中文題目：血液透析病人接種 B 型肝炎疫苗後的產生抗原陽性反應

英文題目：Positive hepatitis B surface antigen after recent vaccination in a hemodialysis patient

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Introduction: In order to prevent the intra-institutional spread of hemodialysis-associated blood-borne infections, every patient before undergoing maintenance hemodialysis is routinely to have a baseline blood screening, including hepatitis B virus (HBV) infection status. If one has positive hepatitis B surface antigen (HBsAg), they will have hemodialysis therapy in an exclusive area for patients with hepatitis B. On the other hand, if one has negative HBsAg, core antibody (anti-HBc), and surface antibody (Anti-HBs), they would be advised to have one more complete vaccination course as possible. For seronegative patients having been undergoing maintenance hemodialysis, periodical surveillance of HBsAg is required.

Theoretically, a recent HBV vaccine booster may cause pseudo-seropositive hepatitis B antigenemia. However, it is nearly never encountered in daily practice because no blood test will be performed soon after a recent shot, except in routine periodical examination or pre-transplantation registration for hemodialysis patients. Thus, a case of incidental seroconversion of positive HBsAg in a hemodialysis patient is to be presented and details about this phenomenon are reviewed.

Case presentation: A 19-year-old man started maintenance hemodialysis for end-stage renal failure due to underlying Alport syndrome. Pre-dialysis blood screening in January 2021 revealed negative for HBsAg, anti-HBc, and anti-HBs. Then he was advised to have a boost course of hepatitis B vaccination. One week after his first shoot of HBV vaccination (Engerix-B) with double dose (40 mcg), he coincidentally had a routine pre-registration blood screen and was found to have positive HBsAg. Clinically, he had no symptoms of acute hepatitis, such as nausea, vomiting, jaundice, or right upper quadrant pain. Besides, his liver function profiles, including alanine transaminase, aspartate aminotransferase, and total bilirubin, were all within normal limits. His anti-HBc was still non-reactive. However, a confirmation test of HBV-DNA was performed and no HBV-DNA was detectable. One month later, his Hepatitis B surface antigenemia turned non-reactive and it remained undetectable 3 and 9 months later. His Anti-HBs titer mounted over 10 IU/L 3 months after the first shot, which indicated the immunogenicity of the vaccination.

Discussion: Hepatitis B virus is notorious for its characteristics of the non-curability and chronic complications, including liver cirrhosis, following refractory ascites, hepatic encephalopathy, portal hypertension, hepatorenal syndrome, and even hepatocellular carcinoma. The chronicity rate was inversely related to the age infected, therefore vaccination as earlier as possible is recommended. The conventional vaccine, is manufactured by a genetic technology with yeast cloned recombinant S antigen DNA. Currently, available brands and also most prescribed include Recombivax HB (Merck & Co, Inc)

and Engerix-B (GlaxoSmithKline). Understanding the composition of vaccines, it seems logical and reasonable that the hepatitis B antigen is detectable soon after vaccination, no matter in healthy or immune-compromised population.

The incidence of transient, post-vaccination hepatitis B antigenemia has been a concern for years. This issue previously attracted physicians' attention when more and more blood donors were rejected because of seropositive results of hepatitis B antigenemia after vaccination. The duration of false-positive hepatitis antigenemia have been reported from 3 to 52 days. B. Klster et al. reported detectable hepatitis B surface antigen within 1 to 3 days after vaccination. An even prolonged antigenemia that lasted for 18 days was reported by E.R. Lunn et al. in 2000. In 2012, C.D. Rysgaard et al. conducted a retrospective study in a tertiary medical center. During a period of 17 months, the seropositive result was mostly observed in patients on hemodialysis and concluded that transient false positive HBsAg would not persist over 14 days. The higher false positive result that occurred in hemodialysis patients might be biased by more frequent and regular clinical requirements of blood screening. A double-dose shot of vaccine recommended for dialysis patients for better immunogenicity might also play a role. Uremia-related immuno-compromised status might also contribute to delayed elimination of vaccinated recombinant HBsAg and suboptimal production of neutralized surface antibodies.

To date, management of a positive HBsAg after vaccination is still a challenging issue, especially confronting difficulty in differentiating true new-onset infection or simply a prolonged antigenemia. In term of the optimal interval between vaccination and blood tests, various periods from one week to at least 14 to 28 days have been advised without authorized endorsement. To establish a consensus or guideline is necessary.

Conclusion: When an HBV-seronegative hemodialysis patient is advised to receive a booster of HBV vaccination, a recent doubled-dose vaccine shoot and delayed clearance of subsequent antigenemia may cause pseudo-positive HBsAg on routine periodical or pre-registration screen tests. Thus, seroconversion of positive HBsAg in a hemodialysis patient is not always indicating a true new hepatitis B infection especially after a recent booster of vaccine. In view of our limited medical resources and unnecessary anxiety, physicians should avoid checking hepatitis B antigens soon after vaccination.