The General Surgeon's Quandary: Atypical Lipomatous Tumor vs Lipoma, Who Needs a Surgical Oncologist?

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BACKGROUND: Differentiating large lipomas from atypical lipomatous tumors (ALT) is challenging, and preoperative management guidelines are not well defined. The diagnostic ambiguity leads many surgeons to refer all patients with large lipomatous masses to an oncologic specialist, perhaps unnecessarily.

STUDY DESIGN: In this retrospective cohort study of patients with nonretroperitoneal lipomatous tumors, preoperative characteristics discernible without invasive diagnostic procedures were evaluated for diagnostic predictive value.

RESULTS: We identified 319 patients (256 with lipomas, 63 with ALTs) treated between 1994 and 2012. Patients with ALTs were older (60.5 vs 53.5 years, $p < 0.0001$), had larger tumors (16.0 vs 8.3 cm, $p < 0.0001$), had tumors more often located on an extremity (88.9% vs 60.5% torso, $p < 0.0001$), and more frequently had a history of previous operations at the same site, exclusive of excision leading to diagnosis and referral (20.6% vs 5.9%, $p = 0.001$). Local recurrence was observed in 2 patients with lipomas (0.8%) vs 14 with ALTs (22.6%, $p < 0.0001$). No patients with ALTs developed distant metastases or disease-specific mortality, with a median follow-up of 27.4 months (range 0 to 164.6 months). On multivariate analysis, age $\geq$55 years, tumor size $\geq$10 cm, extremity location, and history of previous resections were predictors for diagnosis of ALT ($p < 0.05$).

CONCLUSIONS: Characteristics of lipomatous masses associated with a diagnosis of ALT include patient age $\geq$55 years, tumor size $\geq$10 cm, previous resection, and extremity location (vs torso). These easily identifiable traits may guide surgical management or referral to a specialist. (J Am Coll Surg 2013;217:881–888. © 2013 by the American College of Surgeons)

Lipomatous neoplasms are commonly encountered by the general surgeon as well as the surgical oncologist. Collectively, lipomatous neoplasms comprise half of all soft tissue tumors, but the individual histologic subtypes are diverse and range from the benign lipoma to the aggressive liposarcoma. Although an experienced surgeon can frequently distinguish the benign lipoma from the aggressive liposarcoma, the nuances between large lipomas and similarly large atypical lipomatous tumors create a more challenging diagnostic dilemma. Given this difficulty, general surgeons often refer patients with large, ambiguous tumors to specialty centers. The focus of this analysis was to assist the general surgeon in risk-stratifying patients with large lipomatous masses.

Lipomas, the most common benign adipocytic tumor, are defined as well circumscribed, lobulated lesions comprised of adipose tissue, often separated from surrounding adipose tissue by a thin fibrous capsule.[1] Lipomas can occur on any part of the body and, when presenting as intramuscular tumors, can be poorly circumscribed and infiltrative—similar to well-differentiated liposarcomas (WDLS).[1] Histologically, lipomas may exhibit inflammation and/or fibrosis that may be confused

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Abbreviations and Acronyms

ALT = atypical lipomatous tumor
DDLS = dedifferentiated liposarcoma
HR = hazard ratio
ICD-9-CM = International Classification of Diseases, ninth revision, clinical modification
WDLS = well-differentiated liposarcoma

with the atypical features of WDLS,[2] which are nonmetastasizing, low-grade, lipomatous tumors with propensity for local recurrence.[3] The term *atypical lipomatous tumor* (ALT) is used to describe WDLS located on an extremity or torso wall[3] and will be used accordingly throughout this article. Histologically, ALTs are characterized by mature fat with a variable number of atypical, often enlarged and pleomorphic nuclei, but with low cellularity and uncommon mitotic figures.[4] The low number of mitotic figures is particularly important in distinguishing ALT from its more aggressive counterpart, dedifferentiated liposarcoma (DDLS).[5]

After histologic classification and staging, an important prognostic factor for liposarcoma is tumor location (central/retroperitoneal vs peripheral).[1,6] In a single-institution review of WDLS and DDLS, Evans[4] showed that patients with peripherally located tumors (extremities and trunk) experienced no disease-specific mortality and all were free of disease with a minimum of 10 years follow-up. In contrast, patients with retroperitoneal or central tumors experienced significant disease-related morbidity and mortality. In this study, we excluded patients with retroperitoneal and abdominal/pelvic lipomatous tumors on the basis that they have distinct tumor biology separate from that of patients with extremity and torso lipomatous tumors. More importantly, it is appropriate for surgeons without access to a multidisciplinary team to routinely refer patients with retroperitoneal or abdominal lipomatous tumors to a specialty center.

The best opportunity for curative management of ALT is complete resection at the initial operation, yet clinical evaluation and cross-sectional imaging frequently fail to clearly establish the diagnosis. When diagnosis is challenging, patients may undergo incomplete or margin-positive resections, which subsequently can compromise local control. Although this may not affect overall survival due to the low grade nature of the disease, it does contribute to recurrence, morbidity, and reduced quality of life. These concerns frequently lead nonspecialty surgeons to refer patients to specialists with access to multidisciplinary teams and specialized pathologists for treatment of all large, lipomatous tumors. Interestingly, with the advent of genetic analysis, many tumors thought to be ALTs have been reclassified as lipomas.[2,7] Although this is useful to surgeons in a specialty center, many surgeons do not have access to molecular testing. We sought to identify characteristics available through noninvasive methodologies that would aid the community-based general surgeon in determining who should be considered for referral to a multidisciplinary center.

METHODS

Hospital clinic and billing records were queried for all patients with an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code of 214.X (lipomas) or 171.X (sarcomas). To avoid identifying a large number of patients with small, clinically straightforward lipomas, the query was limited to patients treated by 1 of 4 oncologic surgeons responsible for treating the majority of patients with extremity soft tissue sarcomas at our institution. The query identified 1,796 patients who were further screened based on age, histologic diagnosis, primary site of disease, and therapy. Adult patients (age $\geq$18 years) with a pathologic diagnosis of lipoma (including angiolipomas, fibrolipomas, and hibernomas), WDLS, or ALT on an extremity or torso wall treated with curative intent resection were included. Patients presenting with recurrent lesions were included if they underwent curative intent operation for the recurrence at our institution. Patients with retroperitoneal, intra-abdominal, and pelvic tumors were excluded on the basis that these tumors represent significantly different disease biology.[1,3-5] Patients with a previous history of nonliposarcoma sarcoma were also excluded on the basis that new masses in these patients warrant a higher index of suspicion. Histopathologic identification of paucicellular, mature-appearing adipose tissue containing enlarged, atypical adipocyte nuclei with few to no mitotic figures was used to establish the diagnosis of ALT.[4] Retrospective chart review of clinicopathologic characteristics, operative details, and survival outcomes was performed for 319 patients (256 with lipomas, 63 with ALTs). Preoperative characteristics readily identifiable without invasive diagnostic procedures were assessed for predictive value for a diagnosis of ALT.

The WDLS and ALTs were considered synonymous and will be referred to herein as ALT. Regarding tumor location, a lesion was considered to be in the upper extremity if the tumor was distal to the shoulder. Similarly, tumors distal to the groin were categorized as lower extremity lesions; buttock lesions were categorized as lower extremity lesions. Lesions on the neck, chest, abdomen, and back were categorized as on the torso. The anatomic depth of the tumor was evaluated relative