas (26, 27). Some reports have suggested that large tumours (>10 cm) are more likely to contain sarcomas, which makes a preoperative biopsy advisable in such cases (3, 34). The intramuscular location of a lipoma is also considered to be a risk factor for malignancy (3, 34).

It is important to differentiate giant lipomas from liposarcomas, malignant fibrous histiocytomas and other benign soft-tissue lesions, such as old muscle rupture, epidermoid cysts, angiolipomas, deep hemangiomas and

lipoblastomatosis (1). Indeed, the main concern in the diagnosis of giant lipomas should be the exclusion of malignancy (15). It has been suggested that a liposarcoma should be considered when a fatty subcutaneous tumor is more than 10 cm in diameter and has grown rapidly in recent months (35, 36).

Clinically, the age of the patient and onset of symptoms must be thoroughly assessed, and magnetic resonance imaging or a tissue sample should be used to rule out tumour malignancy (37). However, even negative magnetic resonance imaging and tissue sample cannot be taken as proof of the benign nature of the tumour, particularly in the lower limbs, which are one of the most common sites of liposarcomas (35, 38).

Treatment for giant lipomas is complete excision (30). As giant lipomas usually have a well-defined pseudo-capsule (5, 26, 30), dissection of these benign neoplasms is relatively straightforward.

Besides presenting a mass that was strongly attached to the epidermis, our patient also presented a pseudo-epitheliomatous reaction; moreover, the patient had undergone previous partial surgical excision of the lesion. For this reason it was decided to remove the mass with all the overlying epidermis and to repair the resulting lesion first with fibroblast culture and subsequently with a meshed dermo-epidermal graft. This treatment allowed the mass to be removed and the area to repaired easily, thereby obtaining a good esthetic and functional result.

Liposuction for the treatment of giant lipomas has also been reported (12, 20). However, as differential diagnosis between lipomas and liposarcomas is exceedingly difficult on the basis of clinical findings alone, we think that liposuction of large lesions should be avoided, especially those that have grown rapidly in recent months. It is, moreover, very difficult to remove the mass completely by means of liposuction alone, which raises the likelihood of recurrence.

References

1 Rydholm A and Berg NO: Size, site and clinical incidence of lipoma: factors in the differential diagnosis of lipoma and sarcoma. Acta Orthop Scand *54*: 929-934, 1983.

2 Harrington AC, Adnot J and Chesser R: Infiltrating lipomas of the upper extremities. J Dermatol Surg Oncol *16*: 834-837, 1990.

3 Sanchez MR, Golomb FM, Moy JA and Potozkin JR: Giant lipoma: case report and review of the literature. J Am Acad Dermatol *28*: 266-268, 1993.

4 Paarlberg D, Linscheid Rl and Soule EH: Lipomas of the hand. Including a case of lipoblastomatosis in a child. Mayo Clin Proc *47*: 121-124, 1972.

5 Hakim E, Kolander Y, Meller Y, Moses M and Sagi A: Gigantic lipomas. Plast Reconstr Surg *94*: 369-371, 1994.

6 Fletcher CD and Martin-Bates E: Intramuscular and intermuscolar lipoma: neglected diagnoses. Histopathology *12*: 275-287, 1988.

7 Gonzalez-Crussi F, Enneking WF and Arean VM: Infiltrating angiolipoma. J Bone Joint Surg *48*: 1111-1124, 1966.

8 Davis C and Gruhn JG: Giant lipoma of the thigh. Arch Surg *95*: 151-156, 1967.

9 Dionne GP and Thomas AS: Infiltrating lipomas and angiolipomas revisited. Cancer *33*: 732-738, 1974.

10 Terzioglu A, Tuncali D, Yuksel A, Bingul F and Aslan G: Giant lipomas: a series of 12 consecutive cases and a giant liposarcoma of the thigh. Dermatol Surg *30(3)*: 463-467, 2004.

11 Hirshowitz B and Goldan S: Giant lipoma of the back and neck: case report. Plast Reconstr Surg *52*: 312-314, 1973.

12 Nichter LS and Gupta BR: Liposuction of giant lipoma. Ann Plast Surg *24*: 362-365, 1990.

13 Rodriguez IF, Shuster BA and Milliken RG: Giant lipoma of the breast. Br J Plast Surg *50*: 263-265, 1997.

14 Rubenstein R, Roenigk HH, Garden JM *et al*: Liposuction for lipomas. J Dermatol Surg Oncol *11*: 1070-1074, 1985.

15 Zografos GC, Kouerinis I, Kalliopi P *et al*: Giant lipoma of the thigh in a patient with morbid obesity. Plast Reconstr Surg *109*: 1467-1468, 2002.

16 Rosai J: *In*: Tumors of Adipose Tissue. Rosai and Ackerman's (eds.). Surgical Pathology. Philadelphia: Mosby, pp. 2275-2285, 2004.

17 Roger B, Delepine N, Laval-Jeantet M *et al*: NMR examination of soft tissue tumors. J Radiol *67*: 367-376, 1986.

18 Montenegro JSL, Fernandez CB and Ansio FG: Giant submuscular lipoma: clinical, diagnostic, and treatment aspects. Plast Reconstr Surg *101*: 543-544, 1998.

19 Katzer B: Histopathology of rare chondroosteoblastic metaplasis in benign lipomas. Pathol Res Pract *184*: 437-445, 1989.

20 Pinski KS and Roenigk HH Jr: Liposuction of lipomas. Dermatol Clin *18*: 483-184, 1990.

21 Leffell DJ and Braverman IM: Familial multiple lipomatosis: report of a case and a review of the literature. J Am Acad Dermatol *15*: 275-279, 1986.

22 Enzinger F and Weiss S: Soft tissue tumors. St Louis: Mosby; 1983.

23 Turc Carel C, Dal Cin P, Boghosian L *et al*: Breakpoints in benign lipoma may be at 12q13 or 12q14. Cancer Genet Cytogenet *36*: 131-135, 1988.

24 Adair FE, Pack GT and Farrior JH: Lipoma Am J Cancer *16*: 1104-119, 1932.

25 Signorini M and Campiglio GL: Posttraumatic lipomas: where do they really come from? Plast Reconstr Surg *103(3)*: 699-705, 1998.

26 Phalen GS, Kendrick JI and Rodriguez JM: Lipomas of the upper extremity: a series of fifteen tumors in the hand and wrist and six tumors causing nerve compression. Am J Surg *121*: 298-306, 1971.

27 Takagi H, Kato K, Yamada E and Suchi T: Six recent liposarcomas including largest to date. J Surg Oncol *26*: 260-267, 1984.

28 Meggit BF and Wilson JN: The battered buttock syndrome: fat fractures: a report on a group of traumatic lipomas. Br J Surg *59*: 165-169, 1972.

29 Guerrissi J, Klersfeld D, Sampietro G and Valdivieso J: Limitation of thigh function by a giant lipoma. Plast Reconstr Surg *94*: 410-411, 1994.

30 Higgs PE, Young VL, Schuster R and Weeks PM: Giant lipomas of the hand and forearm. South Med J *86*: 887-890, 1993.

31 Pidgeon KJ, Abadee P, Kanakamedala R and Uchizono M: Posterior interosseous nerve syndrome caused by an intermuscular lipoma. Arch Phys Med Rehabil *66*: 468-471, 1985.
32 Chung EB and Enzinger FM: Benign lipoblastomatosis. An analysis of 35 cases. Cancer *4*: 163-174, 1973.
33 Cotran RS, Kumar V and Robbins SL: *In*: Tumors of Adipose Tissue. Robbins' Pathological Basis of Disesses. Philadelphia, PA: Saunders, pp. 1374-1412, 1989.
34 Brasfield RD and Das Gupta TK: Liposarcoma. CA Cancer J Clin *20*: 3, 1970.
35 Celik C, Karakousis CP, Moore R and Holyoke ED: Liposarcomas: prognosis and management. J Surg Oncol *14*: 245-249, 1980.
36 Deutsch AA, Bachar A and Reiss R: Hemipelvectomy for liposarcoma: an unusual case and course. Post Med J *60*: 70-72, 1984.
37 Sundaram M, Baran G, Merenda G and McDonald DJ: Myxoid liposarcoma: magnetic resonance imaging appearances with clinical and histological correlation. Skeletal Radiol *19*: 359-362, 1990.
38 Smith TA, Easley KA and Goldblum JR: Myxoid/round cell liposarcoma of the extremities: a clinicopathologic study of 29 cases with particular attention to extent of round cell liposarcoma. Am J Surg Pathol *20*: 171-180, 1996.

Received May 10, 2006
Revised June 29, 2006
Accepted July 3, 2006