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Case Report

Hepatitis B virus surface antigen and e antigen seroconversion in a known HBSS adolescent – Case report and review of the literature on treatment options and outcome

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ABSTRACT

Hepatitis B virus (HBV) infection remains a global public health challenge with an estimated 257 million people in 2015 living as chronic carriers. Sub-Saharan Africa has the second largest global burden of these chronic carriers of HBV infection. Children with sickle cell anemia (HBSS) are prone to recurrent blood transfusion with the attendant risk of blood-borne diseases including hepatitis B infection. There are several studies in Nigeria on the prevalence of viral hepatitis B infection in children with sickle cell anemia. However, there is no report on the treatment of children with HBSS infected with HBV. This case describes a 16-year-old known HBSS female adolescent who presented with acute derangement of liver function test, marked jaundice, and positive viral hepatitis B serology. Her HBV DNA was remarkably high at 4,880,000 IU/ml and monotherapy on tenofovir, a nucleoside analog led to a return of liver enzymes to normal values at 3 months into treatment, seroconversion of hepatitis B surface antigen (HBsAg) to anti-HBs and hepatitis B e-antigen (HBeAg) to anti-HBe at 12 months into treatment, and 24 months into treatment, the patient maintained sustained virological response (undetectable HBV-DNA). Over 3 years into treatment, she has maintained functional cure, virological response, and biochemical response to treatment. Nucleoside analog is effective in the treatment of viral hepatitis B infection in HBSS adolescents.

Keywords: HBSS, Hepatitis B, Management, Tenofovir, Seroconversion

INTRODUCTION

Hepatitis B virus (HBV) infection is a global public health challenge.[1] Every year about 600,000 people die from acute or chronic complications of hepatitis B infection.[2] Sub-Saharan Africa has the second largest global burden of chronic carriers of hepatitis B infection after East Asia.[2] The majority of the people in these regions become infected during childhood and between 5% and 10% of the adult population is chronically infected.[2] Children with sickle cell anemia are prone to recurrent blood transfusion with the attendant risk of blood borne diseases. Although the incidence of transfusion-acquired infection has decreased over the years, the risk of viral hepatitis B infection in these children remains higher than in the normal population with a prevalence ranging from 1.6% to 17.3% in Nigeria.[3-7] However, there are no guidelines on the management of hepatitis B infection in HBSS patients because of their altered immunity. We present here a 16-year-old known HBSS

female who presented to our facility with acute derangement of her liver function test, positive for hepatitis B surface antigen (HBsAg), hepatitis B e-antigen (HBeAg), hepatitis B core antibody (HBcAb), and remarkably high Viral DNA level.

CASE REPORT

A 16-year-old female who resides with her parents and siblings in Southern Nigeria presented with worsening jaundice, fever, and passage of dark-colored urine for a 2-week duration. She is a known HBSS patient diagnosed at the age of 3 years. Her mother is positive for HBV. She was not vaccinated against HBV. There was also a positive history of sharing of sharps, unprotected sexual intercourse, and blood transfusion given 6 months before the onset of the symptoms at a peripheral hospital. The center that transfused the patient blood screens only for HBsAg using the immunochromatographic method and not the complete hepatitis B serologic profile. However, the blood she was transfused was stated to be HBsAg negative. The siblings and father were screened and are negative for HBV.

On examination, she was acutely ill-looking, febrile, clinically pale, and deeply jaundiced. The liver was palpably enlarged. Her sensorium was normal and there were no signs of encephalopathy.

Full blood count showed a total of white blood cells of 28.69 × 10^3/ul, neutrophils of 64.9%, lymphocytes of 27.1%, and platelet of 688 × 10^3/u. Hepatitis B serologic test showed HBsAg-positive, HBeAg-positive, Total HBcAb-positive, HBeAb-negative, and HBsAb-negative; HBV DNA level was 4,880,000 IU/ml. The clotting profile was deranged. Her liver biochemistry was deranged aspartate aminotransferase-178 IU/L (up to 40 IU/L), alanine aminotransferase-132 IU/L (up to 40 IU/L), alkaline phosphatase-1400 IU/L, total bilirubin-234.2 umol/L, and direct bilirubin-129.6 umol/L. Serum albumin was normal. Screening for hepatitis C virus, hepatitis D virus and human immunodeficiency virus was negative. Ultra-sound scan of the abdomen showed coarse parenchymal echotexture of the liver with biliary dilatation, the intrahepatic vascular channels were normal, no splenomegaly and no free fluid was noted.

She was commenced on Lamivudine, for about 2 weeks but with no improvement. Tenofovir was then commenced. Within 3 months of treatment, the liver enzymes normalized, and she showed remarkable clinical improvement. A repeat HBV DNA 8 months into treatment was 64,000 IU/ml, this showed a significant drop in the viral load and after 14 months of treatment, it was 340 IU/ml. One year into the treatment, the serology panel test showed seroconversion from HBsAg to anti-HBs and HBeAg to anti-HBe. Two years following treatment, the patient showed a virological response to treatment (undetectable HBV DNA). Her alpha-fetoprotein and renal function have remained normal.

DISCUSSION

The presence of high HBV DNA, HBsAg, HBeAg, and total core antibody was indicative of hepatitis B infection with a high rate of infectivity. There were many risk factors for the acquisition of HBV infection in this patient. These included her mother being positive to HBV, having no history of vaccination against HBV, sharing of sharps, unprotected sexual intercourse, and transfused inadequately screened blood 6 months before the onset of symptoms. Studies done in Nigeria have shown a significant association between increasing age and positivity to HBsAg.[7,8] The Nigerian Government introduced the HBV vaccination into the National Program on immunization in 2004 and this patient was born in the pre-vaccination era.[8]

Unsafe sexual exposure, traditional practice (scarification marks), and sharing of sharps are associated with an increased risk of hepatitis B infection[7,9,10] She presented acutely ill, and treatment needed to commence as soon as it was possible to avoid mortality. Liver biopsy was deferred because of the biliary dilatation noted on ultrasound; this increases the risk of bleeding. The coarse echogenicity of the liver seen made it difficult to determine if this was caused by chronic viral hepatitis or recurrent sickle cell crisis which could lead to sickle cell hepatopathy. In children with recurrent crises, chronic liver disease may develop.[11] In Enugu Nigeria, Kaine and Udeozo.[12] showed that in children with SCD, cellular infiltration was more aggressive especially in the portal tracts for those positive for HBsAg. Connor[13] reported a 20–40% risk of developing liver cirrhosis in children with HBSS who also have HBV infection. This underscores the importance of effective treatment of HBV infection in children with HBSS.

The European Society of Paediatric Gastroenterology Hepatology and Nutrition clinical practice guideline on management of chronic hepatitis B in childhood showed that children with persistently elevated alkaline phosphatase, HBeAg positive, and elevated HBV DNA above 2000 IU/ml are in the immunoactive phase; if the liver biopsy shows moderate or severe inflammation and fibrosis, treatment should be commenced.[14] However, those with a positive family history of hepatocellular carcinoma who have mild inflammation or fibrosis of the liver should be commenced treatment.[14] Our patient an HBSS patient was extremely ill at presentation with reduced red blood cell volume. Interferon was not a treatment option, and she was commenced on oral nucleotide analog. An oral nucleotide analog is easily administered with fewer side effects compared to interferon. Interferon, however, has a definite treatment duration with an efficacy range of 20–40% with horizontally acquired infections and in patients with elevated ALT.[15] Tenofovir is licensed for use in children 12 years and above while Entecavir can be used in children 16 years and above.[14]

This patient, 3 years into treatment, has shown sustained biochemical response to treatment with normal liver

biochemistry, functional cure with loss of HBsAg, HBeAg, and development of anti-HBS. Virologic response has been achieved with an undetectable HBV DNA level. HBsAg loss is considered the gold standard in the treatment of HBV.[16] It is strongly associated with sustained HBV DNA suppression. This has been achieved in our patients. The risk of development of HCC is lower in patients with loss of HBsAg and HBV DNA suppression compared to those with HBV DNA suppression alone.[16]

Treatment with oral nucleotide has no definite duration and repeated monitoring of the liver biochemistry, hepatitis B panel test and HBV DNA test are required.[15]

CONCLUSION

Tenofovir was effective in the treatment of viral hepatitis B infection in an HBSS adolescent leading to seroconversion of HBsAg and HBeAg, development of anti-HBs and anti-HBe with sustained virological response to undetectable HBV DNA levels. Early sexual exposure, unprotected sex, probably improperly screened blood, lack of vaccination, and possibly vertical transmission added to the increased risk of hepatitis B infection in this patient.

Recommendation

We recommend the use of Tenofovir in the management of HBSS adolescents with chronic hepatitis B infection with continuous monitoring of their renal function. Proper screening of blood before transfusion should be emphasized in Nigeria and this should include screening for the entire hepatitis B panel test or at least the screening for HBcAb in addition to HBsAg.

Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. Global Hepatitis Report 2017. Geneva: World Health Organization; 2017. Available from: http://apps.who.int/iris [Last accessed on 2020 Jul 29].
2. World Health Organization. Hepatitis B Fact Sheet No 204. Geneva: World Health Organization; 2009. Available from: http://www.who.int/csr/disease/hepatitis [Last accessed on 2018 Jul 29].
3. Abiodun PO, Fatunde OJ, Flach KH, Buck T. Increased incidence of Hepatitis B markers in children with sickle-cell anemia. Blut 1989;58:147-509.
4. Angyo IA, Okuonghae HO, Yakubu AM. Hepatitis B surface antigenaemia in children with sickle cell anaemia in Jos University Teaching Hospital. Nigeria. Med Pract 1988;36:| 15-7.
5. Jibrin B, Jiya NM, Ahmed H. Prevalence of hepatitis B surface antigen in children with sickle cell anemia. Sahel Med J 2014;17:15-8.
6. Alikor EA, Erhabor ON. Seroprevalence of hepatitis B surface antigenaemia in children in a tertiary health institution in the Niger Delta of Nigeria. Nig J Med 2007;16:250251.
7. Abiodun PO, Omoike IU. HBs-Antigenaemia in children in Benin city. Nig J Paediatr 1990;17:27-31.
8. Ikobah J, Okpara H, Elemi I, Ogarepe Y, Udoh E, Ekanem E. The prevalence of hepatitis B virus infection in Nigerian children prior to vaccine introduction into the national programme. Pan Afr Med J 2016;23:128.
9. Tabor E, Gerety RJ. Hepatitis B virus infection in infants and toddlers in Nigeria: The need for early intervention. J Paeditr 1979;95:647-50.
10. Inoue T, Tanaka Y. Hepatitis B virus and its sexually transmitted infection-an update. Microbial Cell 2016;3:420-37.
11. Lacaille F, Lesage F, de Montalembert M. Hepatic crisis in children with sickle cell disease. J Pediatr Gastroenterol Nutr 2004;39:200-2.
12. Kaine WN, Udeozo IO. Sickle cell hepatic crisis in Nigeria children. J Trop Paed 1988;34:59-64.
13. Connor EB. Sickle cell disease and viral hepatitis. Ann Int Med 1968;69:517-27.
14. Sokal EM, Paganelli M, Wirth S, Socha P, Vajro P, Lacaille F, *et al*. Management of chronic hepatitis B in childhood: ESPGHAN clinical practice guidelines. Consensus of an expert panel on behalf of the European society of paediatric gastroenterology, hepatology and nutrition. J Hepatol 2013;59:814-29.
15. Guan R, Lui HF. Treatment of hepatitis B in decompensated liver cirrhosis. Int J Hepatol 2011;2011:918017.
16. Yuen MF, Wong DK, Fung J, Ip P, But D, Hung I, *et al*. HBsAg Seroclearance in chronic hepatitis B in Asian patients: Replicative level and risk of hepatocellular carcinoma. Gastroenterology 2008;135:1192-9.

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