Lipomatous Tumours of Soft Tissue

MCMASTER UNIVERSITY
BY
M. Abushihha, MD
DR. Michelle Ghert

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What are the lipomatous tumours

- mesenchymal tumors derived from adipocytes
- most common mesenchymal and soft tissue neoplasm in humans
- majority of fatty tumors are either lipomas or liposarcomas
- occur at every age and at almost any anatomical location
Histologic classification of Lipomatous tumors

A. Benign tumors

1. lipoma
   a. cutaneous lipoma
   b. deep lipoma
      i) intramuscular lipoma
      ii) tendon sheath lipoma
      iii) lumbosacral lipoma
      iv) intraneural and perineural fibrolipoma
   c. multiple lipomas
Histologic classification of Lipomatosous tumors

2. angiolipoma
3. spindle cell and pleomorphic lipoma
4. myolipoma
5. angiomyolipoma
6. myelolipoma
7. chondroid lipoma
8. hibernoma
9. lipoblastoma or lipoblastomatosis
10. Lipomatosis
Histologic classification of Lipomatous tumors

B. Malignant tumors

Liposarcoma
a. well-differentiated liposarcoma
   i) lipoma-like liposarcoma
   ii) sclerosing liposarcoma
   iii) inflammatory liposarcoma
b. myxoid liposarcoma
c. round cell ( poorly differentiated myxoid ) liposarcoma
d. pleomorphic liposarcoma
e. dedifferentiated liposarcoma
GTNM staging system

- **G** - Tumor grade
  - G1 - Well differentiated
  - G2 - Moderately differentiated
  - G3 - Poorly differentiated

- **T** - Primary tumor size
  - T1 - Tumor less than 5 cm in greatest diameter
  - T2 - Tumor more than 5 cm in greatest diameter
  - a,b- superficial or deep

- **N** - Regional lymph node involvement
  - N0 - No known metastasis to lymph nodes
  - N1 - Verified metastasis to lymph nodes

- **M** - Distant metastasis
  - M0 - No known distant metastasis
  - M1 - Known distant metastasis
The AJCC staging system is as follows:

- **G1** - Low grade
- **G2** - Intermediate grade
- **G3** - High grade
- **T1a** - Noninvasive (<5 cm)
- **T1b** - Noninvasive (>5 cm)
- **T2a** - Invasive (<5 cm)
- **T2b** - Invasive (>5 cm)
- **N1** - Regional nodes involved
- **M1** - Distant metastases
Benign Lipomatous tumors

Lipoma:

- Unknown etiology
- Most common soft tissue mesenchymal neoplasm in adults
- Composed of mature white adipocytes
- Can occur in a subcutaneous, intramuscular, and intermuscular location
Epidemiology

- Age 40-60
- Obese
- Rare in children
- 5% multiple lipomas
Clinical features

- Painless soft tissue mass except for the larger ones - can be painful if compressing a peripheral nerve

- Superficial lipomas generally < 5cm

- Deep lipomas > 5cm
Imaging

- Homogeneous soft tissue mass
- Isodense to the subcutaneous tissue
Imaging
Histopathology

- Clusters of univacuolated fat cells forming lace-like sheets
- Bland peripheral nuclei
- Mild nuclear atypia
Intramuscular lipoma

- Common neoplasm
- Because of its large size and deep location, the diagnostic possibility of sarcoma is to be considered.
- Most are slow-growing and painless.
Histologic finding

- Lipocytes infiltrating muscle in a diffuse pattern
Prognostic factors

- doesn't have any prognostic significance
- has a higher local recurrence rate
**Angiolipoma**

- Subcutaneous nodule consisting of mature fat cells intermingled with small thin-walled vessels
- Upper extremity is the common site
- Often tender or painful on palpation
- Always benign
Histopathology

- Proliferation of small vessels expanding the septae of typical lipoma
Lipoblastoma

- Lobulated, localized (lipoblastoma) or diffuse (lipoblastomatosis) tumour, resembling fetal adipose tissue

- Embryonic or infantile lipoma

- Infrequent neoplasm

- Age 2-3 yrs

- M>F
Lipoblastoma

- More commonly occur at the upper or lower extremity
- Painless nodule or mass
Histopathology

- Fragments of cellular tissue
- Mono- and multivacuolated lipoblasts with centrally located nuclei
- Maturational sequence of lipoblast arranging from spindle and stellate cells to nearly mature cells
Prognostic factors

- Fully benign
- Malignant transformation or metastasis does not occur
- Recurrences 9% to 22%
Liposarcoma

- Most common soft tissue sarcoma in adult
- The 3 major locations in which liposarcomas are found are the lower extremities, the retroperitoneal region, and the shoulder area
- Favorited sites of occurrence in the lower extremities
Clinical features

- Large > 5 cm painless mass
- Gardully increasing in size
- Minority present with late stage
Clinical features

- Any lump presenting with the following should be considered malignant until proved otherwise:
  
  - > 5cm
  - Increasing in size
  - Deep to the deep fascia
  - Painful or painless
  - any recurrence of a previously excised lump
Incidence

- Incidence of soft tissue sarcoma is approx (7000 – 8000) new cases per year in the USA
- age (50-70) yrs
Incidence

- Database of 4496 patients over the age of 16 who had been admitted and treated in Memorial Sloan-Kettering Cancer Center (MSKCC) with a diagnosis of soft tissue sarcoma from July 1st, 1982 to December 31st, 2000.
Distribution by sex for total pt admitted, MSKCC

- Male: 22270 (50%)
- Female: 2226 (50%)

Total: n = 4496
Distribution by histopathology

- MFH 810, 18%
- Leiomyosarcoma 808, 18%
- Fibrosarcoma 479, 11%
- Synovial 309, 7%
- MPNT 146, 3%
- GIST 149, 3%
- Other 956, 21%
- Liposarcoma 839, 19%

n = 4496
Extremity distribution of STS

n=1993

- Thigh: 42%
- Lower extremity: 10%
- Shoulder: 13%
- Other lower extremity: 18%
- Forearm: 6%
- Upper extremity: 6%
- Other upper: 5%
Imaging

- Heterogeneous mass lobulated
- Low to intermediate signal
- Displasing the muscle
- Pseudocapsule
- Calcification

Figure 5. Magnetic resonance imaging, T1-weighted sagittal view (A) and T1-weighted sagittal view with fat signal saturation obtained after paramagnetic contrast agent intravenous injection (B).
Well differentiated liposarcoma

- Atypical lipomatous tumor (ALT)
- Low grade locally aggressive liposarcoma
- Nonmetastasizing lesion
- Occurs most frequently in deep soft tissue
- 40-45% of all liposarcomas
- 3 types:
  - Lipoma-like
  - Sclerosing
  - Inflammatory
Imaging

- Resemble the benign lipoma in MRI
- Homogeneous soft tissue mass
- Isodense to the subcutaneous tissue
Hitopathology

- Large univacuolated fat cells with enlarged hyperchromatic nucleus
Prognostic factors

- In the extremities <5% can dedifferentiate
Dedifferentiated liposarcoma

- **High grade malignant adipocytic neoplasm** showing transition either in the primary or in a recurrence from WD liposarcoma to high grade non-lipogenic sarcoma

- Occurs in up to 10% of WD

- > retroperitoneal then extremities
Histopathology

- Transition between WDL and the high grade non lipogenic area
Prognostic factor

- Anatomic location
- Recur locally in 40% of cases
- Distant metastasis 15-20%
- Mortality rate 28-30%
Myxoid liposarcoma

- Intermediate grade
- Second most common subtype of liposarcoma
- Occurs in the deep soft tissue of the extremities
- Rarely retroperitoneal
- More than 5-20% round-cell component have a worse outcome.
Imaging

- Low grade myxoid liposarcoma with a high signal lesion
Histopathology

- Mixtures of
  - mxyoid stroma
  - plexiform capillary
  - proliferating lipoblasts
- Neoplastic cells with enlarged hyperchromatic nuclei
Pleomorphic liposarcoma

- High grade liposarcoma
- Containing Pleomorphic lipoblast
- Occur in the extremities lower > upper
Histopathology

- pleomorphic spindle and giant cells
- Pleomorphic lipoblasts
- Enlarged and hyperchromatic nuclei
Prognosis

- Depth, grade and size determine prognosis
Management of benign and malignant liposarcomas

- Hx
- O/E
- Local and systemic staging
- Biopsy
- Definitive treatment
Limb-salvage procedures

Soft-tissue tumor

Radical resection
En bloc removal of entire muscle compartment

Wide excision
En bloc removal of tumor and reactive zone plus margin of normal tissue

Marginal excision
En bloc removal of tumor within reactive zone

Intracapsular excision
Debulking or piecemeal

Bone tumor

Radical resection
En bloc removal of entire bone

Wide excision
En bloc removal of tumor, reactive zone, and surrounding margin of normal bone

Marginal excision
En bloc removal of tumor through reactive zone

Intracapsular excision
Piecemeal or curettage
Biopsy:

- Lesions < 5 cm → excisional biopsy
  particularly the superficial lesions

- Lesions > 5 cm → tru-cut biopsy
Biopsy

- Transverse incision in extremities are to be avoided

NEVER TRANSVERSE INCISION
Biopsy

- Longitudinal incision capable of encompassed at the definitive procedure
Suspicious mass

Biopsy

Histopathology

grad

size

< 5cm

> 5cm
Definitive treatment

- Definitive treatment
  - Preoperative biopsy
    - Benign: Excise
      - Low grad: >5cm
        - Wide excision
          - No further Rx
    - Malignant: Sarcoma
      - High grad: >5cm, <10cm
        - Wide excision, +/- pre op
          - Chemotherapy
    - Malignant: Other
      - >10cm
        - Wide excision, BRT
          - No further Rx
Overall survival depends on:

- Grade (high/intermediate)
- Depth (deep)
- Size (>5cm)
- Age (>50)
- Local Recurrence
- Adequacy of excision
- Not Operation (Amp)
Conclusions: The decision to perform a primary amputation for an STS of the extremity is based on the location and local extent of the tumor, and the expected function of the extremity after tumor resection. The higher risk of metastases for patients who require primary amputation is accounted for by independent risk factors associated with their tumors—predominantly large tumor size.
Remember to consult

- **Oncologist:**
  when previous incisional biopsy reveals liposarcoma, consultation with an oncologist prior to the definitive surgical procedure is recommended

- **Radiation oncologist:**
  Adjuvant therapy may be indicated in cases in which excision is incomplete
Thank you