H&P

- 62y F with painful lump around elbow x 5 weeks
Sarcoma- a RARE disease

- Nationwide incidence
  - Soft tissue sarcoma ~12,000 (<1%)
  - Primary Bone Sarcoma: ~3,000
- Compare to:
  - Breast/Prostate Cancer: 233,000
  - Lung Cancer: 225,000
- Small numbers, lack of robust clinical studies, lumping together of histological subtypes

Lumps & Bumps

- Painless
- Slowly enlarging
- Incidentally noted
- Lack of systemic or constitutional symptoms

Evaluation

- Not all tumors obey the textbooks:
  - Small <5cm and superficial (to fascia) = benign
- Imaging
  - Xray
  - CT
  - MRI
    - With gadolinium contrast
- Biopsy
  - Best to refer to sarcoma center BEFORE biopsy
  - Limb Salvage Surgery attainable >90%
MRI for Soft Tissue Masses

- T1: DARK
- T2: BRIGHT
- Gadolinium
  - Peripheral vs. central enhancement
- “It’s there but diagnosis uncertain.”
- MRI doesn’t put a name on it

- Characteristic Imaging Findings

✓ Diagnostic

Lipoma

- SAME signal intensity as fat on ALL sequences

Left T1 and Right STIR
Lipoma

43 y M with longstanding leg mass
Atypical Lipoma & Liposarcoma

T1 FS post gad (L) and T1 (R)

Atypical Lipoma

Well Differentiated Liposarcoma
Liposarcoma
4 variants

Histology

Neurogenic Tumors
- Benign
- Schwannoma
- Neurofibroma
- MPNST
Schwannoma Histo

Neurofibroma vs. MPNST
**OPEN BIOPSY PRINCIPLES**

- Extensile incision that can be incorporated into definitive resection.
- Minimal ST dissection/development of planes to avoid contamination.
- Avoid exposure of major neurovascular structures.
- For bone tumors, Bx should include ST mass.
- Use drains to decrease hematoma. Bring drain thru distal incision b/c drain site must be excised also.
- Excisional biopsy can be performed for presumed benign lesions or lesions small enough (2 cm diameter or less) to include a cuff of normal tissue.
- Use tourniquet s exsanguination.
- Same surgeon should perform Bx, definitive resection.
Biopsy

Longitudinal Incision

Transverse Incision

Perineuroma – MARGINAL resection

MARGINS
Undifferentiated Pleomorphic Sarcoma

Diagnosis & Staging
- Histologic Subtype
  - Liposarcoma
  - Leiomyosarcoma
- Grade
- MRI local site
- CT chest
- Bone Scan
- PET scan

Low Grade Sarcoma
- Mainstay is surgical excision by WIDE margin

www.Sarcoma.org
M. Malawer
High Grade Sarcoma

- Wide resection
- (Neo)adjuvant therapy
  - Radiation
    - Improved LOCAL control
  - Chemotherapy
    - Esp recurrent and/or metastatic disease

Surgical Decision Making

- Resection
  - Adjuvant Therapies
  - Surrounding structures
    - Neurovascular elements
    - Bone/periosteum
    - Skin/Subq tissue
    - Prior surgery/radiation
- Reconstruction
  - Adjuvant Therapies
  - Flap/graft requirement
  - Dead space management
  - Soft tissue (Ligaments/Tendons/etc) function
  - Bone prophylaxis

Postop/preop MRI
Plan

- Tumor Bed Resection

Tumor Bed Resection
Tumor Bed Resection

- Allograft patellar tendon reconstruction
- Gastrocnemius Rotational Flap
- STSG
- Prophylactic Internal Fixation Tibia
  - Medial proximal tibial plate and screws

Reconstruction

- Surveillance (LR and Distant dz)
  - q 3mo x 2y
  - q 60 x 3y
  - yearly
“The Hazards of Biopsy”
Mankin et al, JBJS 1982

- Study based on survey of MSTS membership. Members asked to submit records on 20 consecutive Px’s who underwent Bx and subsequent Tx for malignant primary bone/ST tumor.
- 329 Px’s (222 bone, 107 ST)
- 18.2% major errors in Dx.
- 10.3% technically poor/inadequate Bx’s.
- 18.2% major change in Tx plan due to problems c Bx.
- 4.5% unnecessary amputations.
- Complications 3-5x more frequent when performed @ referring institution rather than center of definitive Tx.
- CONCLUSION: Refer Px’s to treating center before performing a Bx!

“The Hazards of Biopsy, Revisited”
Mankin et al, JBJS 1996

- Repeated same MSTS-based study 10 years later.
- 597 Px’s (362 bone, 235 ST)
- 17.8% major errors in Dx (18.2% in ’82 study).
- 8.4% technically poor/inadequate Bx’s (10.3% in ’82 study).
- 19.3% major change in Tx plan due to problems c Bx (18.2% in ’82 study).
- 3% unnecessary amputations (4.5% in ’82 study).
- Complications 2-12x more frequent when performed @ referring institution rather than center of definitive Tx (3-5x in ’82 study).
- CONCLUSION: We haven’t learned our lesson! Refer the Px BEFORE Bx or you WILL hurt somebody!

61 y M with “sciatica” and atraumatic onset thigh hematoma.

Meds: No anticoagulants
Radiation in STS

- Historically → amputation
- “Radioresistance” debunked
- 1960s and 1970s
  - Acceptable LC rates with less radical surgery + radiotherapy
  - Significant advances/refinement in technique
- Current Indications
  - Large (>5cm), Deep (to fascia), High Grade
  - Situational
    - Recurrent
    - Unplanned Excisions

PRE vs. POST operative RTx

- No difference in local control or disease free survival
- Complications differ:
  - Pre: wound complications
  - Post: higher volume/larger field = long term fibrosis/edema/dysfunction
- Benefits of Preoperative RT
  - Improve resectability
  - Reduce volume of normal tissue receiving RT
Dosage

- Postoperative $\geq 63\text{Gy}$
- Preoperative $50\text{Gy}$
  - $5\text{-}10\text{cm}$ longitudinal margin
  - 2-3 week rest, then resection
  - Postop "boost" for +margins

And back to our intro case...
62y F with painful lump x 5 weeks

Physical Exam

Workup?

- B. HENSELAE IGG SCREEN
- B. HENSELAE IGG TITER 1:128 H <1:64
- B. HENSELAE IGM SCREEN
- B. HENSELAE IGM TITER 1:20 H <1:20