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Extrasketal Osteosarcoma: Clinico-pathologic Features and Results of Multimodal Management

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Extraskeletal Osteosarcoma: Clinico-pathologic Features and Results of Multimodal Management

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Extraskeletal Osteosarcoma

Background

- About 1% of all soft tissue sarcomas
- First described by Wilson in 1941
- Few large series then reported
- Older individuals & usually worse survival than skeletal osteosarcoma
Extraskeletal Osteosarcoma

Diagnostic Criteria

- Arise in the soft tissue and not be attached to bone/periosteum
Extraskeletal Osteosarcoma

Diagnostic Criteria

- Uniform sarcomatous pattern, high-grade
- Produce osteoid-bone/cartilage matrix
Extraskeletal Osteosarcoma

Classic Literature: 80’s-90’s

- 26-88 pts, 1915-1988, all high-grade lesions
- Mean age 51-55 yrs, M:F=1-1.9, 47-68% lower limb
- Mgmt: mostly surgical unimodal, little role for Rxt/Cht
- LR 43-69%, mets 61-80%, 5yr OS rate 24-37%
- Suggested role for tumor size, surgical margin and possibly aggressive multimodal management

**MSKCC**  - Sordillo PP et al, Cancer, 1983
**AFIP**  - Chung EB & Enzinger FM, Cancer, 1987
**MDACC**  - Bane BL et al, Cancer, 1990
**Mayo Clinic**  - Lee JS et al, Cancer, 1995
Extraskeletal Osteosarcoma

Recent Literature

- 17-38 pts, 12-20 yrs experience, all high-grade lesions
- Mean age 44-55 yrs, M:F=1-2, 47-52% lower limb
- Mgmt: mostly multimodal - Surgery & Cht, less Rxt
- LR 16-29%, mets 7-39%, 3yr EFS 56%, 5yr EFS 47%
  5ys OS rate 46-66%
- Improved outcome, better surgical margin, Cht likely
  beneficial even if questionable clin/path response

MDACC - Ahmad SA et al, J Clin Oncol, 2002
Munster - Goldstein-Jackson SY et al, J Cancer Res Clin Oncol, 2005
Extraskeletal Osteosarcoma

Rizzoli Experience

- 48 pts, 1966-2007, 36 admitted, 12 consults
- Clinico-path & radiologic features reviewed
- Management correlated with outcome
- Updated FU obtained in all patients
- Kaplan Meier & log rank survival analysis
Rizzoli Experience

- Median age 53.6 yrs, M 21/F15, LL 69%
- Prox 52.8%, Distal 16.7%, Girdles 30.6%
- All high-grade lesions; def Dx on specimen 16 (44%)
- 23 pts localised (64%), 13 metastatic (36%)
- 16 prev. excision admitted for further surgery
Extraskeletal Osteosarcoma

Rizzoli Experience: Management

- Surgery: 34 (LS 69.5%, amp 25%), 2 inop.
- Margins: adequate 76.5%, inadequate 23.5%
- Cht 19 (52.8%): 17 adjuv postop, 2 neoadjuv - 2 to 4 drugs regimen based on pt age
- Postoperative Rxt: 6 patients (16.7%)
Extraskeletal Osteosarcoma

Expected Overall Survival

Median FU: 58 months
Extraskeletal Osteosarcoma

Expected Event-Free Survival

Median FU: 5.8 yrs

24% 24%
Extraskelatal Osteosarcoma

Overall Survival: Age

\[ p = 0.066 \]
Event-Free Survival: Age

$p=0.007$
Extraskeletal Osteosarcoma

Overall Survival: Tumor Volume

$p=0.01$
Extraskeletal Osteosarcoma

Overall Survival: Stage

- 23 pts localised, 9 survivors (1DOC when DF)
  - DS survival 43.5% (DFS 39%)
- 13 pts metastatic, 3 survivors (2 AWD, 1 DF)
  - DS survival 23% (DFS 7.7%)

NS
Extraskeletal Osteosarcoma

Overall Survival: Margin and LR

- Localised 23, operated 22
  - Adequate 18, survivors 8, DFS 44.4%
  - Inadequate 4, survivors 2, DFS 50%
  - Amputation vs LS: no difference

- 8 pts developed 12 LR’s → further surgery
  - 2 pts DF at final FU: 25%
Overall Survival: Chemotherapy

- Cht: 19 pts, 8 survivors (42.1%)
- No Cht: 17 pts, 5 survivors (29.4%)
Extraskeletal Osteosarcoma

Overall Survival: Chemotherapy

- **Localised (23 pts)** → improved DFS
  - Cht 10 pts: DFS 60%
  - No Cht 13 pts: DFS 31% (23%)

- **Metastatic (13 pts)**
  - Cht 9 pts: 1 DF, 1 AWD DFS 11%
  - No Cht 4 pts: 1 AWD DFS 0%

\[ p=0.09 \]

NS
Conclusions

- Results comparable with recent literature
- Age and volume important factors
- Worse prognosis than bone OGS?
- Biologic behavior of aggressive STS
- Cht seems valuable in pts with loc. disease
Extraskeletal Osteosarcoma

Literature

- **Sordillo PP et al, Cancer, 1983** - MSKCC

  - 48 pts, 1950-1982, all high-grade lesions
  - Mean age 51 yrs, M=F, 54% lower limb, 5 prev Rxt
  - Mgmt (45 pts): Surgery 43, Cht in 5 relapses
  - LR 69%, mets 80%, LR &/or mets 91%, OS 24%
  - Survivors: amput/resection & Rxt, 4/5 Cht at relapse
Extraskeletal Osteosarcoma

Literature

- Chung EB & Enzinger FM, Cancer, 1987 - AFIP
  - 88 pts, 1946-1982, all high-grade lesions
  - Mean age 54.6 yrs, M 58%, 46.6% lower limb
  - Management: unimodal (surgery), no details
  - 2.7 yrs mean FU on 65 pts: LR 43%, mets 63%, OS 38.4%, CDFS 12.3%
  - Better prognosis of prominent fibroblastic or MFH-like histologic component
Extraskeletal Osteosarcoma

Literature

- **Bane BL et al, Cancer, 1990 - MD Anderson CC**

  - 26 pts, 1950-1987, all high-grade lesions
  - Mean age 53.5 yrs, M:F=1.9, 61.5% lower limb
  - Dx: initial biopsy/excision not showing osteoid
  - Mgmt: Surg 9, Surg & Cht 9, Surg & Rxt 3
  - 4.6 yrs FU: LR 50%, mets 61%, NED 27%
  - Size (< 5 cm vs > 5 cm) main prognostic factor \( p < 0.001 \)
  - Behaviour more like ST MFH than bone OGS
Lee JS et al, *Cancer, 1995* - Mayo Clinic

- 40 pts, 1915-1988, all high-grade lesions
- Mean age 50.7 yrs, M:F=1.9, 68% lower limb
- Management: Surgery 39, Rxt 12, Cht 2
- LR 45%, mets 65%, 5-yr survival 37%, OS 27%
- Positive impact of radical/wide margin and chondroblastic subtype
**Extraskletal Osteosarcoma**

**Literature**

- **Ahmad SY et al, J Clin Oncol, 2002** - MD Anderson CC
  
  - 60 pts, 1960-99, AJCC I=3 ,II=25%, III=43%, IV=28%
  
  - Mean age 55 yrs, M:F=1.6, 52% lower limb
  
  - Management AJCC<IV: Surgery 35, Rxt 6, Cht 24
    
    - LR 20%, mets 40%, 5-yr survival 46%
  
  - 8 month survival if present with mets
  
  - relatively doxorubicin-resistant, poor-prognosis
  
  ST sarcoma that is distinct from OS
Extraskeletal Osteosarcoma

Literature

- **Goldstein-Jackson SY et al, J Cancer Res Clin Oncol, 2005**
- 17 pts, 17 insts 1986-2002, all high-grade lesions
- Mean age 44 yrs, M:F=1.7, 47% lower limb
- Management: Surgery 16, Rxt 1, Cht 16
- LR 32%, mets 18%, 5-yr survival 77%
- Positive impact of multi-agent chemotherapy
Extraskeletal Osteosarcoma

Literature

- **Torigoe T et al, J Orthop Science, 2007**
  - 20 pts, 1991-2003, UICC Stage: II=5, III=13, IV=2
  - Mean age 50 yrs, M:F=2.3, 60% lower limb
  - Management: Surgery 19, Rxt 5, Cht 15
  - LR 15%, mets 45%, 5-yr survival 66%
  - Positive impact of chemotherapy – similar findings
Extraskeletal Osteosarcoma

Rizzoli Experience

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Extraskeletal Osteosarcoma

Diagnostic Criteria

- Arise in the soft tissue and not be attached to bone/periosteum
- Polyethylene Wear & Hinge Design
- Cemented vs Uncemented Fixation
- Tendon Attachment & Soft Tissue Sealing
Extraskeletal Osteosarcoma

Unsolved & Controversial Issues

- About 1% of all ST sarcomas

- Wilson H, Ann Surg, 1941
Extraskeletal Osteosarcoma

Unsolved & Controversial Issues

- Deep Infection and Septic Failure
- Polyethylene Wear & Hinge Design
- Cemented vs Uncemented Fixation
- Tendon Attachment & Soft Tissue Sealing
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