

## **Vesalius SCALpel™ : Sarcoma (see also: soft tissue/sarcoma folios)**

1% of adult malignancies, 15% of pediatric

multimodality Rx the rule

ext pre 55Gy or post 65Gy -> 90% control

circumferential and tissue plane growth, pseudocapsule

1/3 of pts. asymptomatic

lymphatic spread rare

exceptions: epithelioid, rhabdomyo, clear cell, angio

predisposition:

genetic:

VonRecklinghausen neurofibromatosis: 10% neurofibrosarcoma

LiFraumeni (P53): rhabdomyosarcoma, early breast cancer

retinoblastoma (Rb)

FAP

Gardner's: desmoid (aggressive fibromatosis)

somatic p53 mutation found in 30-60% of soft tissue sarcomas

radiation: 8-50X increased incidence

lymphedema, lymphangiosarcoma, 3% of all sarcomas, 10y average delay

after axillary lymph node dissection = Stewart-Treves syndrome

chemical:

PVC: aggressive hepatic angiosarcoma

phenoxyacetic acid herbicides: dioxin, agent orange

arsenic

hemochromatosis

trauma: postpartum

molecular markers

leiomyosarcoma: RB1

synovial: SYT-SSX 1,2 fusion products

malignant fibrous histiocytoma (MFH): P53

neurofibromatosis: S-100

angio: factor VIII

rhabdo: myoglobin (alveolar histology worst)

types: 20% lipo-, 19% leiomyo-, 18% malignant fibrous histiocytoma (MFH, all hi grade, spindle cell, cartwheel pattern), 10% fibro-, 7% synovial, 32%, other (45 other types)

age: child small blue cell, embryonal rhabdomyoSA (H&N, GU, extremity; favorable prognosis <10yo)

young adult: synovial

location:

50% extremities (lipo, MFH, Ewing's)

40% trunk/retroperitoneum (lipo,leio)

10% head and neck

Dx

painless mass, frequent delay diagnosis

Bx: > 5cm, new, increasing size, symptomatic

core Bx 90% accurate, replacing incisional Bx

retroperitoneal mass assume sarcoma, operate without Bx  
4% LN mets, 25% distant mets (hematogenous)

visceral spread to liver  
extremities spread to lung

grade, not size most important staging criterion (one of few tumors grade is important in staging)

I, II lo grade, III, IV hi grade

I well differentiated, II moderately well, III poorly, IV undifferentiated  
based on: mitosis, cellularity, necrosis, differentiation, stromal content

size: T1 < 5cm (a superficial, b deep [deep/investing fascia]), T2 > 5cm (a, b)

T1 better prognosis

N & M 0 and 1

no adequate staging retroperitoneal, visceral

5y survival by stage:

I 95%, II 80, III 50, IV 15

overall 50%

surgery

margins 2-3cm ideal, outside pseudocapsule

< 2mm 100% recurrence

90% limb-sparing successful, 10% recurrence, rare amputation

Moh's surgery (successive frozen section of margins) for well differentiated in critical  
areas

leave clips for adjuvant radiation

amputation only if recurrent and can't be reexcised without severe loss of limb  
function

salvage amputation improves Karnofsky score and quality of life

radiation: adjuvant increases local control (external beam and brachytherapy)

< 5cm with negative margins no RT, even for hi grade

chemo little benefit

doxocycline, ifosfamide may improve local recurrence, survival

hi grade, > 5cm 20% response

isolated hyperthermic limb perfusion with melphalan & ifosfamide in selected cases

chemoradiation neoadjuvant may shrink large tumor; 25% wound complications

hi risk

local recurrence: age > 50, recurrent, positive margin, fibroSA, malignant peripheral nerve SA

distant recurrence: > 10cm, recurrent, deep, hi grade, leiomyoSA, non-lipoSA

recurrence

recurrence directly related to grade, nerve sheath worst

local recurrence most significant factor for overall survival

most recur < 2y, older patients more local recurrence

retroperitoneal scan: hi recurrence rate (30-50%)(hard to get negative margin)

30% recurrence < 2y, limb salvage still possible

head and neck hi recurrence (48%), hard to get margins

resect isolated recurrence, 2/3 long term benefit

predictors of survival after recurrence: extent, length of disease-free interval, older

distant mets: 25% 1y survival

chemo: doxocycline, ifosfamide, dacarbazine  
up to 47% response rate, 10% complete response  
lung met resect. (even bilat.) if primary controlled, no mediastinal involvement, no  
extrathoracic disease, medically fit  
20-50% 5y survival  
benefit of resecting hepatic met unclear

#### retroperitoneal

15% of all sarcomas, 55% of retroperitoneal tumors  
vague symptoms, present late: abdominal mass, wt. loss, pain, early satiety, nausea/vomit  
only 50% negative margins  
common location for recurrence (50%), die of local disease  
CT/RT little benefit

#### GIST

interstitial pacemaker cells of Cajal

markers:

CD34: hematopoietic progenitor cell antigen

CD117: C-kit protein: membrane receptor with tyrosine kinase component

C-Kit proto-oncogene (tyrosine kinase receptor) mutation/overexpression

also PDGFR alpha (another tyrosine kinase receptor)

most common mesenchymal tumor of the GI tract

frequently benign, can be malignant (> 5cm)

5 mitoses/10 HPFs

malignant changes highest in stomach

hi recurrence, lo lymph node mets so no lymph node dissection

recurrence common on peritoneal surface of liver

65% stomach, 25% small bowel, 5% colon, 5% esophagus

presentation: 60% pain, 35% bleeding

Rx: resect with negative margin, no node dissection

50% cure with complete resection, 50% overall 5y survival

imatinib mesylate/gleevec selective inhibition tyrosine kinase receptors

50% partial response unresectable disease, 31% stable

sunitinib more powerful for imatinib resistant

role as adjuvant Rx under investigation

endoscopic, CT f/u

#### desmoid

like low grade sarcoma, women, multiple recurrences

no metastatic potential

resect with clear margin

sulindac, TAM may prevent recurrence

increased incidence in FAP

#### bone sarcoma

osteosarcoma most common

childhood and adolescence

painful mass

CT/MRI, incisional Bx

induction/pre-op/neoadjuvant chemo helps limb-sparing (Ewing's)

25% develop pulmonary mets

childhood sarcoma

- small blue cell most common (70%)
- rhabdo-, Ewings (musculoskeletal, 25% mets @ Dx, favorable prognosis)
- chemo/rad pre-op, incisional Bx
- respond better than adult

head and neck

- 4% of all sarcomas, 1% of head and neck cancers
- XRT may be some benefit, no role for chemo
- 45-68 overall 5y

neurofibromatosis

- peripheral/type1 (VonRecklinhausen) most common; central neurofibromas
- 3-15% lifetime risk neurofibrosarcoma
  - large, rapid growth
  - high uptake PET/FDG (fleurodeoxyglucose) suggests malignancy
  - complete resection with margins +/- RT

mesothelioma

- asbestos
- pleura, peritoneal, tunica vaginalis
- usually late Dx
- palliative Rx, 0% 5y survival

vascular

- 4% of all soft tissue sarcomas
- no Bx, causes bleeding
- excise with negative margin
- XRT depending on location

chemo main benefit for bone and child