Radiology-Pathology Conference
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Case 1

- 62 year-old female
Differential diagnoses Hypodense, hypermetabolic liver lesion

- Primary malignant tumor: Hepatoma, lymphoma, intrahepatic cholangiocarcinoma
- Metastasis: colon, stomach, pancreas, breast and lung
- Benign tumor: Adenoma
- Abscess
Radiology / Pathology Conference

Stacie Canacci, M.D.
Liver, right lobe, CT-guided FNA: Diff-Quik stain, 20x
Liver, right lobe, CT-guided FNA: Diff-Quik stain, 40x
Liver, right lobe, CT-guided FNA: Papanicolaou stain, 40x
Liver, right lobe, CT-guided FNA: Cell Block
Hematoxylin and eosin stain, 40x
Liver, right lobe, CT-guided fine needle aspiration:

Malignant tumor cells present derived from metastatic adenocarcinoma consistent with origin from colon.

Comment: Extensive necrosis is identified.

Cell block and cytologic preparations examined.
Liver, right lobe, core biopsies:

Metastatic adenocarcinoma consistent with colonic origin.
Liver metastasis

- Most common malignant tumor of the liver
- The liver is second most commonly involve organ by metastatic disease, after the lymph nodes
- Multiple lesions
- Usually no portal vein invasion

Hypovascular mets (more common):
- GI tract, lung, pancreas, most breast cancer

Hypervascular mets:
- Endocrine, renal, thyroid, melanoma, some breast cancer
Liver metastasis

CT:
• Variable density
• Hypovascular (more common)
• Detection of calcification, hemorrhage

MRI:
• Heterogeneous signal intensity with irregular and indistinct outer margins
• Smooth or irregular central area of high signal intensity with a surrounding ring of lower signal intensity
Treatment

- Resection or ablation for colorectal mets
- Chemoembolization for carcinoid/ neuroendocrine mets
- Chemotherapy for all others
- The fiducial marker was placed within the liver lesion
- This patient underwent stereotactic body radiation therapy
Case 2

- 44 year-old female with renal failure and weight loss
Differential diagnoses

• Bladder tumor: TCC (90%), squamous cell, adenocarcinoma, lymphoma, rhabdomyosarcoma, leiomyoma
• Colon cancer
• Lymphadenopathy
• Uterine and cervical mass: fibroid, endometrial cancer, leiomyosarcoma, cervical cancer
• Ovarian mass
Lymph node, right iliac, CT-guided FNA: Diff-Quik stain, 20x
Lymph node, right iliac, CT-guided FNA: Diff-Quik stain, 40x
Lymph node, right iliac, CT-guided FNA: Papanicolaou stain, 20x
Lymph node, right iliac, CT-guided FNA: Papanicolaou stain, 40x
Lymph node, CT-guided FNA: Cell block, H & E stain, 20x

Cell block, 40x
Lymph node, CT-guided FNA: Cell block, CK 7 Immunostain, 20×
Lymph node, CT-guided FNA: Cell block, p63 Immunostain, 20x
Lymph node, CT-guided FNA:
Cell block, CK 20 Immunostain, 20x
Lymph node, CT-guided FNA:
Cell block, TTF-1 Immunostain, 20x
Lymph node, right iliac, CT-guided fine needle aspiration:

Malignant tumor cells present derived from metastatic high grade urothelial carcinoma.

Comment: The tumor is morphologically identical to previous biopsy. Immunohistochemical stains do not mark with TTF-1 or CK 20. They do mark with CK7 and focally with p63. These results may be seen with urothelial carcinoma showing squamous differentiation.

Cell block and cytologic preparations examined.
Bladder, right trigone, biopsy:

High grade invasive urothelial carcinoma.
Bladder, right trigone, biopsy: Hematoxylin & Eosin stain, 4x
Bladder, right trigone, biopsy: Hematoxylin & Eosin stain, 20x
CT for bladder cancer

- CT urography (CTU) : evaluate the entire urinary system because urothelial tumor may have multifocal disease
- CTU can detect direct perirenal, periureteral, and extravesical tumor spread, lymphadenopathy and distant metastases
- CTU requires a shorter examination time compared with traditional excretory urography and has greater accuracy for detecting urothelial lesions
CT for bladder cancer

- Bladder cancer: tumor growth along the bladder wall, including papillary, sessile, infiltrating, mixed, or flat intraepithelial growth
- Focal, nodular soft tissue tumor or focal asymmetric bladder wall thickening
- Retraction of the bladder wall may be present
• Early enhancement
• Distant metastasis occurs late in the course and especially at the time of recurrence: bones, lungs, brain, and liver
Case 3

- 57 year-old female with right knee pain and swelling
GRE
GRE
Differential diagnoses

- PVNS
- Synovial osteochondromatosis
- Gout
- Amyloid
- Hemophilic arthropathy
- Nodular synovitis
Soft tissue, right posterior cruciate ligament, biopsy: Hematoxylin & Eosin stain, 10x
Soft tissue, right posterior cruciate ligament, biopsy: Hematoxylin & Eosin stain, 20x
Soft tissue, right posterior cruciate ligament, biopsy:

Pigmented villonodular synovitis.
PVNS

• PVNS is a monoarticular proliferation of the hemorrhagic synovium which affected joint, bursa and tendon sheath

• Commonly involved sites: knee (80%), hip, elbow and ankle

• Male : Female 1:2

• Peak age : 30-40 years
Clinical manifestation

- Pain
- Swelling
- Limit range of motion
- Monoarticular
- Joint effusion
• **Radiograph**: joint effusion, erosion and subchondral cysts, secondary degenerative changes

• **CT**: effusion, soft tissue mass and synovium enhances on post contrast
• **MRI**: Most sensitive
  - Effusion with synovial proliferation, low signal on all sequences with blooms on GRE
Treatment

- Resection with synovectomy (high recurrent rate with incomplete resection)
- Radiation resection following recurrence
Case 4

- 69 year-old male
Differential diagnoses

- Primary lung cancer: bronchogenic carcinoma, lymphoma, sarcoma
- Metastasis: kidney, colon, ovary, testicular, melanoma
- Infection: focal pneumonia, abscess, TB, sarcoid, histoplasmosis, fungus ball
- Round atelectasis
- Inflammatory: RA, Wegener granulomatosis
- Benign: Hamartoma, fibroma, LN, leiomyoma
Lung, right upper lobe, CT-guided FNA: Diff-Quik stain, 20x
Lung, right upper lobe, CT-guided FNA: Diff-Quik stain, 40x
Lung, right upper lobe, CT-guided FNA: Papanicolaou stain, 20x
Lung, right upper lobe, CT-guided FNA: Papanicolaou stain, 40x
Lung, right upper lobe, CT-guided FNA: Cell block, H & E stain, 20x
Lung, CT-guided FNA: Cell block, Melan-A Immunostain, 20x
Lung, CT-guided FNA:
Cell block, HMB-45 Immunostain, 40x
Lung, CT-guided FNA: Cell block, S-100 Immunostain, 40x
Lung, right upper lobe, CT-guided fine needle aspiration:

Malignant tumor cells present derived from malignant melanoma.

Comment: Immunohistochemical stains show the tumor cells mark strongly with Melan-A, HMB-45 and S-100. These staining results support melanocytic origin.

Cell block and cytologic preparations examined.
Skin, left scapula, excision: H & E stain, 4x
Skin, left scapula, excision: H & E stain, 40x
DX: Metastatic melanoma
Transthoracic needle biopsy (TNB)

- CT or CT-fluoroscopic guidance

Contraindication

- Uncooperative patient
- Irreversible bleeding diathesis
- Severe bullous emphysema
- Prior pneumonectomy
Type of needle

- Aspiration needles (Chiba) range from 23–25 gauge diameter
- Core biopsy needles range from 18-20 gauge diameter (to provide histologic samples) (both methods use Guide needle (coaxial needle one gauge larger))

Lung cancer in general can be diagnosed reliably by microscopic examination of cytologic specimens, and core needle biopsy typically is not necessary
• Sensitivity of TNB for the diagnosis of malignant SPNs > 5 mm are above 90%
• TNB has lower sensitivity and specificity for benign lung lesions: the nonspecific pathologic appearance of many common benign lesions
• Core biopsy specimens in patients who have potentially benign lesions is of great use in providing material for specific benign histologic diagnoses
Complications

• Pneumothorax: occurs only 20-30%
• Hemorrhage
• Needle track seeding
• Air embolism: occur when a fistula is created between a pulmonary vein and an airway
Case 5

- 69 year-old male with low back pain
Differential diagnoses lytic bone lesion

• Metastasis: Renal, Thyroid, melanoma, breast
• Multiple myeloma and plasmacytoma
• Lymphoma
• Osteomyelitis
• Primary neoplasm of the bone: Sarcoma
Ileum, left posterior, CT-guided FNA: Diff-Quik stain, 20x
Ileum, left posterior, CT-guided FNA: Diff-Quik stain, 20x
Ileum, left posterior, CT-guided FNA: Diff-Quik stain, 40x
Ileum, left posterior, CT-guided FNA: Papanicolaou stain, 20x
Ileum, left posterior, CT-guided FNA: Papanicolaou stain, 40x
Ileum, left posterior, CT-guided fine needle aspiration:

Malignant tumor cells present consistent with origin from metastatic renal cell carcinoma.

Immunohistochemical stains are positive for CK 7 and negative for CK 20, CD10 and p63.

Cell block and cytologic preparations examined.
Ileum, left posterior, CT-guided FNA: Cell block, H & E stain, 20x

Cell block, 40x
Ileum, left posterior, CT-guided FNA: Cell block, CK 7 Immunostain, 20x
Ileum, left posterior, CT-guided FNA: Cell block, CK 20 Immunostain, 20x
DX: Metastatic renal cell carcinoma
Metastatic renal cell carcinoma

- Spread of the tumor is via lymphatic, hematogenous and direct invasion

Sites of metastasis
- Lungs
- Bone
- Liver
- Pancreas
- Small intestine
Bone metastasis from RCC

• Bone metastases appear to have an intermediate prognosis (poor with liver mets and better with only lung mets)
• Typically osteolytic and are generally very aggressive
• Most commonly affected sites are the pelvis, ribs and spine. Long bones and the skull may also be seen
• CT: Bone destruction with or without the presence of an enhancing soft-tissue mass
• Variable uptake on bone scintigraphy with the sensitivity of 10-60%
• MRI is more sensitive of detecting bone lesions
• FDG PET may offer improved specificity over bone scintigraphy in the detection of bone metastases. However, there is report of 30% false negative on PET scan.