Chronic Viral Hepatitis

Mei-Hwei Chang

Department of Pediatrics, College of Medicine, National Taiwan University, Taipei, Taiwan

Abstract. Among hepatitis A to E viruses, hepatitis B, C, and D viruses can cause chronic hepatitis, in both children and adults. Hepatitis B virus (HBV) infection is the most prevalent and important one. Perinatal transmission accounts for about 40-45% of chronic HBV infection in hyperendemic areas. Horizontal transmission through intramuscular injection using non-sterile needles and intrafamilial spread accounts for the other half of carriers. During the natural course of HBV infection, the host gradually clears HBV and hepatitis B e antigen (HBeAg), liver damage and elevation of aminotransferases occur during the process of HBV clearance. The most effective way to eliminate HBV infection is immunoprophylaxis starting since birth. It can prevent both HBV and hepatitis D virus (HDV) infections. Hepatitis C virus (HCV) infection in children occurs mainly in high risk children, such as those who received blood product or injection using non-sterile needles, or infants of HCV viremic mothers, etc. Screening of blood product reduced markedly the prevalence of post-transfusion HCV infection, but the prevention of sporadic cases requires HCV vaccination which is still under investigation. (Indian J Pediatr 1995; 62 : 673-679)

Key words: Hepatitis B virus; Hepatitis C virus; Hepatitis D virus; Immunoprophylaxis; Seroepidemiology.

Among hepatitis A to E viruses, three viruses (B, C and D) may cause chronic hepatitis. Hepatitis B virus infection is the most important and prevalent problem in children in Asia. Hepatitis C infection occurs mainly in high risk children, and hepatitis D infection is very rare in children in the world except in some endemic areas.

CHRONIC HEPATITIS B VIRUS INFECTION

Hepatitis B virus (HBV) infection is a world wide health problem. About 1 billion people in the world have been infected by HBV, and 200 million of them become chronic hepatitis B surface antigen (HBsAg) carriers. Each year about 2 million people die of complications of HBV infection. Chronic HBV infection can cause chronic hepatitis, cirrhosis of the liver, and even hepatocellular carcinoma.

HBV infection occurs most frequently during childhood in high prevalence areas such as Asia and Africa. It is the main etiologic agent responsible for chronic hepatitis in children. On the contrary, HBV infection occurs mainly in older children or adults in low prevalence areas. Perinatal transmission from carrier mothers to their infants is an important route of transmission in hyperendemic areas such as Asia.
1. Transmission of HBV

(1). Perinatal Transmission
In Taiwan, where the prevalence rate of HBsAg carriers in the general population is 15-20%, and perinatal transmission accounts for around 40-50% of HBsAg carriers before the era of HBV vaccination. Totally about 40% of the infants of HBsAg carrier mothers become HBsAg carriers. About 90% of the infants of hepatitis B e antigen positive, HBsAg carrier mothers became chronic carriers, which is true also in other parts of the world irrespective of the prevalence of HBsAg positive rate in HBsAg carriers mothers. In infants of HBeAg negative HBsAg carrier mothers, less than 5% of their infants are infected by HBV.

(2). Horizontal Transmission
Age is important factor influencing the outcome of HBV infection. Study in Taiwan showed that the annual infection rate of HBV in children below the age of 5 years was about 5%, and 25% of the infected toddlers became HBsAg carriers. The annual new HBV infection rate in university students is about 1.5%, and 2.7% of the infected young adults become chronic carriers. We have investigated the route and the risk factors of horizontal HBV infection by studying 131 HBsAg carrier children of HBsAg negative mothers. An age-Matched seronegative control group of children was compared. The intramuscular injection frequency during infancy and toddler stage and the prevalence of HBsAg among siblings were significantly higher in carrier children that in the control group. The results indicated that non-sterilized, multiple intramuscular injections and intrafamilial spread among siblings might be the major routes of horizontal HBV transmission in children.

2. Clinical, Histologic and Virologic Course of Chronic HBV Infection in Children
During the early stage of HBV infection, viral replication is active, hepatitis B e antigen (HBeAg) is positive, and the aminotransferase levels are normal or mildly elevated, i.e. fluctuating around the upper limit of the normal values. The liver histologic changes were normal, minimal or mild hepatitis with mild inflammation or fibrosis. When age increases, viral replication decreases, and HBeAg seroconversion to anti-HBe occurs. Liver histologic changes with inflammation and fibrosis become more active and prominent during the process of HBe seroconversion. The peak alanine aminotransferase (ALT) levels in most of our HBsAg carrier children are lower than those in adults. Only about one third of our long-term followed HBsAg carrier children had a peak ALT level above 100 IU/ml when they cleared their HBeAg.

After HBe seroconversion, viral replication becomes very low. Liver histology still shows mild to moderate inflammatory activities and fibrosis within 6 months of HBe seroconversion. More than 6 months after HBe seroconversion, liver histology becomes mostly inactive. However, the damage produced during the process of HBe seroconversion may persist and integration of HBV DNA may occur, which may lead to liver cirrhosis and even hepatocellular carcinoma during childhood or later in adulthood.

Acute exacerbation of liver damage after HBe seroconversion is not uncommon.