Terminology-Classification-Diagnostic Tools-Differential Diagnosis

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Treating patients with musculoskeletal tumors is a relatively easy task.
Preoperative Neo-adjuvant Chemotherapy
Postoperative Neo-Adjuvant Chemotherapy
What Can Go Wrong?
Pretty Much everything!

Terminology - Classification - Diagnostic Tools - Differential Diagnosis
Case #1
Medical record file belongs to a patient treated by the speaker
Case #2
Medical record file belongs to a patient treated by the speaker
Case #3
Medical record file belongs to a patient treated by the speaker
Case #4

Medical record file retrieved by PubMed
Case #5
Medical record file belongs to a patient treated by the speaker
Maybe it's not that easy after all...
Maybe there are more things endangered this way...?
Patient Referral
Multidisciplinary Team
Biopsy
Patient Referral
Treating patients with musculoskeletal tumors is a difficult task...

It is preferable to be done from the beginning in designated tumor services and by specialized physicians.
Every tumor is not easily treated and should not be excised before we know exactly its characteristics...

Many times, initial treatment by physicians who are not familiar with musculoskeletal oncology, may compromise the salvation of a limb, and/or the survivorship of the patient.

COMMUNiCATE
Multidisciplinary Team
All musculoskeletal tumors (primary and metastatic) should be evaluated and treated by a team of physicians who are experts on this field.

**CORE SPECIALTIES**

Sarcoma Orthopaedic Surgeon
Pathologist
Oncologist & Pediatric Oncologist
Radiotherapist
Musculoskeletal Radiologist

**ADDITIONAL SPECIALTIES**

Thoracic Surgeon
Plastic Surgeon
Vascular Surgeon

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**Terminology-Classification-Diagnostic Tools-Differential Diagnosis**
Staging
What's that?
It is the procedure by which patients with musculoskeletal tumors are being evaluated for:

- The histology of the tumor
- Local extent of the tumor
- Metastases
Surgical staging aims to:

Evaluate patients based on well-known risk factors

Evaluate (if possible) prognosis

Provide guidance regarding treating modalities

Compare results between patients/treatments
<table>
<thead>
<tr>
<th>Stage</th>
<th>Grade</th>
<th>Local Extent</th>
<th>Metastases</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-A</td>
<td>Low</td>
<td>Intracompartmental</td>
<td>None</td>
</tr>
<tr>
<td>I-B</td>
<td>Low</td>
<td>Extracompartmental</td>
<td>None</td>
</tr>
<tr>
<td>II-A</td>
<td>High</td>
<td>Intracompartmental</td>
<td>None</td>
</tr>
<tr>
<td>II-B</td>
<td>High</td>
<td>Extracompartmental</td>
<td>None</td>
</tr>
<tr>
<td>III</td>
<td>Any</td>
<td>Any</td>
<td>Present</td>
</tr>
</tbody>
</table>
CT & MRI non-existing when it was introduced

Assisting decisions regarding operative options BEFORE the introduction of current neo-adjuvant treatments
## Multidisciplinary Team

### TABLE 3 Definition of TNM and Grade $[^G]$

<table>
<thead>
<tr>
<th>Primary Tumor $[^T]$</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Primary tumor cannot be assessed</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor 8 cm or less in greatest dimension</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor more than 8 cm in greatest dimension</td>
</tr>
<tr>
<td>T3</td>
<td>Discontinuous tumors in the primary bone site</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Regional Lymph Nodes $[^N]$</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX*</td>
<td>Regional lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>No regional lymph node metastasis</td>
</tr>
<tr>
<td>N1</td>
<td>Regional lymph node metastasis</td>
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</table>

<table>
<thead>
<tr>
<th>Distant Metastasis $[^M]$</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX</td>
<td>Distant metastasis cannot be assessed</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
</tr>
<tr>
<td>M1a</td>
<td>Lung</td>
</tr>
<tr>
<td>M1b</td>
<td>Other distant sites</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Histologic Grade $[^G]$</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GX</td>
<td>Grade cannot be assessed</td>
</tr>
<tr>
<td>G1</td>
<td>Well differentiated—low grade</td>
</tr>
<tr>
<td>G2</td>
<td>Moderately differentiated—low grade</td>
</tr>
<tr>
<td>G3</td>
<td>Poorly differentiated—high grade</td>
</tr>
<tr>
<td>G4†</td>
<td>Undifferentiated—high grade</td>
</tr>
<tr>
<td>Stage</td>
<td>Tumor (T)</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>I-A</td>
<td>T1</td>
</tr>
<tr>
<td>I-B</td>
<td>T2</td>
</tr>
<tr>
<td>II-A</td>
<td>T1</td>
</tr>
<tr>
<td>II-B</td>
<td>T2</td>
</tr>
<tr>
<td>III</td>
<td>T3</td>
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<td>IV-A</td>
<td>Any T</td>
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<tr>
<td>IV-B</td>
<td>Any T</td>
</tr>
<tr>
<td></td>
<td>Any T</td>
</tr>
</tbody>
</table>
History (age, co-morbidities)

Physical Examination
- Evaluation of the size of a mass (when palpable)
- Local temperature
- Mobility
- Muscles atrophy
- Neurologic deficit
- Vascularity
- Nodes
Plain x-ray
MRI
CT
Bone Scanning
Blood tests (?)

NECESSARILY before biopsy

Terminology-Classification-Diagnostic Tools-Differential Diagnosis
Biopsy
Biopsy

Diagnosis and histological identification of a lesion before operative treatment is mandatory.

Differential Diagnosis may be extremely challenging!
Every Infection can mimic a tumor!
Every tumor can mimic an infection!
Ideally, this should be performed at the designated Musculoskeletal Oncology Center where treatment will take place.

Proper placing of a biopsy is extremely important.

It can either be Core-Needle or Open
Needle biopsy may yield successful results in up to 97% of cases…

…when performed by experts!

The same rules apply in both cases.

BEWARE!

Improper placement of a biopsy may compromise result and later lead to amputation in 18% of patients.
Biopsy incision should be made along the definite surgical incision which will later follow.
Biopsy

COMMUNICATE!

• Surgeon
• Radiologist
• Pathologist


Terminology-Classification-Diagnostic Tools-Differential Diagnosis
We perform biopsies even on pathological fractures after performing an MRI-scan.

In patients at risk to sustain a fracture following biopsy, non-weight bearing walking is highly advised.

Case #6
Medical record file belongs to a patient treated by the speaker
Case #7
Medical record file belongs to a patient treated by the speaker
CT guided-core needle biopsy
Case #8

Medical record file belongs to a patient treated by the speaker
Closed CT-guided core needle biopsy
Open biopsy 3/52 after the closed
MUSCULOSKELETAL TUMORS

Benign  Malignant

Biopsy

Terminology - Classification - Diagnostic Tools - Differential Diagnosis
MALIGNANT TUMORS

Primary

Metastatic

Terminology - Classification - Diagnostic Tools - Differential Diagnosis
HOLY $#%@*!
YOU ARE 40
Mesenchymal Musculoskeletal Tumors

Tumors deriving from:
• Bone
• Cartilage
• Adipose tissue
• Peripheral nerve
• Fibrous tissue

Sarcomas are rare tumors. Their annual incidence is:

~6,000-7,000 new cases of soft-tissue sarcomas per annum / per year (USA)
~2,500 new cases of bone sarcomas per annum / per year (USA)
~200,000 new cases of soft-tissue & bone sarcomas per annum / per year (globally)


Terminology-Classification-Diagnostic Tools-Differential Diagnosis
Mesenchymal Musculoskeletal Tumors

Malignancy Grade

“Indolent”  “Infiltrating”  “Metastasizing”


Take Home Messages...
When a patient with a musculoskeletal tumor is treated by expert surgeons, recurrence rate is <10%

Increased local recurrence rates may be expected if:
• The patient is being treated in a non-designated Oncological center
• Excision margins are not “clear”

Patients with local recurrence...

- Are in danger to develop metastases
- May need to undergo radical excision and/or amputation
Note to self:
I AM NOT GOD.
Κακοήθεις
Όγκοι
Μαλακών
Μορίων.
Χειρουργική
Αντι
µετώπιση
And why's that?
Thank you...