PATHOLOGY OF LIVER & PANCREAS

Lab 2

Enrique Aburto
Liver, hepatic lobules, normal dog

CV = Central vein
P = portal triad

Higher magnification

Why is liver fibrosis clinically important?


1. Fibrosis is the key feature of progressive damage to the liver

2. Fibrosis increases the resistance to portal flow at the level of the sinusoids

3. It participates in the formation of new vascular channels in the fibrotic septa that connect the vessels in the portal region to terminal hepatic veins, shunting blood from the parenchyma.

4. The deposition of collagen in the space of Disse causes loss of fenestration of sinusoidal endothelial cells (capillarization of sinusoids), impairing the exchange of solutes between hepatocytes and plasma
Liver from a horse, give the most likely morphologic diagnosis

Liver: **Capsular fibrosis**, (perihepatitis filamentosa). Incidental finding. Numerous fibrous tags are present on the diaphragmatic surface of the liver. These tags are thought to be attributed to reparative fibrosis of the migration tracts of *Strongylus* spp. larvae.

*Pathologic Basis of Veterinary Disease (2006), 4th ed., Mosby-Elsevier*
4.5 Postmortem changes

- Occur rapidly
- Pale, irregular foci
- Greenish black near intestine
- Emphysema
- Soft & putty-like
Liver with postmortem emphysema
Circulatory disturbances can be grouped according to whether blood flow into, through, or from the liver is impaired.

**Prehepatic** portal hypertension:
- Any impairment of blood flow through the portal vein (or hepatic artery) before it enters the liver. Leads to prehepatic portal hypertension and/or ischemia.
  - i.e., Portal vein hypoplasia, portal vein thrombosis, external compression by masses.

**Intrahepatic** portal hypertension:
- Any condition able to increase the resistance of blood flow within the sinusoids. Leads to intrahepatic portal hypertension.
  - i.e., cirrhosis, diffuse fibrosis, amyloidosis, intrahepatic arteriovenous shunts.

**Posthepatic** portal hypertension:
- Conditions that lead to increased resistance to venous outflow in the hepatic vein or cava. May cause posthepatic portal hypertension.
  - i.e., thrombosis of the hepatic vein, veno-occlusive disease, Passive congestion.
Passive congestion, liver

CV = Central vein
C = Centrilobular area (congestion)
M = Midzonal area (vacuolar degeneration)
P = Periportal area (normal parenchyma)
Liver from a dog. Describe the lesion and give a morphologic diagnosis

**Answer:** Diffuse pale yellow discoloration and enhanced lobular pattern

**Dx:** Hepatic lipidosis (steatosis), diffuse, severe
Liver section from a puppy. Describe the changes.

Answer: There are **intranuclear**, eosinophilic **inclusion bodies** in hepatocytes which marginalize the chromatin.

Which diseases may cause this finding in dogs?

**Canine adenovirus 1 (ICH) vs. Canine herpesvirus 1**

How can you distinguish these entities?

ICH, bilateral corneal opacity (blueing) due to edema.

ICH, liver dog. The wall of the gall bladder is markedly thickened due to edema.
Livers from cows, give a morphologic diagnosis for each case

Dx: Hepatic abscesses, multifocal

Dx: Hepatic granulomas, multifocal
Liver and rumen from a cow. Give a morphologic diagnosis and most likely etiology

1. Liver and rumen: Multifocal necrosis and hemorrhage (Hemorrhagic infarcts)

2. Mycotic rumenitis which leads to necrotizing vasculitis and thrombosis (Mucor sp, Rhizopus sp, Absidia sp, Mortierella sp, Aspergillus sp)
Pig livers with hydatid (parasitic) cysts. Larval stage of *Echinococcus granulosus*
Liver from a horse with bacterial enterocolitis. The bile ducts are infiltrated by large numbers of neutrophils. The portal areas are expanded by edema, fibrin and neutrophilic infiltrates. 

Dx: Suppurative cholangitis, diffuse, severe, acute to subacute.

Liver from a horse with enhanced lobular pattern. There is centrilobular necrosis, periportal steatosis and lymphohistiocytic portal hepatitis. Give some differential diagnoses.

**Answer:** Equine serum hepatitis; Hepatotoxins.
<table>
<thead>
<tr>
<th>Lymphocytic portal hepatitis</th>
<th>vs.</th>
<th>Lymphocytic cholangitis</th>
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<tbody>
<tr>
<td><strong>Cats older than 10 years</strong></td>
<td></td>
<td>Cats ~4 years old (Persian)</td>
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<tr>
<td>Aging change or subclinical form of disease</td>
<td></td>
<td>Ascitis, icterus, hypergammaglobulinemia</td>
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<td>Slow progression to portal fibrosis/bile duct hyperplasia</td>
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<td>Active stage:</td>
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<tr>
<td>Lymphoplasmacytic inflammation</td>
<td></td>
<td>- Lymphocytic inflammation within and around bile ducts</td>
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<tr>
<td><strong>No cholangitis, no periportal inflammation/necrosis, no pseudolobules</strong></td>
<td></td>
<td>- Extension to periportal parenchyma</td>
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<td>Immune mediated disorder?</td>
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<td>Chronic stage:</td>
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<tr>
<td>No association with IBD or pancreatitis</td>
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<td>- ↓ of lymphocytes</td>
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<td></td>
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<td>- Bridging fibrosis → pseudolobules</td>
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<td></td>
<td></td>
<td>Etiology:</td>
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<tr>
<td></td>
<td></td>
<td>- No concurrent enteritis or pancreatitis</td>
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<tr>
<td></td>
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<td>- Immune-mediated disorder?</td>
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</table>

What type of cholangitis is associated with concurrent intestinal or pancreatic disease in cats?

**Answer:** Suppurative (neutrophilic) cholangitis
Lymphocytic cholangitis

Chronic lymphocytic cholangitis, liver, cat

Feline lymphocytic cholangitis, liver, cat. *Histo:* Large numbers of lymphocytes surrounding and infiltrating bile ducts, and biliary hyperplasia (arrows).
Livers from rabbits

Dx: Proliferative (hyperplastic) cholangitis; etiology: *Eimeria stidae*
BEST WISHES IN THE FINAL