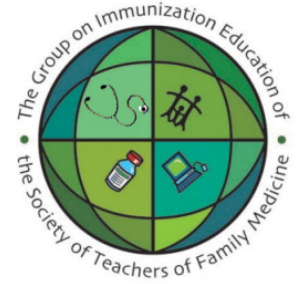


Group on Immunization Education
Society of Teachers of Family Medicine



CLINICAL SCENARIO SERIES ON IMMUNIZATION

Chronic Liver Disease

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Clinical Scenario – Chronic Liver Disease

Learning Objectives

1. State which vaccines a person with chronic liver disease needs.
2. Understand the rationale for vaccinating persons with chronic liver disease against hepatitis A and B.

Scenario

Sarah and Charles

Sarah, a 35-year-old female has chronic hepatitis C infection, including a positive viral load. Her boyfriend, Charles, just returned from traveling to Mexico and feels ill (see picture). He complains of nausea, loss of appetite, malaise, and vague abdominal pain. His stools are formed but grey-colored.



Questions

1. Which vaccines are indicated for Sarah? Why?
2. Is prevaccination testing advisable for Sarah?
3. What are the administration routes for these vaccines?
4. When should she return for follow-up doses?
5. Under which conditions is post-vaccination testing indicated?
6. Should Charles have received any vaccines prior to travel?



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Answers

1. Hepatitis A, hepatitis B, pneumococcal polysaccharide, and inactivated influenza vaccines are indicated for Sarah.

Explanation:

Disease Risk

Persons with chronic liver disease are at substantially higher risk for fulminant hepatitis if infected with hepatitis A virus. In fact, one analysis found that patients with chronic liver diseases other than hepatitis B virus (HBV) had a “23-fold increased risk of death” from acute hepatitis A (50-fold for hepatitis B chronic infection) [Aliment Pharmacol Ther 2004; 19: 715–727].

The severity of hepatitis B in patients with hepatitis C varies with the type of hepatitis B. Acute hepatitis B sometimes causes fulminant hepatitis in those with chronic hepatitis C but occasionally results in clearing of both infections. However, chronic co-infection with both hepatitis B and hepatitis C worsens the outcomes, substantially raising the rates of histologic disease, cirrhosis, and hepatocellular carcinoma.

Based on case series, influenza infection in those with chronic liver disease can lead to decompensation and hospitalization. The incidence of pneumococcal disease is higher in those with chronic liver disease and, among alcoholics with chronic liver disease, the mortality rate is higher.

Immunogenicity

Hepatitis A vaccine is strongly (>90%) immunogenic in mild, moderate and compensated liver disease but less (49%-66%) in decompensated liver disease [Aliment Pharmacol Ther 2004; 19: 715–727].

The immunogenicity of hepatitis B vaccine is good (69%-100%) with hepatitis C disease but less immunogenic in alcoholic liver disease, particularly if cirrhosis is present. Some data suggest that in some instances hepatitis B vaccination invokes an immune response that might improve liver function tests in those with chronic hepatitis C [Aliment Pharmacol Ther 2004; 19: 715–727]. For immunocompromised persons, a higher dose (40 micrograms) is recommended and some experts suggest that this higher dosage is appropriate for transplantation candidates [Aliment Pharmacol Ther 2004; 19: 715–727].



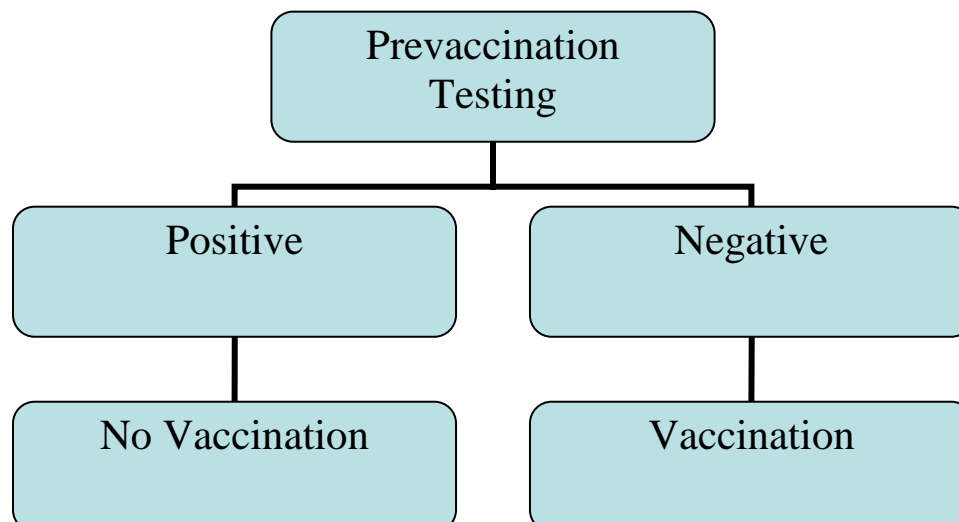
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Inactivated influenza and pneumococcal polysaccharide vaccines have reasonable effectiveness against their respective disease in high risk immunocompetent persons and may be most efficacious against severe disease. However, the protection in immunocompromised persons is substantially less.

Sidebar

During an influenza epidemic, three patients with end-stage liver disease (1 with Wilson disease and 2 with alcoholic liver disease) who attended a liver transplantation clinic had positive influenza cultures, developed hepatic decompensation and required hospitalization during infection with influenza A. Two patients had biochemical and clinical evidence of hepatic decompensation, including ascites, hepatic encephalopathy, and peripheral edema, and the third had acute hepatocellular damage, with elevated liver function tests. Evaluation for other causes was negative; testing included viral hepatitis serologic testing, acetaminophen levels, drug and alcohol screening findings, and bacterial and fungal cultures. Based on *Arch Int Med* 2000: 160:113-115.

2. Although there is no benefit from hepatitis A or hepatitis B vaccination in those already immune, the risk of adverse events does not increase. Thus, the decision to conduct prevaccination testing is based the likelihood of being immune, the cost of the test, the cost of the vaccine, and the likelihood that testing will delay start of the vaccine series.





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Persons for whom HAV prevaccination serologic testing is likely to be cost-effective include adults who (1) were born or lived for extensive periods in geographic regions with a high endemicity for HAV (e.g., Central and South America, Africa, Asia, Native Americans reservations, and Alaskan Native villages), (2) have high risk occupations (work with HAV infected primates or HAV laboratories), (3) have a clotting factor disorder, (4) use illegal drugs, or (5) are men who have sex with men. Total HAV IgG is the usual test.

Persons for whom HBV prevaccination serologic testing is likely to be cost-effective include those with a prevalence of HBV of 20% or higher. Such groups include (1) Alaskan natives and Pacific islanders, (2) children of immigrants and immigrants from endemic-disease countries, (3) family members of HBsAg-positive persons, (4) men who have sex with men, and (5) injection drug users. Testing may include anti-HBc, the best test for prior infection, and anti-HBs, which results from vaccination and from prior infection (although anti-HBs is less likely to be present in prior infection than is anti-HBc, that is anti-HBc is more sensitive).

3. Hepatitis A, hepatitis B, and inactivated influenza vaccine are given intramuscularly (IM) in the deltoid. Pneumococcal polysaccharide vaccine is given either IM or subcutaneously, although some experts prefer the IM route.
4. For hepatitis A vaccine, she should return in 6-18 months, depending on the product, for the second dose. For hepatitis B vaccine, she should return in 1 month for dose 2 and again in 5 months for dose 3 (i.e., today, 1 month, 6 months).
5. Postvaccination testing is not recommended for influenza, pneumococcal or hepatitis A vaccinations. Postvaccination testing for anti-HBs is recommended only when the results will affect the person's subsequent medical care. Such persons include dialysis patients, infants born to HBsAg-positive mothers, sexual contacts of persons chronically infected with HBV, and health-care workers at high risk of percutaneous or permucosal exposure to body fluids. Testing should be performed 1 to 2 months after completion of the vaccine series, (with the exception of infants born to HBsAg-positive mothers, who should be tested at 9 to 18 months of age). An adequate antibody response following vaccination is ≥ 10 mIU/mL. Post-vaccination testing is not indicated after routine vaccination of infants or persons at low risk of exposure, e.g., public safety workers who do not have contact with blood or blood-contaminated body fluids.

Revaccination is recommended when the postvaccination level of anti-HBs is less than 10 mIU/mL in which case 3 doses are recommended on a 0-, 1-, and 6-



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- month schedule. Antibody testing should be conducted again 1 to 2 months after revaccination. Persons who do not respond after two series (6 doses) of hepatitis B vaccine should be counseled about universal precautions and the need for HBIG if they are exposed to HBV/potentially infectious fluids. Such persons may be tested for HBsAg, because some may already be chronically infected. Hemodialysis and immunocompromised patients at risk for infection should have serological tests conducted annually and be given a booster dose when antibody levels decline <10 mIU/mL.
6. Charles has symptoms consistent with hepatitis A. He should have received hepatitis A and typhoid vaccines prior to traveling to Mexico (www.cdc.gov/travel). He should also be up-to-date for routine vaccines such as Tdap. Sarah is a risk for contracting hepatitis A from Charles if he is still infectious. Viral shedding persists from 1 to 3 weeks, being highest in the 1 to 2 weeks prior to clinical illness and less in the week after jaundice starts.