3. An 18-year-old male with elevated liver enzymes, increased copper in the urine, and Kayser-Fleischer rings on slit lamp eye exam will most likely have:
   a. A high serum level of antinuclear antibody and anti-smooth muscle antibody.
   b. Glucose intolerance.
   c. Degeneration of the putamen in the brain.
   d. High serum ceruloplasmin level.
   e. Low serum copper level.
   Answer: c

22. Which of the following statements about mucinous cystic neoplasms of the pancreas is true?
   a. These tumors are all associated with a poor prognosis.
   b. Genetic alterations of K-ras, p53, and SMD4/DPC4 play a role in their pathogenesis.
   c. They occur more frequently in males than females.
   d. Obstructive jaundice is usually the first clinical presentation.
   e. They are associated with von Hippel-Lindau syndrome.
   Answer: b

24. What is the risk of becoming infected with hepatitis B (HBV) or hepatitis C (HCV) from a needle stick?
   • HBV is 6–30% and HCV is 1.8%.
   • HIV (for comparison): 0.3% risk.
30. List histologic clues that can aid in the differential diagnosis of the common types of viral infection of the liver.

- In immunocompetent patients:
  - Abundant plasmacytes and cholestasis: hepatitis A (HAV).
  - Predominant central ballooning degeneration: Ground glass cytoplasmic inclusions HBV.
  - Dense lymphoid aggregates, bile duct damage, sinusoidal lymphocytes: Steatosis HCV.
  - Portal and sinusoidal small lymphocytes, and granulomas with minimal hepatocyte damage: Epstein–Barr virus (EBV)/cytomegalovirus (CMV).
  - Confluent necrosis and cholangitis: hepatitis E (HEV).

- In immunocompromised patients:
  - Nuclear/cytoplasmic inclusions and microabscesses with neutrophils: CMV.
  - Portal infiltration of large lymphocytes (polymorphic B–cell hyperplasia or lymphoma): EBV.
  - Randomly distributed coagulative necrosis and nuclear inclusions: herpes virus or adenovirus.
  - Extensive hepatocyte necrosis, prominent cholestasis, and pericellular fibrosis: fibrosing cholestatic hepatitis HCV.

35. Give the differential diagnosis of “ground glass” hepatocytes in a nonneoplastic setting.

- **Hepatitis B**
- Drug induced hypertrophy of smooth endoplasmic reticulum (e.g., phenobarbital): centrilobular, PAS diastase negative, orcein negative.
- Fibrinogen storage disease: random location, PAS diastase positive.
- Alcohol aversion drug (cyanamide): secondary lysosome accumulation, periportal, PAS positive, PAS diastase negative.
- Glycogen storage disease type IV or abnormal glycogen metabolism due to multidrug intake: mostly periportal, PAS positive, PAS diastase negative.
- Lafora disease (myoclonic epilepsy): periportal; positive for PAS, and for colloidal iron and polysaccharide immunostains. Composed of smooth endoplasmic reticulum and glycogen.

45. List four clinical consequences of liver cirrhosis.

- Portal hypertension: ascites; formation of portosystemic venous shunts leading to upper GI bleeding; splenomegaly.
- Hepatic dysfunction: coagulation defects, hypoalbuminemia, hepatic encephalopathy, hyperestrinism in males.
- Renal dysfunction due to hepatorenal syndrome.
- Increased incidence of hepatocellular carcinoma.
- **Hepatopulmonary syndrome.**
60. List three different types of pigments in the liver and the stains that can differentiate them.

- Iron: Perl stain, blue color.
- Copper: rhodamine stain, reddish orange, orcein.
- Bilirubin: Hall stain, green color.

71. List four clinical complications of chronic ethanol consumption.

- Liver: steatosis, steatohepatitis, cirrhosis, hepatocellular carcinoma.
- CNS: Wernicke-Korsakoff psychosis.
- Gastrointestinal: pancreatitis, gastritis.
- Malnutrition and deficiency of vitamins: anemia, dilated cardiomyopathy due to thiamine deficiency.
- Pregnancy: fetal alcohol syndrome.

86. List entities that cause macrovesicular steatosis and entities that cause microvesicular steatosis.

- Macrovesicular:
  - Alcohol.
  - Diabetes.
  - Drugs.
  - Deficient diet (TPN).
- Microvesicular:
  - Pregnancy.
  - Reye syndrome.
  - Drugs/toxins: valproic acid, mushrooms, tetracycline.
  - Adult onset diabetes.

95. List five autopsy findings of portal hypertension other than cirrhosis.

- Portal vein thrombosis.
- Hepatoportal sclerosis.
- Nodular regenerative hyperplasia.
- Incomplete septal cirrhosis.
- Splenomegaly.
- Esophageal varices.
- Other: artery-portal vein fistula, schistosomiasis.
132. What clinicopathological clues differentiate mechanical duct obstruction, primary biliary cirrhosis (PBC) from primary sclerosing cholangitis (PSC)?

<table>
<thead>
<tr>
<th>Features</th>
<th>Mechanical duct obstruction</th>
<th>Primary biliary cirrhosis</th>
<th>Primary sclerosing cholangitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated other diseases</td>
<td>• Biliary atresia.</td>
<td>• 30% associated with inflammatory arthropathy, other autoimmune diseases.</td>
<td>• 70% associated with inflammatory bowel disease (CUC).</td>
</tr>
<tr>
<td></td>
<td>• Gallstones.</td>
<td></td>
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<td></td>
<td>• Stricture.</td>
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<td></td>
<td>• Carcinoma of pancreatic head.</td>
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<tr>
<td>Sex predilection</td>
<td>• No.</td>
<td>• F:M = 6:1.</td>
<td>• 70% male.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Middle age.</td>
<td>• 70% &lt; 45 years old.</td>
</tr>
<tr>
<td>Cancer risk</td>
<td>• Not established.</td>
<td>• Mostly hepatocellular carcinoma.</td>
<td>• Mostly cholangiocarcinoma.</td>
</tr>
<tr>
<td>Laboratory findings</td>
<td>• Conjugated hyperbilirubinemia.</td>
<td></td>
<td>• Elevated serum IgM, hypergammaglobulinemia, atypical p-ANCA.</td>
</tr>
<tr>
<td>Cholangiogram</td>
<td>• Based on etiology, proximal dilatation.</td>
<td></td>
<td>• Elevated serum IgM, M2 form of anti-mitochondrial antibody highly specific.</td>
</tr>
<tr>
<td>Characteristic histology</td>
<td>• Acute cholangitis, cholestasis (canalicular or ductal), bile lakes, ductular proliferation with surrounding neutrophils, portal tract edema.</td>
<td>• Intrahepatic small duct. • Florid duct lesion. • Granulomas adjacent to bile duct.</td>
<td>• Extrahepatic and intrahepatic small and large bile ducts, periductal portal tract fibrosis, segmental stenosis.</td>
</tr>
</tbody>
</table>

154. List five common complications of gallstones.

- The spectrum of complications varies depending on where the stone is located in the biliary system: gallbladder, common bile duct, or intrahepatic ducts.
- Calculus cholecystitis, acute or chronic, hydrops/mucocele, empyema, perforation, fistulas.
- Obstructive cholestasis or pancreatitis.
- Cholangitis or hepatic abscess.
- Secondary biliary cirrhosis.
- Carcinoma of gallbladder.
- Gallstone ileus.