

Hepatitis B Status in Hemodialysis Patients: An Overview from Morocco

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DOI: [10.36347/sasjm.2024.v10i02.004](https://doi.org/10.36347/sasjm.2024.v10i02.004)

Received: 22.12.2023 | Accepted: 30.01.2024 | Published: 03.02.2024

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Abstract

Original Research Article

Background: Patients with end-stage renal disease, particularly hemodialysis patients are at risk for contracting hepatitis B virus (HBV) because of their compromised immune status and exposure to blood products. Regardless of a shorten in the incidence of HBV infection, surveillance is mandatory in preventing the spread of this dreaded virus. Infection control practices, regular review of serologic markers and hepatitis B vaccination are the cornerstone to maintain a safe environment for dialysis. The aim of our study is to provide an overview of the serologic and vaccination status for hepatitis B in hemodialysis patients. **Methods:** A cross-sectional study was carried out in our hospital haemodialysis center to evaluate hepatitis B serological status and vaccination profile of chronic kidney disease patients on chronic dialysis program in Agadir, Morocco. Serologic profile results were checked for all patients (anti-HBc, HBsAg and anti-HBs). Individuals without previous vaccination, incomplete vaccination schedule or no serological conversion (anti-HBs <10mUI/ml) have been prescribed hepatitis B vaccine as it is still not available in public health center in Morocco, with a monitoring of adverse events. **Results:** Fifty-five dialysis patients were included in the study. The majority were male (56,4%), mean age was 59.29 years. All patients were already screened and negative for HBsAg. 69,09% of the population study were vaccinated against hepatitis B (65,78% complete and 34,22% incomplete schedule), with a seroconversion rate of 78,94%. A booster dose of vaccine was given to patients who had not achieve seroconversion (anti HBs <10mUI/ml), because of the immunocompromised state of the dialysis patient. All patients were already screened for anti-HBc. 20% of them were positive, indicating previous contact with the virus. This contact was immunizing in 80 % of patients (anti-HBs>10mUI/ml). For the two patients whose previous contact was not immunizing, the HBV vaccine was prescribed and received, following a 4-double dose schedule. **Conclusion:** Despite the screening of both anti-HBc and anti-HBs for all dialysis patients in our center, economic constraints have reduced the adherence to the vaccination protocol. This represents a real obstacle to the total eradication of the disease among hemodialysis patients, who are a population at high risk of contracting the disease.

Keywords: Hemodialysis patients, hepatitis B virus (HBV), hepatitis B vaccination, chronic kidney disease.

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INTRODUCTION

Hepatitis B virus (HBV) infection is a public health issue, affecting approximately 240 to 350 million individuals worldwide [1]. In this regard, Patients with end-stage renal disease, especially hemodialysis (HD) patients are at risk for contracting hepatitis B virus (HBV) because of their compromised immune status. Indeed, the concurrent treatment of multiple patients in hemodialysis centers represents a potential risk for direct transmission of infectious agents between people such as contact from the hands or gloves of medical professionals or indirect through contaminated equipment and environmental surfaces [2]. Regardless of

a shorten in the incidence of HBV infection, surveillance is mandatory in preventing the spread of this dreaded virus. Infection control practices, regular review of serologic markers and hepatitis B vaccination are the cornerstone to maintain a safe environment for dialysis. The aim of our study is to provide an overview of the serologic and vaccination status for hepatitis B in hemodialysis patients.

METHODS

Patients

This cross-sectional study was conducted on a group of adult patients (over 18 years of age) undergoing regular hemodialysis in the Dialysis Department of the

Oued Eddahab Military Hospital in Agadir, from July 2022 to December 2023. Exclusion criteria were: the existence of an infection or the use of an antibiotic. Oral consent was obtained from all participants.

Laboratory Methods

Blood samples were collected to assess the HBV serological profile of all patients: hepatitis B surface antigen (AgHbs), antibody to hepatitis B component antigen (anti-Hbc) and antibody to hepatitis B surface antigen (anti-HBs). Tests were performed on the Abott Architect 1000SR analyzer using the chemiluminescence technique at least two months after completion of the initial vaccination series, to assess response to vaccination.

Hepatitis B Vaccination

Once the serological profile had been determined, the vaccination status was reviewed: Patients who have received hepatitis B vaccine in a 4 double dose schedule of 0, 1, 2 and 6 months (2 ml (40µg) of Engerix Hbs-Ag, through intramuscular deltoid injections) were considered to have completed the vaccination course. Patients with incomplete vaccination schedule were urged to complete the vaccination protocol. A booster dose of vaccine was prescribed to patients who did not achieve serological conversion (AcHbs<10Ui/ml). Vaccination according to 4 double dose schedule was prescribed to patients who had never been vaccinated. They were after contacted to evaluate compliance with the vaccination and adverse effects within 30 days after vaccination.

Statistical analysis:

Data were determined as the mean±standard deviation (SD), median and range values. Descriptive statistical analysis was performed. All statistical analyses were performed using SPSS (version 11.5).

RESULTS

This study assessed all patients on chronic renal replacement therapy at the Military Hospital in Agadir. In total, 55 were included in the study. The majority of patients were male (56.4%) with mean age of 59.29 years [25,87]. The patients were on dialysis for a median time of 63 months (23-109). All patients have been screened and negative for AgHbs. Among the 55 patients, 20% were positive for anti-Hbc, attesting a previous contact with the HVB. This contact was immunizing in 9 patients (anti-Hbs titers above 10 mIU/mL). 69,09% of patients were already vaccinated against HVB (65.78% complete and 34.22% incomplete schedule). The seroconversion rate among vaccinated patients was 78.94%. A booster dose of vaccine was prescribed to patients who did not achieve serological conversion (AcHbs<10Ui/ml) and for the two patients who have not achieved protective titers of anti-HBS after immunization. No adverse events have been recorded among patients referred to immunization.

Table 1 describes the HVB serological profile and vaccination status of the 55 dialysis patients of our centre.

Table 1: Hepatitis B characteristics of the 55 dialysis patients of the study

Characteristics	n (%)
Serological markers	
HBsAg	
Positive	0 (0)
Negative	55 (100)
Anti-HBc	
Positive	11 (20)
Negative	44 (80)
Anti-HBS	
≥ 10 mIU/mL	29 (52.7)
< 10 mIU/mL	26 (47.3)
Hepatitis B vaccine status	
Vaccinated	38 (69,09)
Complete schedule (4 doses)	25 (65.78)
Incomplete schedule	13 (34.22)
Not vaccinated	17 (30.90)

DISCUSSION

In this study, All patients have already been screened for HBsAg and were negative. The dialysis centers adopt draconian measures when it comes to the dosage of HBsAg: Any patient newly placed on hemodialysis should have the antigen dosage before joining the HD center and every 6 months thereafter. The

HBsAg prevalence (0%) was compatible to that found in other dialysis populations (0% to 10%) [3, 4].

All patients included in the study underwent a screening of the anti-Hbc, a strict policy testing implemented in our center for all dialysis patients in order to interpret the HVB serological profile as accurately as possible. However, there are still

hemodialysis centers that have not yet implemented anti-Hbc assays due to a lack of economic resources. The patients with available anti-Hbc had dosed it in kidney transplantation centers [3]. The anti-Hbc seroprevalence in our dialysis population was 20%, similar to that reported by other teams [5, 6]. The major threat of not monitoring anti-Hbc in dialysis patients is the possibility of occult hepatitis B, with potential reactivation during periods of immunosuppression. The prevalence of occult hepatitis B infection in dialysis patients with anti-Hbc positive varies from 1.5% to 44.7% [7]. Prophylaxis against HBV infection by vaccination is imperative to preventing the spread of disease. In our study, the HVB vaccine coverage rate was low (30% of the population study was not vaccinated) similarly to other studies in dialysis patients [3]. Major causes is the economic constraints that have reduced the adherence to the vaccination protocol. We should also point out that the response rate in relation to achieving immunity has been suboptimal in patients with ESRD as a result of altered cellular and humoral immunity [8]. Compared with the adult general population with normal immune function who achieved immunity in 90% to 95% of cases, patients with ESRD were found to have a median response rate of 64% after a 3-dose scheduled series [9]. In this study, the seroconversion rate among vaccinated patients was 78.94% justifying a booster doses to achieve immunization. Since first-generation hepatitis B vaccines were generally ineffective, second-generation vaccines derived from recombinant yeast vaccines have gradually improve seroconversion rates [10]. Currently, the most widely used commercial brands are recombivax and engerix-B [11]. Dialysis patients require larger doses of vaccine to increase seroreactivity. Current recommendations for adults on dialysis are 40 mg of recombivax administered at 0, one and six months or engerix-B administered at 0, one, two and six months [10, 12]. A protocol of doses (0, one, six months) induces more rapid, and persistent protection, both in pre-dialysis, compared with four doses.

CONCLUSION

Despite the benefit of dosing anti-Hbc and anti-HBs before admission to dialysis, economic constraints have reduced the adherence of all patients to the vaccination protocol. In this respect, free vaccine would be the best way to ensure total access to vaccination and increase the seroconversion rate, reducing the risk of outbreaks.

REFERENCES

1. MacLachlan, J. H., & Cowie, B. C. (2015). Hepatitis B virus epidemiology. *Cold Spring Harbor perspectives in medicine*, 5(5), a021410.
2. Alter, M. J., Arduino, M. J., Lyster, H. C., Miller, E. R., & Tokars, J. I. (2001). Recommendations for preventing transmission of infections among chronic hemodialysis patients. *MMWR Recomm Rep*, 50(RR-5), 1-43.
3. Guimarães, M. N. C., Facincani, T., & Santos, S. D. S. D. (2017). Hepatitis B status in hemodialysis patients. *Arquivos de Gastroenterologia*, 54(4), 356-358.
4. Purnamasidhi, C. A. W., Mariadi, I. K., Wibawa, I. D. N., & Kandarini, Y. (2017). High Incidence of Hepatitis B Virus Infection in Hemodialysis Patients at Sanglah General Hospital and Its Risk Factors. *The Indonesian Journal of Gastroenterology, Hepatology, and Digestive Endoscopy*, 17(3), 155-161.
5. Carrilho, F. J., Moraes, C. R., Pinho, J. R., Mello, I. M., Bertolini, D. A., Lemos, M. F., ... & Da Silva, L. C. (2004). Hepatitis B virus infection in Haemodialysis Centres from Santa Catarina State, Southern Brazil. Predictive risk factors for infection and molecular epidemiology. *BMC public health*, 4, 1-11.
6. Ferreira, R. C., Teles, S. A., Dias, M. A., Tavares, V. R., Silva, S. A., Gomes, S. A., ... & Martins, R. (2006). Hepatitis B virus infection profile in hemodialysis patients in Central Brazil: prevalence, risk factors, and genotypes. *Memórias do Instituto Oswaldo Cruz*, 101, 689-692.
7. Di Stefano, M., Volpe, A., Stallone, G., Tartaglia, L., Prato, R., Martinelli, D., ... & Fiore, J. R. (2009). Occult HBV infection in hemodialysis setting is marked by presence of isolated antibodies to HBcAg and HCV. *JN journal of nephrology*, 22(3), 381-386.
8. Al Saran, K., Sabry, A., Al Halawany, Z., & Ismail, M. (2014). Factors affecting response to hepatitis B vaccine among hemodialysis patients in a large Saudi Hemodialysis Center. *Saudi Journal of Kidney Diseases and Transplantation*, 25(1), 185-191.
9. Bruguera, M., Cremades, M., Mayor, A., JM, S. T., & Rodés, J. (1987). Immunogenicity of a recombinant hepatitis B vaccine in haemodialysis patients. *Postgraduate Medical Journal*, 63, 155-158.
10. Kosmadakis, G., Albaret, J., Correia, E. D. C., Somda, F., & Aguilera, D. (2018, September). Vaccination practices in dialysis patients: A narrative review. In *Seminars in Dialysis* (Vol. 31, No. 5, pp. 507-518).
11. Naqvi, S. B., & Collins, A. J. (2006). Infectious complications in chronic kidney disease. *Advances in chronic kidney disease*, 13(3), 199-204.
12. Abramowicz, M., Zuccotti, G., & Pflomm, J. M. (2018). A Two-Dose Hepatitis B Vaccine for Adults (Heplisav-B) (Reprinted from The Medical Letter on Drugs and Therapeutics vol 60, pg 17-18, 2018). *Jama-Journal of the American Medical Association*, 319(8), 822-823.