

The Hepatitis B Carrier State

BRIAN J. MURRAY, M.D., University of California, San Diego School of Medicine, La Jolla, California

Acute hepatitis B virus infection resolves in 95 percent of patients within one year. The remaining 5 percent have persistent infection and become chronic carriers. In the United States, there are nearly one million carriers, who are at increased risk of developing immune-complex disorders and liver diseases. Treatment is available to reduce vertical transmission, and ongoing trials of immunosuppressive and antiviral agents are aimed at decreasing or resolving viral replication.

The hepatitis B virus is a 42-nm spherical, double-shelled virus. The outer shell consists of hepatitis B surface antigen (HBsAg), and the inner shell is made up of hepatitis B core antigen (HBcAg), DNA polymerase, DNA and hepatitis B e antigen (HBeAg).

More than one-half of patients with acute hepatitis B have subclinical disease, with no evidence of infection. In clinical hepatitis B, HBsAg is usually found in the patient's serum before the onset of symptoms or elevations in serum transaminase levels. In 95 percent of patients with acute hepatitis B, HBsAg disappears from the serum within one year.

The Hepatitis B Carrier State

About 5 percent of patients with acute hepatitis B have persistent infection, with continued viral replication, and become chronic carriers of the virus. In these patients, one of three forms of HBsAg is detected in the serum: a spherical particle or a tubular particle, both of which are noninfectious, or the infective Dane par-

ticle, which is the whole hepatitis B virion. HBeAg is often found in association with HBsAg. The presence of HBeAg in serum indicates a high degree of viral replication and greater potential infectivity.

Identification of the hepatitis B carrier requires finding HBsAg-positive serum on two different occasions at least three to six months apart, in the absence of clinical features of acute infection. If an acute infection is suspected, serum examination for the antigen should be repeated in six months.

In some patients with acute hepatitis B infection, it may take up to one year for the serum to become HBsAg negative. Each year, 1 to 2 percent of HBsAg carriers seroconvert to an immune state. It is not unusual for hepatitis B virus antigenemia to resolve after 20 to 30 years. In addition, the titer of HBsAg in the carrier decreases with the length of the carrier state.

Prevalence of the Carrier State

There are an estimated 210 million carriers of hepatitis B worldwide. Certain geographic areas, such as Taiwan, Southeast Asia and parts of Africa, have a high incidence of hepatitis B infection, and in these areas the carrier state is found in 10 to 15 percent of the population. The carrier state is also more prevalent among those who are exposed to the virus through work (e.g., laboratory technicians, dentists) or social contact. For example, a carrier rate of 10 percent is found among sexually active male homosexuals. The prevalence of HBsAg carriers is increased among males, blacks, Asians and the young.