



Prevention And Control of Hepatitis B In Patients on Chronic Hemodialysis Program

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In recent years the average human lifespan has increased, leading to a growing need for various modalities of kidney function replacement in elderly patients. Since the elderly population was largely unvaccinated against hepatitis B (HBV) because it was not included in the mandatory vaccination schedule, there arose a need to vaccinate patients with renal failure before haemodialysis (HD) or transplantation (Tx).

HBV infection is a major global public health problem, particularly in developing countries, affecting approximately one-third of the world's population. Approximately 350 million people are chronic carriers of HBV. Each year, 2% of the world's population experiences spontaneous recovery and develops seroconversion, as demonstrated by presence of anti-HBs antibodies [1]. In hospital settings, HBV infection is transmitted by blood transfusion, contaminated needles, and non-sterile instruments. Patients receiving immunosuppressive therapy and patients on chronic HD are at the highest risk [2].

HBV is a hepatotropic virus that can cause chronic infection in humans through immune tolerance. Although the incidence of HBV infection is decreasing due to vaccination, currently 3.5% of the world's population is chronically infected with HBV [3]. Persistent infection can lead to the development of cirrhosis and hepatocellular carcinoma (HCC) [4].

Montenegro, a Balkan country in the Mediterranean region, shows significant genetic heterogeneity of hepatitis B virus (HBV) in Europe [5]. According to the World Health Organization (WHO), approximately 257 million people worldwide are chronically infected with hepatitis B, with in Montenegro having seen a decline in hepatitis B incidence over the past two decades thanks to vaccination, although it remains a significant public health problem [5,1]. The HBV vaccine was first approved in 1982, and the recombinant DNA vaccine against hepatitis B was introduced in 1986. The emergence of HBV vaccination marked a pioneering and significant step in the effort to prevent HBV infection in HD patients [5]. In Montenegro, hepatitis B vaccination is regulated by law through the Regulation on the conditions and manner of implementing mandatory immunoprophylaxis and chemoprophylaxis against certain infectious diseases. The Regulation was published in the „Official Gazette of Montenegro”, No. 36/2020 and 35/2022. [6]. HD patients are particularly susceptible to hepatitis B virus and have a less durable and weaker antibody response to HBV vaccination. It is important to note that HBV vaccination, blood product screening and infection control measures have led to a significant reduction in HBV among HD patients [7].

Infection control measures include both general and specific preventive measures

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related to environmental disinfection, reuse of dialyzers for the same patients, hand hygiene and wearing of gloves and protective equipment, isolation and barrier measures, HBV vaccination and routine serological testing, ensuring HBV immune status of HD ward staff, transmission-based precautions and outbreak management [7]. A study by Brnovic et al., conducted at the Clinical Center of Montenegro, which concerns the knowledge and attitudes of healthcare workers about hepatitis B, its nature, transmission routes and prevention measures, significantly influences their behavior in terms of preventing hepatitis B virus infection [8].

As of December 2025, 5 patients positive for hepatitis B out of a total of 80 HD patients were dialyzed in the Dialysis Center at the Clinic of Nephrology of the Clinical Center of Montenegro. It is important to note that none of the patients with HBV infection were infected in the Dialysis Center at the Clinic of Nephrology. By properly preventing HBV infection: vaccination, isolating patients from other HD patients, on special devices, in a separate room and reducing the number of blood transfusions after the introduction of erythropoietin for the treatment of anemia, we were able to prevent the transmission of hepatitis B virus in HD patients. Effective prevention, control, diagnostics, treatment and care of patients largely depend on the work of nurses at the Dialysis Center, and such outstanding results are, among other things, the merit of doctors, nurses who work with these patients, as well as educated non-medical staff who maintain hygiene in the rooms where HBV-positive patients are dialyzed, in the so-called positive HD rooms.

Issues of importance to the professional and scientific community

In the context of HBV in HD units, the professional and scientific community faces specific challenges where standard procedures fail due to human factors or systemic deficiencies. Here are some critical points that the professional and scientific community should pay attention to: Why do a significant proportion of HD patients („non-responders”) not develop adequate antibody titers after standard vaccination and whether PCR testing is routinely performed or is there an overreliance on serology. Is patient isolation sufficient by simply

separating equipment or is complete spatial isolation and separation of personnel necessary to reduce the risk of cross-contamination to zero. It is important to note that when storing medical waste, the critical moment of separation of used sets (needles, tubing) should be taken into account, since any blood leak in the dialysis area poses a high epidemiological risk. Due to a shortage of nurses, the „hand hygiene” step is often skipped between patients or gloves are inadequately changed during fistula manipulation. The procedure is not successful enough if the patient is not aware of the risks. There is often a lack of clear communication about why hygiene of the puncture site is important before and after treatment. Monitoring the „window period”: The system often fails in the period between two tests. If a patient becomes infected immediately after the examination, they can be a hotbed of infection for the next 3 to 6 months until the next screening.

Proposal for improving preventive measures, healthcare and patient education before and on HD

Improving preventive measures, healthcare and patient education before and during HD should involve coordinated efforts across multiple hospital departments including infection control, clinical pharmacology, sterilization, hospital epidemiology and healthcare and nursing supervision. Key measures should include strengthening oversight of central sterilization processes, as well as enhancing diagnostic capacity at the point of care. Vaccination prior to the initiation of dialysis should be ensured for all patients, alongside strict isolation protocols for HBV-positive individuals undergoing HD. Records of vaccination status should be implemented including the introduction of a mandatory „digital passport” for each dialysis patient, enabling quarterly monitoring of antibody titers and incorporating automated alerts to prompt timely revaccination when necessary.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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Prevenција i kontrola hepatitisa B kod bolesnika na hroničnom programu hemodijalize

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