Giant Cell Tumour of Bone

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Introduction

- WHO - “an aggressive, potentially malignant lesion”
- 80% benign course
- 10-50% local recurrence rate
- 10% undergo malignant transformation at recurrence
- 1-4% pulmonary mets, even with benign histology
Mononuclear spindle-shaped cell

Chromosome abnormality

↑p53
C-myc
C-fox
N-myc

Neoplastic characteristic - oncogenes

Cytokine, Differentiate factors

M-CSF
IFN-γ
TNF-α

Macrophage recruitment, activation

Fusion of mononuclear cells

Pathogenesis
GCT Hypothesis

- Spindle-shaped neoplastic mononuclear stromal cells stimulate immigration of blood monocytes into tumor tissue and promote formation of osteoclast like giant cells.

- Characteristic cell types are simply reactive components of the GCT, while spindle shaped stromal cells represent neoplastic component of tumour.
Clinical appearance

15% benign bone T
3-8% all bone T
Clinical Presentation

non-specific, local swelling, warmth, pain radiating w/o WB
purely cystic lesion
epiphyseis metaphysis
pathologic # - 15%
Differential Diagnosis
aneurysmal bone cysts, chondroblastoma, non-ossifying fibroma, chondromyxoid fibroma, eosinophylic granuloma, high-grade central osteosarcoma
Recurrence

Historically, high rate of recurrence, especially after intra-lesional curettage
- usually in first 12-36 months
- 1st symptoms of recurrence are pain and enhanced bone scan
Grading and Staging systems

- Can not prognosticate based on histology
- Enneking’s surgical stages
  - 1: latent lesion - biologically static
  - 2: active lesion - showing growth but confined w/in bone
  - 3: locally aggressive - showing soft tissue extension
Campanacci
radiographic grade

1: quiescent - minimal cortical involvement
2: active - extensive cortical thinning/bulging
3: aggressive - break in cortical bone and soft tissue component
Special forms of GCT

- monostotic, occasionally polyostotic
- malignant GCT
  - 1°: 1-3%, malignant from onset
  - 2°: 5-10%, recurrence, radiotherapy transformation
- Benign metastasing GCT: 1-3%
  - Lung mets usually appear 2-3 yrs after Rx primary tumor
  - CXR for 1st presentation and f/u
Treatment

- en-block resection - Gold Standard
- recurrence rate 0-5%
- recommended for grade 3 tumour
- GCT usually epiphysis, sacrifice articular surface
Intralesional Curretage

Historic high rate recurrence 30-50%

Adjuvants

- High-pressure pulsatile lavage
- High speed dental burr
- Thermal - cement, liquid nitrogen
- Chemical - Phenol, H O

cement - cheap, immediate WBAT, recog local recurrence
Treatment of Giant-Cell Tumors of Long Bones with Curettage and Bone-Grafting


Investigation performed at the University Musculoskeletal Oncology Unit, Mount Sinai Hospital, Toronto

59 pt. - Retrospective
Rx w/ curettage and high speed burr w/ w/o bone graft
7 (12%) local recurrence

Adequacy of removal of tumor rather than adjuvant modalities determine recurrence

F/U 62mth (min 24mth)
75 pt., Rx intralesional curettage, high speed burr + adjuvant Rx
Adj - Bone Grafting, cement, electrical cautery, phenol
10 (13%) Local recurrence

No sign. diff. between adjuvant Rx.
GIANT CELL TUMOR OF BONE

Giant Cell Tumor of Long Bone: A Canadian Sarcoma Group Study

Robert E. Turcotte, MD*,**, Jay S. Wunder, MD***; Marc H. Isler, MD*; Robert S. Bell, MD†; Norman Schachar, MD§; Bassam A. Masri, MD***; Guy Moreau; and Aileen M. Davis, PhD++

186 pt - 158 1°, 28 recurrence

148 curettage
high speed burr 135

cement 64
bone graft 61
phenol 37
liquid nitrogen 10

36 resection

1° GCT recurrence - 10%

Recurrence GCT curettage - 35%

No difference - nature of filling material or adjuvant used

Results of Giant Cell Tumor of Bone Treated With Intraläsional Excision

Paul Saiz, MD; Walter Virkus, MD; Patricia Piasecki, RN, MS, ONC; Alexander Templeton, MD; Susan Shott, PhD; and Steven Gitelis, MD

40 pt - single surgeon intraläsional curettage, cautery, phenol, cement

local recurrence 12.5%
curettage, high speed burr, pulse lavage
no filler
137 pt
Overall 26 (19%) recurrence
C I-II - 7%
C III - 29%
Radiotherapy

- historical data - local recurrence 50-70%
- modern equipment - local recurrence 10-15%,
- radiation-induced malignant tumour 0-8%
- in selected cases if curettage is only incomplete, radiation may be effective alternative
Prognosis

- most GCTs show tendency to progress and without Rx reach stage 3 sooner or later
- Recurrence - most significant factor is surgical procedure
  - curettage with adjuvant therapy 7-34%, resection 7%
- Mx of local recurrence - varied - repeat intralesional vs wide excision
- Malignant transformation/pulmonary mets - rare - poor
Recurrence - optimal Rx

- careful curettage and use of adjuvants to decrease rate of recurrence
- joint-sparing Sx at revision operations and in stage 3 tumors whenever possible
- in cases of proven malignancy - resection according to oncological criteria
- comparative histological and molecular biological evaluation of primary and recurrent tumors