SEROLOGIC SCREENING OF PREGNANT WOMEN AT HIGH RISK FOR TRANSMITTING HEPATITIS B TO THEIR NEWBORN

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MATERNAL transmission of hepatitis B virus to newborn infants has been documented as an important mode of dissemination of this disease entity.[1] Studies clearly demonstrate that the risk of infection depends on the carrier state of the mother.[2] Evidence suggests that these infants, over a lifetime, are at high risk of developing chronic hepatitis, cirrhosis and/or primary hepatocellular carcinoma.[3] With the availability of hepatitis B immune globulin and hepatitis B vaccine, as well as specific clinical markers that can determine hepatitis B infection, clearly this disease entity can be controlled, but only with proper recognition of the mother's carrier status before delivery can appropriate medical treatment of the newborn be implemented. This study was undertaken to determine the specific carrier rate in a population of pregnant women with risk factors for the perinatal transmission of hepatitis B .

MATERIALS AND METHODS

Over a nine-month period between July 1983 and March 1984, pregnant women identified by history as belonging to a high risk category[4] for carriers of hepatitis B were screened, using hepatitis B surface antigen to determine carrier state as well as hepatitis B surface antibody or hepatitis B core antibody to determine past exposure. During this nine-month period, a total of 148 patients were screened. Serum was analyzed by radioimunnoassay for the specific markers of hepatitis B. All serum was assayed for

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hepatitis B surface antigen and, if positive, an additional assay was carried out for hepatitis B e antigen. In addition, all serum was assayed for antibody to hepatitis B surface antigen or antibody to hepatitis B core antigen. Assays were performed using Abbott Laboratories Diagnostic Division kits using radioimmunoassay for the detection of hepatitis B surface antigen (Ausria II-125) antibody to hepatitis B surface antigen (Ausab) and detection of antibody to hepatitis B core antigen (Corab). An enzyme immunoassay was used for the detection of hepatitis B e antigen (Abbott-HBeEIA).

Results were reported as positive or negative for each specific hepatitis B marker. No patients had clinically acute hepatitis B infection. This was demonstrated by their past history as well as normal physical examinations and liver function testing.

Results

Of a total of 1,141 deliveries at University Hospital, State University of New York at Stony Brook, 148 patients were identified as being at high risk for the carrier state of hepatitis B. This represented 13% of obstetrical patients at this institution during that period.

Of the 148 obstetrical patients screened, a total of five (3.4%) were hepatitis B surface antigen positive. Of these five pregnant women positive for hepatitis B surface antigen, two (40%) were also positive for hepatitis B e antigen. Of the 143 women who were surface antigen negative, 37 (or 25%) demonstrated past evidence of hepatitis B virus infection. The table presents the data from the specific high risk groups that were screened. Patients born in Asia or Africa have the highest carrier rates. Of the 21 patients in this group, three (14.3%) were carriers, and two of these patients demonstrated both surface antigen and the e antigen. An additional seven (33%) demonstrated evidence of past infection to hepatitis B virus. In the 24 patients screened because of a history of parenteral drug use, 42% demonstrated past infection. However, only one of the 24 (4%) demonstrated a carrier state. Of the 50 patients screened because of a past history of hepatitis, 26% demonstrated serologic markers of HBV infection, but only one patient (2%) demonstrated a carrier state. Of the remaining groups, which included health care workers, patients with skin tattoos, patients who had a transfusion prior to 1975 and others, there were no carriers identified from this screening. However, these groups did demonstrate significant evidence of past infection by hepatitis B virus.

RESULTS OF SCREENING OF PREGNANT POPULATION AT HIGH RISK OF TRANSMITTING HEPATITIS B TO THE NEWBORN

High-risk category	*Number screened*	*HBV carrier % (No.)*	*Past HBV infection now immune % (No.)*
Born in Asia or Africa	21	14.3 (3)	33 (7)
Past history or current use of parenteral drugs	24	4.0 (1)	42 (10)
Past history of hepatitis	50	2.0 (1)	26 (13)
Health care workers	12	0 (0)	8.3 (1)
Skin tattoos	24	0 (0)	12.5 (3)
Blood transfusion (before 1975)	6	0 (0)	50 (3)
Other	11	0 (0)	0 (0)
Total	148	3.4 (5)	25 (37)

Discussion

The data presented in this study clearly demonstrate a high risk population of pregnant women who should be screened to identify the carrier state of hepatitis B. Transmission from mother to infant during birth is one of the most efficient modes of HBV transmission.[5] Many reports clearly demonstrate that the carrier state of the mother is the prime factor in vertical transmission from mother to newborn.[2] Not only is there initial infection of infants, but many of these infants become chronic carriers with long-term problems of cirrhosis and primary hepatocellular carcinoma.[3] Only with proper recognition of the maternal carrier state can therapy be aimed at preventing severe acute disease, including fetal fulminant hepatitis in the newborn,[6,7] as well as chronic infection and long-term sequelae in the newborn offspring.

Although the present study examined a limited number of high-risk patients over a short time, it clearly documents the high percentage of carriers in select populations. In the Far East studies showed that 5 to 20% of the population carry hepatitis B surface antigen. In our study the carrier rate of 14.3% among patients born in Asia and Africa agrees with previous studies performed in Asia. The prevalence of the hepatitis B carrier state and prior exposure in our group of parenteral drug users is somewhat lower than that previously reported,[9] probably reflecting the sporadic way in which our population abused parenteral drugs. Most patients did not use parenteral drugs at the time of their prenatal care. The prevalance of prior hepatitis B mar-

kers and the carrier state in women with a previous history of hepatitis B infection, as well as those working in the health care fields, falls within the previously reported ranges for these disease entities.

Studies clearly indicate that the most important action to be taken against perinatal transmission of hepatitis B is prompt administration of hepatitis B immune globulin to the newborn infants of mothers who have acute HBV infection or who are HBV carriers.[4] Data suggest that delay beyond 24 hours greatly reduces the efficacy of this prophylactic treatment.[10] Since efficacy of this regimen depends on administration of hepatitis B immune globulin on the day of birth, it is vital that potentially infectious pregnant women be identified before delivery. Mothers belonging to groups at high risk of hepatitis B infection should be routinely tested prenatally. Our study clearly demonstrates significant carrier state identification when an active program of hepatitis B screening is conducted during the antenatal period. Current recommendation by the Centers for Disease Control is administration of hepatitis B immune globulin, 0.5 ml intramuscularly within 12 hours of birth and hepatitis B vaccine, 0.5 ml intramuscularly within seven days of birth. This initial dose of hepatitis B vaccine should be followed with a subsequent dose at one month and six months.[5]

With the great advances into the prophylaxis for hepatitis B infections, our study demonstrates the need for a program to screen high risk pregnant women at high risk of transmitting HBV infection so that appropriate therapy can be given their newborn infants to prevent vertical transmission of this disease.

SUMMARY

Only by recognition of active HBV illness in the carrier state in pregnant women can perinatal transmission of hepatitis B virus be interrupted with proper medical management of newborns. The current study was undertaken to determine the specific prevalence in pregnant women at high risk of transmitting HBV to their newborns. Blood from these women was screened for hepatitis B surface antigen and, if positive, e antigen was assayed as well. They were also screened for hepatitis B core antibody or hepatitis B surface antibody. A total of 148 pregnant women at high risk of transmitting HBV to their newborns were screened for the carrier state of hepatitis B. Five women (3.4% of this population) were hepatitis B surface antigen positive. Of these 5, 2 (40%) were e antigen positive. Of the 143 women who were surface antigen negative, 37 (26%) demonstrated past evidence of hepa-

titis B virus infection. Among the high risk categories, 14.3% of women born in Asia or Africa were hepatitis B carriers and an additional 33% had evidence of past infection. Four percent of drug users were carriers, and 42% demonstrated past exposure. When there was a history of hepatitis, 2% were carriers and an additional 26% showed past infection. Pregnant women at high risk of transmitting HBV to the newborn should be screened to identify potentially infectious women so their infants can be treated appropriately.

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