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Hepatitis goes viral

By Helene Harris, MSN, RN, and Ann Crawford, PhD, RN, CNS, CEN

COMPLAINING OF right upper quadrant pain that's persisted for several weeks, Mr. G, 28, is admitted to a nursing unit. He's been experiencing fever, associated with anorexia, nausea/vomiting, and diarrhea. He tells his nurse that he feels tired all the time and has "aches and pains all over." The nurse notes that his sclerae are icteric.

Upon questioning, Mr. G tells the nurse that he and his friend got tattoos about 3 months ago at a local tattoo parlor. Based on his history and signs and symptoms, the nurse suspects viral hepatitis, which may require immediate attention and intervention.

This article discusses five viral causes of hepatitis, identified alphabetically as A through E. These are differentiated by their transmission mode, onset, and incubation period. Although some evidence suggests the existence of other strains of viral hepatitis, they're beyond the scope of this article. For a review of normal hepatic anatomy, see *Looking at the liver and biliary system*.

From mild and self-limiting to fatal

Hepatitis, or inflammation of liver cells (hepatocytes), may be mild and self-limiting, chronic with serious manifestations, or even fatal, depending upon the cause. Although the most common causes are viral, hepatitis also may be triggered by exposure to hepatotoxins, such as industrial toxins, alcohol, medications, or certain herbal remedies and chemicals. (Nonviral causes are beyond the scope of this article.) Hepatitis may also develop secondary to other viral infections, such as those caused by Epstein-Barr, herpes simplex, varicella-zoster, and cytomegalovirus.[1-3]

Hepatitis A and E viruses (HAV and HEV) are transmitted via the oral-fecal route. Hepatitis B, C, and D viruses (HBV, HCV, and HDV) are transmitted via blood and body fluids.

Upon exposure to the causative pathogen, the liver becomes distended and engorged with inflammatory cells, lymphocytes, and fluid, causing right upper quadrant pain. The inflammation results in cellular changes and necrosis. Inflamed and distorted liver tissue increases portal pressure and causes vascular congestion, further impeding liver tissue perfusion.[2,3] For more on how liver dysfunction affects normal body processes, see *Manifestations of altered liver function*.

Characteristic signs and symptoms

Patients with hepatitis may complain of right upper quadrant pain, tenderness, or a feeling of fullness, often exacerbated with jarring movements. Other common signs and symptoms are nausea and vomiting, diarrhea or

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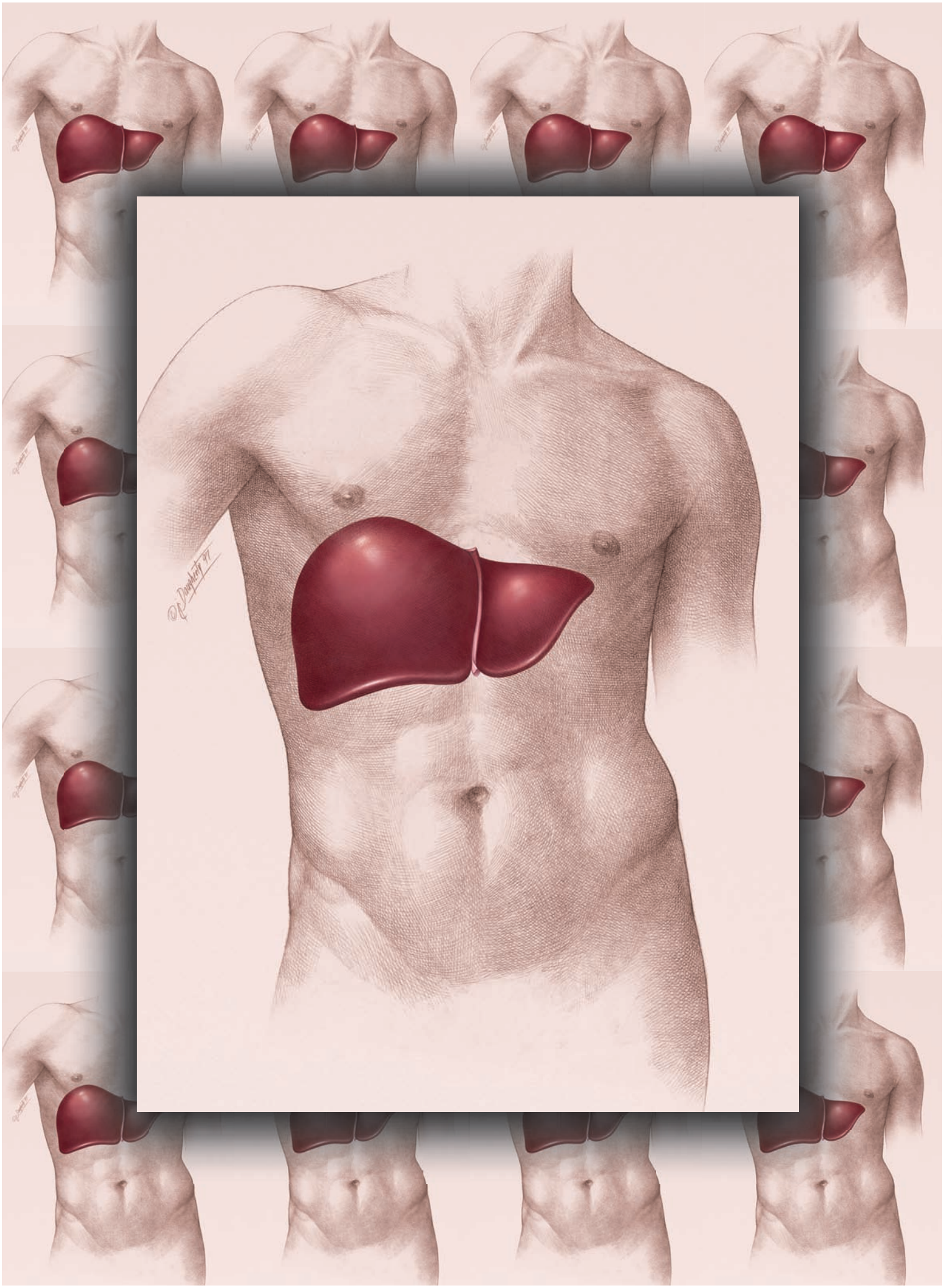


constipation, and changes in the color of stool and urine. Skin may become jaundiced, along with yellowing of the sclerae (icterus) and mucous membranes. Patients may experience fever, pruritus, arthralgia, myalgia, and fatigue. General malaise and inactivity may contribute to depression and impaired self-concept.[1,4] Because hepatitis is sometimes linked to behavior considered socially unacceptable (such as illicit drug use and multiple sex partners), patients may feel guilt, embarrassment, and anger, and worry about spreading the disease to their loved ones.[1,4,5]

See *Clinical manifestations of hepatitis* for details on how hepatitis affects various body systems.

Diagnostic studies

Acute elevations in the liver enzymes aspartate aminotransferase (AST) and alanine aminotransferase (ALT) help confirm a hepatitis diagnosis. When hepatitis has a viral cause, ALT is usually higher than AST. In contrast, AST is typically higher than ALT when hepatitis is related to alcoholism.[1,4] Alkaline phosphatase levels may be normal or elevated. Serum total bilirubin and urinary bilirubin levels will be elevated in the presence of jaundice.

When hepatitis is caused by a viral infection, serum levels of the virus (viral antigens) and antibodies specific for that virus (immunoglobulins) will be present.[1,4,6] Serum albumin and total protein levels, as well as platelet count, prothrombin time and international normalized ratio, may be monitored to assess hepatic dysfunction.[7]

A percutaneous image-guided liver biopsy (commonly guided with computerized tomography or ultrasound) is used to confirm the diagnosis and its cause, and to determine the degree and extent of liver damage.[1,4,6]

Treatment and nursing interventions

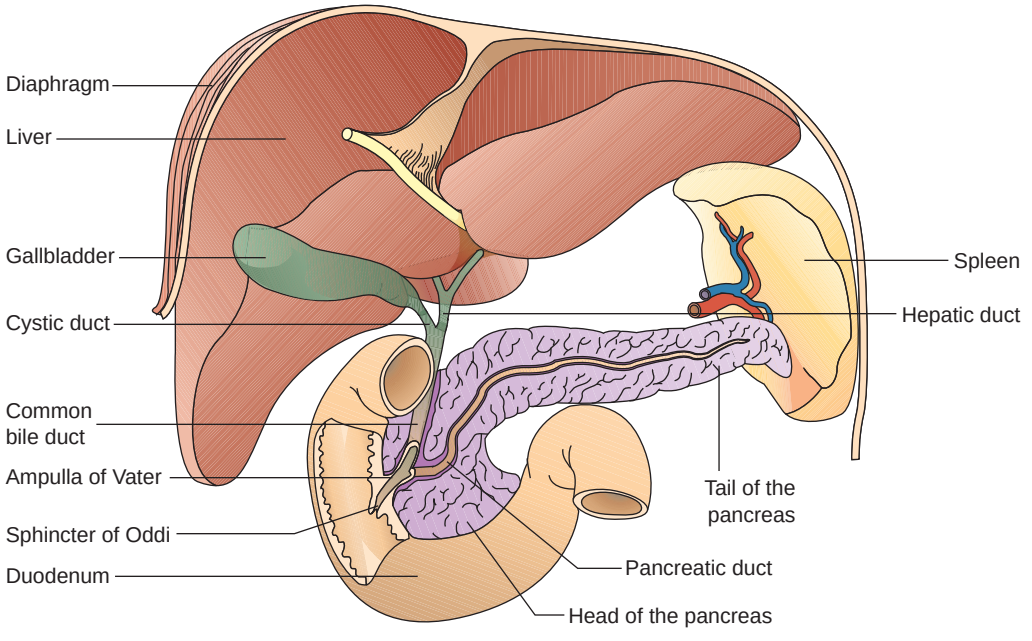
Medical and nursing interventions for hepatitis include treating the underlying cause, alleviating signs and symptoms, preventing complications, and providing psychosocial support and education. Additional measures may be indicated depending on the virus causing the infection.

- **HAV** is usually self-limiting; most patients have an uneventful recovery and develop immunity to the disease. No specific treatment is available for HAV, so interventions focus on supportive care. Most patients return to their optimal level of health within 2 months. Rarely, patients with preexisting liver disease (such as chronic HCV infection) develop serious manifestations such as fulminant hepatic failure.[3,8,9]
- As with HAV, treatment for **HBV** is supportive. Acute cases are self-limiting, with treatment focused on alleviating the patient's symptoms. If an acute case is severe, however, the patient may be treated with an oral anti-viral medication.[10]

Acute HBV infection becomes chronic if liver inflammation lasts longer than 6 months. Chronic pathophysiologic changes in liver

Looking at the liver and biliary system

One of the largest organs in the body, the liver is located mainly in the upper right quadrant of the abdomen.



function predispose the patient to complications such as hepatocellular carcinoma. Patients with chronic HBV infection are treated with antiviral drugs, such as adefovir dipivoxil (a combination oral tablet), standard interferon, peginterferon, lamivudine, entecavir, and telbivudine.[11,12]

In the United States, two commercial HBV vaccines are approved for adults, Recombivax HB and Engerix-B (in addition to a combination vaccine for HAV and HBV, TwinRix).[13] HBV vaccination provides long-term protection against HBV infection.[14] Patients experience relatively few adverse reactions; primarily, pain and inflammation at the injection site. A series of three doses is generally given over 6 months (an accelerated two-dose schedule can be used for adolescents).[13] These three doses protect up to 90% of patients from HBV following exposure.

Vaccination is now required for all children. Infants should receive the first dose shortly after birth.[2,14,15]

• **HCV** infection can be acute or chronic. Patients potentially infected with HCV may be screened with a virus-specific immunoassay test, such as the enzyme-linked immunosorbent assay, enzyme immunoassay, or chemiluminescent microparticle immunoassay.

The acute form of HCV infection is typically self-limiting, but it usually becomes chronic. Progressing over many years, chronic HCV infection may lead to cirrhosis, hepatocellular carcinoma, and the need for a liver transplant.[16] Patients are also susceptible to many extrahepatic complications, including vasculitis, glomerulonephritis, and autoimmune thyroiditis.[11]

Besides symptomatic and supportive care, treatment for chronic HCV infection involves antiviral drug therapy with peginterferon in combination with ribavirin. Patients with genotype 1 may also receive boceprevir or telaprevir.[16] Interferon suppresses cell division, inhibits viral replication, and stimulates macrophage and T-lymphocyte activity. Ribavirin inhibits viral replication.[15-19]

Not all patients with chronic HCV infection begin treatment at diagnosis. Antiviral treatment can cause significant adverse reactions, including depression and other psychological symptoms.[20] The decision to initiate treatment depends on various factors, including the viral load, degree of liver fibrosis, and the patient's willingness to adhere to treatment. Because patients face ongoing health threats, counseling and emotional support should be part of any treatment regimen.[16]

In August, the National Institutes of Health announced promising results for an investigational oral regimen combining an experimental drug, sofosbuvir, with ribavirin. The regimen was both highly effective and well tolerated by a group of 60 volunteers with liver damage from HCV.[21]

• **HDV** is a defective virus that causes infection only in the presence of HBV. The course of disease varies among patients; some are asymptomatic carriers, others experience rapidly progressing cirrhosis or fulminant liver failure.[22] In patients with fulminant liver failure, liver transplantation may be the only option.

The goal is to achieve long-term suppression of both HDV and HBV replication. Peginterferon alfa-2a, alone or in combination with adefovir dipivoxil, has produced positive results in some patients, but studies indicate that long-term response to drug therapy is poor in patients with HDV infection.[22] Because HDV develops in those already infected with HBV, these patients may be prophylactically treated for development of HDV with the vaccine for hepatitis B.[1,2,15]

• Because **HEV** is self-limiting and doesn't normally cause chronic infection, patients require only symptomatic and supportive care.[1,3]

Nursing assessment

Because viral hepatitis can impair the liver's metabolic and synthesis functions, the nurse should perform a thorough patient assessment to identify any physiologic alterations.

• Monitor for cardiac dysrhythmias and auscultate for abnormal heart sounds because portal hypertension

Manifestations of altered liver function

Besides metabolizing hormones and drugs, the liver has many functions that may be disrupted by liver disease, leading to wide-ranging signs and symptoms.

- malabsorption of fat and fat-soluble vitamins
- elevation in serum bilirubin and jaundice
- disturbances in gonadal function, including gynecomastia in men
- signs of increased serum cortisol levels, such as Cushing syndrome
- signs of hyperaldosteronism, such as sodium retention and hypokalemia
- decreased drug metabolism
- decreased plasma binding of drugs due to decreased albumin production
- hypoglycemia related to impairments of glycogenolysis and gluconeogenesis
- abnormal glucose tolerance curve related to impaired uptake and release of glucose by the liver
- impaired lipoprotein synthesis
- altered serum cholesterol levels
- elevated serum ammonia levels
- decreased levels of serum albumin and other plasma proteins, contributing to edema
- bleeding tendency
- deficiency of vitamins stored in the liver
- increased infection risk.

Source: Porth CM. *Essentials of Pathophysiology*. 3rd ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins; 2011:732.

can increase myocardial workload.[1,23]
• Monitor for altered peripheral tissue perfusion by assessing peripheral pulses and capillary refill time.
• Assess for signs and symptoms of overt or occult bleeding, such as hematemesis or fecal occult blood.
• Assess lung sounds, respiratory rate and depth, and oxygen saturation levels; abdominal pain and ascites may impair the patient's ability to breathe deeply.[1]
• Perform a comprehensive abdominal assessment, including assessment of bowel sounds. Evaluate the patient for gastrointestinal (GI) signs and symptoms, such as right upper quadrant pain, ascites, anorexia, nausea, vomiting, and diarrhea.
• Document food and fluid intake, output, and daily weight. Patients experiencing anorexia may benefit from a dietary referral.
• Assess characteristics of urine. Patients with hepatitis may have dark-colored urine due to the presence of bilirubin, which results from the liver's inability to remove bilirubin from the bloodstream.
• Examine the skin, mucous membranes, and sclerae for jaundice. Look for evidence of pruritus, peripheral edema, ecchymoses, and skin breakdown.
• Assess for arthralgia and myalgia.
• Many drugs administered to treat hepatitis are nephrotoxic, so closely monitor renal function.
• Administer medications as prescribed for the specific form of hepatitis and monitor the viral load.
• Perform neurologic assessments including monitoring for changes in level of consciousness secondary to hyperammonemia. Patients with hepatitis may become discouraged, so also assess for signs and symptoms of depression. Provide emotional support and involve the family in patient care as appropriate to promote the patient's psychological well-being. Facilitating access to a social worker, clergy, or a mental health professional may be beneficial.

Clinical manifestations of hepatitis[1,4,5]

Signs and symptoms may vary somewhat based on the cause and severity of the damage and the degree of hepatic impairment.

Abdominal/GI
- right upper quadrant pain
- abdominal cramping
- nausea and vomiting
- anorexia
- weight loss
- diarrhea or constipation
- dark amber urine
- clay-colored stool
- ascites
- splenomegaly
- hepatomegaly

Integumentary
- edema
- jaundice
- pruritis
- urticaria
- maculopapular lesions
- erythema

Cardiovascular
- dysrhythmias
- peripheral edema

Psychosocial
- depression

Neurologic
- lethargy
- fatigue
- asterixis
- headache
- altered mental state
- stupor/coma (with severe damage)

Musculoskeletal
- weakness
- malaise
- myalgia
- arthralgia

Immunological
- lymphadenopathy (often posterior cervical lymph nodes)
- fever.

• Maintain a safe environment and assist with ambulation and activities of daily living as needed.[1,23]

What patients need to know

Patient education is an important component of nursing care for patients with hepatitis. Patients need to know about their medications' actions and potential adverse reactions. Stress the importance of adhering to drug therapy and avoiding over-the-counter medications or herbal supplements unless approved by their healthcare provider. Acetaminophen and many other potentially hepatotoxic medications and herbal products are readily available without a prescription, and patients may not associate them with the potential for liver damage and failure.

Encourage patients to eat a nutritious diet, avoid stress, and get plenty of rest. Explain the importance of abstinence from alcohol, which may exacerbate liver inflammation. Obtain a dietary consult as indicated to help the patient maintain a balanced diet of nutritious foods.

Teach patients about proper hand hygiene, especially before and after food preparation and after using the restroom, to guard against viruses transmitted via the oral-fecal route.[1,23,24]

Educate patients about the importance of not sharing personal items that may carry blood traces (such as toothbrushes and razors) and to dispose of bloody tissues or bandages properly. They need to be aware that they won't be permitted to donate blood or blood products.

In addition, advise them to keep follow-up appointments with their HCP and to notify their HCP immediately if they have continued or worsening signs and symptoms.

Teach patients to avoid crowds to avoid exposure to infectious pathogens, and to receive vaccinations as advised by their healthcare provider.[1,23,24]

Because hepatitis can be transmitted between partners during sexual activity, reinforce the need for safer

sexual practices. Discuss the risks of engaging in unprotected sex and review possible protective devices, such as condoms, latex barriers, and/or latex gloves.

Returning to the case study

Mr. G was diagnosed with hepatitis C, most likely contracted through the use of contaminated tattoo needles. He was given a combination of peginterferon and ribavirin, in addition to counseling and supportive therapies for his symptoms. Following an uneventful hospital stay, he was discharged to home with follow-up appointments with his primary care provider and hepatologist, as well as with counseling referrals and information about local support groups. ■

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Helene Harris is a clinical educator at Central Texas Veterans Health Care System in Temple, Texas. Ann Crawford is a professor at the College of Nursing, University of Mary Hardin-Baylor in Belton, Texas.

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