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Research Article

Serological Profile of Hepatitis B in Chronic Hemodialysis Patients

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Abstract

Background: Hepatitis B virus (HBV) infection remains a major concern for patients on chronic hemodialysis (CHD) due to immunosuppression and the high risk of nosocomial transmission. This study aimed to describe the serological profile and immune status regarding HBV among CHD patients in a Moroccan dialysis unit.

Methods: This was a retrospective cross-sectional study conducted at the Mohammed V Military Teaching Hospital in Rabat, Morocco, between March 2019 and February 2020, involving 37 CHD patients. Demographic, clinical, and serological variables (HBsAg, Total anti-HBc, Anti-HBs) were collected. Serological diagnosis was performed using chemiluminescent microparticle immunoassay (CMIA).

Results: The population comprised 51% men (Sex ratio M/F = 1.05). The most represented age group was 70–80 years. The most notable result was the prevalence of active infection (HBsAg positive), which was null (0%, *n* = 0/37) in this cohort. Regarding immune status: 19% of patients (*n* = 7/37) were positive for Total anti-HBc (indicating prior contact), and 68% (*n* = 25/37) were positive for Anti-HBs. Among patients with positive Anti-HBs, 72% presented a typical post-vaccination profile (HBsAg-/Total anti-HBc-). However, 56% of protected patients had Anti-HBs titers below the optimal protective threshold (<100 IU/L).

Conclusion: The absence of active HBV infection suggests the efficacy of the rigorous prophylactic and hygiene measures in place within this hemodialysis unit. However, the high proportion of patients with suboptimal Anti-HBs titers highlights the need for regular antibody monitoring and booster doses to maintain adequate seroprotection in this immunocompromised population.

Introduction

End-stage renal disease (ESRD) requires renal replacement therapy, with hemodialysis (HD) being the most common modality [1]. Patients on HD are particularly vulnerable to blood-borne viral infections, particularly hepatitis B virus (HBV), due to uremia-related immunosuppression, the invasive nature of the treatment, and the risk of cross-transmission within the dialysis unit [2]. The prevalence of HBV among hemodialysis patients varies significantly by region and infection control practices, ranging from 1% to over 15% in some series [3].

In Morocco, a country classified as an intermediate endemicity zone, the prevalence of HBV in the general population is estimated between 1% and 3% [4].

This study was conducted at the Hemodialysis Center of the Mohammed V Military Teaching Hospital in Rabat. It aims to describe the epidemiological characteristics and the complete serological profile of hepatitis B in this patient cohort to evaluate the impact of vaccination and prevention strategies on nosocomial HBV transmission.

Patients and methods

Study design and setting

We conducted a retrospective cross-sectional study at the Mohammed V Military Teaching Hospital in Rabat. Data and serological samples were collected over twelve months, from March 2019 to February 2020.

Study population

The study included a total of 37 consecutive patients under a chronic hemodialysis program. Clinical-biological data included age, sex, duration of dialysis, and comorbidities.

Sampling and techniques

Blood samples were collected in dry tubes for serological analysis. The HBV serological markers screened were:

- Hepatitis B Surface Antigen (HBsAg).
- Total anti-HBc antibodies (Total anti-HBc).
- Anti-HBs antibodies (Anti-HBs).

Serological tests were performed using Chemiluminescent Microparticle Immunoassay (CMIA) on an Abbott ARCHITECT i2000sr system. Anti-HBs positivity was used to assess immunity, with an optimal protective level set at 100 IU/L [5].

Statistical analysis

Data were entered and analyzed descriptively using Excel software (Microsoft Office). Results are presented as frequencies and percentages.

Results

Demographic characteristics

The study included 37 patients (N = 37). The population showed a male predominance (51%, n = 19), with a sex ratio (M/F) of 1.05. The most represented age group was 70–80 years.

HBV serological profile: The serological results are summarized in Table 1. The prevalence of active infection was null: HBsAg screening was negative in 100% of patients (0%, n = 0/37).

Regarding immune status, 68% of patients (n = 25/37) were Anti-HBs positive. As suggested by the serological profiles, these patients fall into two distinct categories: 1. Natural Immunity (Cured): 19% of the total population (n = 7/37) were positive for Total anti-HBc, indicating prior contact with the virus and subsequent cure.2. Post-Vaccination Immunity: 49% of the total population (n = 18/37) showed an isolated Anti-HBs profile (HBsAg negative / Total anti-HBc negative), typical of successful vaccination.

Notably, among these protected patients, 56% (n = 14/25) had an Anti-HBs titer below the optimal protection threshold of 100 IU/L.

Discussion

The main finding of this study is the absence of HBsAg in all included CHD patients. This 0% prevalence is remarkably low compared to historical data in dialysis centers and the general Moroccan population [4,6]. This highlights the success of infection prevention and control protocols applied at our institution, including strict segregation, universal precautions, and regular screening [7].

However, the analysis of immune status reveals persistent challenges regarding vaccine immunogenicity. Although immunity is primarily vaccine-derived (72%), 56% of protected patients had sub-optimal Anti-HBs levels (<100 IU/L). This phenomenon is well documented in dialysis patients, where the immune response to vaccination is often impaired due to uremia [8].

Based on our findings, distinct control measures should be applied to the two identified groups. For patients with natural immunity (Total anti-HBc positive), routine booster vaccination is not required, but regular monitoring for viral reactivation (HBsAg and DNA) is essential, especially in cases of profound immunosuppression.

Conversely, for vaccinated patients, management relies strictly on Anti-HBs titers. In accordance with KDIGO and CDC guidelines [10,11], we recommend the following actionable protocol to address the rapid antibody decline observed in this population: 1. Titers < 10 IU/L: Administer an immediate booster dose. 2. Titers 10–100 IU/L: An immediate booster is not mandatory but highly recommended to maintain long-term seroprotection. Alternatively, closer serological monitoring (every 6 months) should be implemented. 3. Titers > 100 IU/L: Continue standard annual monitoring.

Table 1: Serological results of the study population (N = 37).

Serological marker	Result	N (out of 37)	Percentage (%)	Interpretation
HBsAg	Negative	37	100 %	No active infection
Total anti-HBc	Positive	7	19 %	Prior contact / Cured
Anti-HBs	Positive	25	68 %	Immunity present

Conclusion

The study of the serological profile of Hepatitis B in this cohort of chronic hemodialysis patients demonstrated a 0% prevalence of active infection, attesting to the effectiveness of systematic vaccination and infection control measures. However, the significant proportion of patients with sub-optimal antibody titers highlights the need to strengthen immune monitoring and rigorously apply revaccination protocols to ensure long-term protection.

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