LASOP Resident Case Presentation

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Clinical History

• 34 year-old male

• Chief complaint:
  – Painful, enlarging soft tissue mass of the left great toe for several months

• Physical examination:
  – Dark, hemorrhagic, soft tissue lesion on the distal medial aspect of the great toe
  – Three peripheral purple satellite lesions, 4 mm in diameter each
Imaging (MRI)

- 1.4 cm enhancing subcutaneous soft tissue mass lesion at the medial aspect of the distal left first phalanx
- Unremarkable adjacent bone with no cortical erosion
- Grossly unremarkable visualized muscles
• Excisional biopsy (7/24/03)
  – Gross examination: 0.8 x 1.6 x 0.2 cm well circumscribed, firm, tan-pink mass with minute cystic foci
Negative Immunostains

Keratin AE1/AE3
CAM 5.2 keratin
Cytokeratin 19
EMA
Smooth muscle actin
Desmin
S100 protein

HMB-45
Chromogranin
Synaptophysin
CD99
CD31
CD34
CD68
Malignant myopericytoma
Additional work-up/Treatment

• 9/19/03
  – Re-excision of left great toe mass
    • Similar histologic findings to original biopsy
    • Positive surgical margins
  – Inguinal lymphadenectomy
    • Metastatic myopericytoma
      – Vascular invasion

• 2/24/04
  – Re-excision of left great toe mass
    • Islands of residual tumor within fibrofatty tissue
      – Histologically identical to prior history

• Radiation/Chemotherapy
• 10/20/05
  – Surveillance abdominal CT scan
    • focal wall thickening, right colon

• 10/25/05
  – Total colonoscopy
    • Large ulcerated, multi-nodular mass, cecum
      – Biopsy: poorly differentiated invasive adenocarcinoma

• 11/17/05
  – Right colectomy with distal ileectomy
    • Adenocarcinoma, poorly differentiated, 9.4 cm in greatest dimension
    • Prominent lymphovascular invasion
    • Metastatic adenocarcinoma within 10/19 sampled regional lymph nodes
  – Adjuvant chemotherapy
4/17/07
Amputation of right fifth digit
• Invasion into bone present
• Tumor cell necrosis present
• Mitotic index: 12 per 10 HPF

• Patchy smooth muscle actin expression
• Lack of CD34, S100 protein, and keratin AE1/3

• Contralateral side
• Absence of known lung involvement
8/7/07
Below the knee amputation
Final Diagnosis

• Myopericytoma (WHO 2004), histologically malignant and clinically recurrent/metastastic

• Foci of involvement: great toe, plantar surface, anterior medial aspect of lower leg

• Multiple cutaneous, soft tissue and bony metastases, some with overlying ulceration

• Angiolymphatic invasion with large vessel involvement
Cytogenetic Studies

• **G-banding:**
  
  – 95% of cells showed consistent clonal numerical and structural abnormalities, as well as some cell to cell variability.
    • Loss of the short arm of the X chromosome
    • Extra copies of chromosomes 13 and 15, and a derivative chromosome 20 (11;20 translocation with breakpoints at 11q13 and 20q13.3).
    • An abnormal copy of chromosome 21
    • Several cells showed loss of the Y chromosome, variable sized ring chromosome, and random additional translocations (possible treatment result)
  
  – There was no evidence of the 7;12 translocation reported in some cases of myopericytoma
Cytogenetic Studies Cont.

• Fluorescence in situ hybridization (FISH)
  – Loss of chromosome Y, all cells
  – No loss of the short arm of the X chromosome (translocated to chromosome 21)
  – Amplification of a portion of chromosome 12, region 12q13-q24.1 (The chromosomes previously designated as extra copies of chromosome 13 and 15).
    • Seen in a variety of tumors including sarcomas, osteosarcomas, pleomorphic adenomas, well-differentiated/atypical liposarcomas, and brain tumors, and often involves the CDK4 and MSM2 genes.
  – 11;20 translocation
Additional Follow-up

• 1/17/08
  – Pulmonary metastasis, bilateral

• 1-7/08
  – Palliative management

• 7/30/08
  – The patient was lost to follow up
Malignant Myopericytoma

• Subcutaneous or deep-seated locations

• Gross features:
  – Size : 15 to 130 mm (median 30 mm)
  – Consistency: soft-firm
  – Color : white, grey, purple or red
  – Well-poorly circumscribed

• Microscopic features:
  – Malignant histological features in addition to evidence of myopericytic differentiation
Unencapsulated and poorly circumscribed, composed of highly cellular nodules
Oval-to-spindle shaped with eosinophilic cytoplasm and a myoid appearance
Concentric perivascular growth accentuating vascular walls
• The perivascular growth:
  – Varies in prominence:
    • Less obvious in the more poorly differentiated tumors
    • Often prominent at the edges of the tumor nodules or more intimately admixed with spindle cell areas
  – As in benign myopericytoma and glomus tumor, perivascular proliferation of lesional cells maybe evident in tissue immediately adjacent to the main tumor mass
Necrosis/prominent areas of geographical necrosis with adjacent microcystic pattern
Focal areas with thin-walled hemangiopericytoma-like branching vessels

Numerous mitoses (15–48/10 high-power fields (HPF), median 27), rare atypical mitotic figures
Vascular invasion
Focal fascicular arrangement of spindle cells, resembling myoid areas of myofibromatosis
Small foci composed of cuboidal cells with distinct cell borders and pale cytoplasm, resembling glomus cells
Additional Features

- Scattered pleomorphic cells with nuclear enlargement and occasional multinucleation
- Focal stromal myxoid change
- Frequent apoptotic bodies
- Focal subendothelial proliferation of tumor cells
Immunoreactivity

- Smooth muscle actin: at least focal positive staining in solid nodules and in areas with perivascular growth pattern (15–80% of cells, median 40%)
- Desmin: +/-, focal
- Epithelial membrane antigen: +/-, focal
- Cytokeratin (AE1/AE3): +/-, focal
- S100: Negative
Differential Diagnosis

• Benign myopericytoma
  – Usually superficially located
  – Reasonably well circumscribed
  – Well-developed concentric perivascular growth pattern
  – Necrosis and cytological atypia are generally not seen
  – Mitoses are infrequent
Differential Diagnosis Cont.

• Solitary myofibroma/myofibromatosis
  – Biphasic appearance with primitive spindle cells arranged around branching blood vessel areas and myoid/myofibroblastic areas
  – A fascicular or commonly whorled appearance
  – composed of spindle cells with abundant pale eosinophilic cytoplasm
  – Mitoses can be frequent
  – Numerous apoptotic bodies and areas of necrosis (ischemic infarction)
  – Cellular pleomorphism should not be present
  – perivascular concentric growth generally not a prominent feature
Differential Diagnosis Cont.

- Leiomyosarcoma
  - More brightly eosinophilic cytoplasm and plump, cigar-shaped nuclei
  - Perivascular concentric growth is absent
  - Positive staining with desmin
  - Almost 40% show at least focal immunopositivity for cytokeratins and/or epithelial membrane antigen
Differential Diagnosis Cont.

- Malignant peripheral nerve sheath tumor
  - Spindle cell neoplasm
  - Can show perivascular accentuation of tumor cells
  - Focal positivity for smooth muscle actin may be seen
  - Typically shows alternating hyper- and hypocellular areas
  - Tumor cells have pale, indistinct cytoplasm with a tapered or buckled nuclear contour
  - S100 protein is positive in 50% of malignant peripheral nerve sheath tumors (although expression is typically focal)
Differential Diagnosis Cont.

- Monophasic synovial sarcoma
  - Spindle-cell tumor
  - Commonly infiltrative
  - Can show areas with prominent thin-walled branching vessels.
  - Concentric perivascular growth of tumor cells is not a feature
  - Wiry stromal collagen
  - Frequent stromal mast cells
  - Scattered epithelial membrane antigen or cytokeratin positivity
  - Smooth muscle actin: +/-
References

- (http://atlasgeneticsoncology.org/Tumors/Pericytomt0712ID5192.html).
Thank You