

SESSION 1: GENERAL (BASIC) PATHOLOGY CONCEPTS

Thursday, October 15, 2009

9:30am - 11:30am

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GOAL: Describe the basic morphologic (structural) changes which occur in various pathologic conditions. The diagnosis is not the goal.

OBJECTIVES:

1. Describe the morphologic changes which characterize the different types of necrosis.
2. Describe the morphologic changes which characterize the different types of inflammation.
3. Describe the morphologic changes which characterize tissue regeneration.
4. Describe the morphologic changes which characterize the continuum between benign to malignant tumors.

Case numbers correspond to “Virtual Microscopy” case numbers

Case 1

70 year-old male developed right costovertebral angle pain and hematuria two days after being admitted to the hospital for acute myocardial infarction.

- a. What is the organ?
Kidney
- b. What are the characteristic structural changes in this tissue?
Infarction is characterized by “ghost like” remnants of glomeruli and tubules. Cell outlines remain but cell details, including nuclei, are lost. An inflammatory process is noted at the interface of the infarct and normal tissue. Here, vessels are dilated with red blood cells and leukocytes infiltrate the interstitium.
- c. Pathologic Process: **Ischemic Necrosis (Infarct)**

Case 2

70 year-old male complained of chest pain with inspiration. He developed hemoptysis and dyspnea. He has metastatic colon cancer and a swollen left leg.

- a. What is the organ?
Lung
- b. What are the characteristic structural changes in this tissue?
Infarction is characterized by “ghost like” remnants of alveoli which are difficult to see. Red blood cells fill the spaces of the alveoli.
- c. Pathologic Process: **Hemorrhagic Necrosis (Infarct)**

Case 3 – normal appendix

Case 4

A 15 year-old female presented to the emergency room with right lower quadrant abdominal pain and vomiting for 12 hours.

- a. What is the organ?
Appendix
- b. What is the predominant inflammatory cell in this tissue? Where are these cells located?
Acute inflammation is noted. The lumen contains neutrophils. The mucosa is partially necrotic. Neutrophils infiltrate all layers of the appendix, including the serosa. Eosinophils and mononuclear cells are also present in varying degrees.
- c. Pathologic Process: **Acute Inflammation**

Case 5

A 90 year-old female had a diverticulum of the esophagus which resulted in food retention and multiple episodes of infection. Part of the esophagus was resected.

- a. What is the predominant inflammatory cell in this tissue? Where are these cells located?
Mononuclear inflammatory cells, predominantly lymphocytes, infiltrate the submucosa.
- b. Pathologic Process: **Chronic Inflammation, Non-Granulomatous**

Case 6

A 54 year-old Hispanic male presented with low-grade fever, cough and weight loss over 2 months. He had recently returned from Mexico after living there for 18 months.

- a. What is the organ?
Lung
- b. Describe the characteristic structural changes. What is the characteristic lesion in this tissue?
Lung tissue contains multiple large and small granulomas which contain central necrosis. You can see macrophages and some giant cells. The normal parenchyma is destroyed, being replaced by fibrous tissue and mononuclear inflammatory cells.
- c. Pathologic Process: **Granulomatous Inflammation, Caseating**

Cases 7,8,9 – self study

Case 7

32 year-old African American female presents with cough and difficulty breathing. Symptoms worsened over the last 6 months.

A. What is the organ? **Lung**

B. Describe the characteristic structural changes. What is the characteristic lesion in this tissue? **Lung tissue contains multiple large and small granulomas which do not have central necrosis. Lymphocytes are present at the periphery of the granulomas. Giant cells are seen. Epithelioid cells are characterized by abundant eosinophilic cytoplasm and vesicular nuclei.**

C. Pathologic process: **Granulomatous Inflammation, Noncaseating**

Case 8

65 year-old male with non-healing infection of the right knee (despite antibiotic treatment). Surgical debridement was required.

A. What are the characteristic morphologic features of this tissue? **There are numerous blood vessels, proliferation of fibroblasts, deposition of immature collagen and scattered chronic inflammatory cells**

B. In this case, what prevents healing? **Chronic infection**

C. Pathologic process. **Granulation tissue**

Case 9

This 31 year-old female had a repeat cesarean section. Old scar from the anterior abdominal wall was excised.

A. What is the organ? **Skin**

B. What are the structural changes in this tissue? **Thick connective tissue deposition in the dermis**

C. Pathologic Process: **Wound healing, scar formation**

Case 10

A 45 year-old female was found to have white plaques in the endocervix. She has had 5 children with no complications. Her previous PAP smear showed inflammatory changes.

- a. What morphologic change indicated adaption?
Stratified squamous epithelium replaced simple columnar epithelium. Squamous epithelium overlies endocervical glands. Squamous epithelium extends into endocervical glands in some sections.
- b. Pathologic Process: **Metaplasia**

Case 11

A 40 year-old female presented with a subcutaneous nodule in her left lateral thigh. The nodule was non-tender, soft, movable and had been slowly growing for about 2 years. The nodule was excised. Its cut surface was yellow and lobulated.

- a. What is the clinical significance of the nodule being movable and slowly growing?
These are characteristics of a benign neoplasm.
- b. What morphologic characteristics suggest that the nodule is a benign neoplasm?
The microscopic is composed of well differentiated lipocytes with no evidence of atypia. The neoplasm is enclosed within a thin fibrous capsule. There is no infiltration of the capsule.
- c. Pathologic Process: **Benign neoplasm of mesenchymal cell origin-lipoma**

Case 12

A 44 year-old female presented with weight loss and lower back pain. On examination both her legs were swollen. CT scan revealed a large retroperitoneal mass encasing the inferior vena cava and right ureter.

- a. What is the significance of the mass encasing the inferior vena cava and the right ureter?
A malignant neoplasm, such as a fibrosarcoma, will infiltrate adjacent tissue, encasing or destroying organs. The neoplasm surrounds and compresses the inferior vena cava and right ureter.
- b. What morphologic characteristics suggest that the mass is a malignant neoplasm?
The neoplasm is composed of interlacing bundles of malignant fibrocytes. The neoplastic cells are highly atypical, having large, hyperchromatic nuclei with many mitoses. The neoplastic cells are pleomorphic and infiltrate fat. There is no capsule.
- c. Pathologic Process: **Malignant neoplasm of mesenchymal origin-sarcoma**

Case 13

This 35 year-old female found a nodule in her left breast on self-examination. It was non-tender and firm but not attached to the skin or chest wall. On resection, it was found to be well-circumscribed, with a white, rubbery cut surface.

- a. What is the significance of the nodule being well-circumscribed, not fixed to the skin?
The tumor is probably encapsulated, or at least is not infiltrating adjacent normal tissue. Suggests a benign lesion.
- b. What morphologic characteristics suggest that the mass is a benign neoplasm?
The neoplasm is composed of well differentiated epithelial and stromal elements. Cells lack atypia and closely resemble their normal counterparts. The neoplasm is “encapsulated.” Adjacent normal mammary tissue is compressed by the slowly expanding tumor.
- c. Pathologic process: **Benign neoplasm of epithelial/mesenchymal cell origin-Fibroadenoma**

Case 14

A 58 year-old male smoker presented to the clinic with swelling and pain of the floor of the mouth. On examination he had an ulcerated tumor involving the floor of the mouth and tongue. Wide local excision was done.

- a. What is the significance of the tumor being ulcerated and “involving” the tongue and the floor of the mouth?
Suggests rapid and uninhibited growth of the neoplasm. Also suggests neoplasm is infiltrating oral structures. The characteristics are consistent with a malignant neoplasm.
- b. What morphologic characteristics suggest that the tumor is malignant?
The carcinoma is composed of large and small nests of atypical but well differentiated squamous cells. The cells contain hyperchromatic nuclei with many mitoses. Keratin pearls and intercellular bridges are noted. The neoplasm infiltrates the adjacent skeletal muscle. There is no capsule.
- c. Pathologic Process: **Malignant neoplasm of epithelial origin-Carcinoma.**