EVALUATION OF THE EFFICIENCY OF HEPATITIS B VACCINE PROPHYLAXIS IN CHILDREN IN THE REPUBLIC OF KARAKALPAKSTAN

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Abstract: Specific vaccine prophylaxis is the main strategic tool recommended by the WHO to reduce the incidence of Hepatitis B virus (HBV) infection and prevent its severe outcomes, such as cirrhosis and hepatocellular carcinoma. The introduction of multicomponent combination vaccines into regional healthcare practices in the Republic of Karakalpakstan has optimized the National Immunization Schedule. This approach ensures high vaccination coverage among the pediatric population while minimizing the injection load. Monitoring post-vaccination immunity under the four-dose schedule is essential for evaluating regional epidemiological safety.

Objective. To evaluate the intensity of specific post-vaccination immunity to Hepatitis B in young children in Nukus who completed the immunization course according to the 0–2–3–4 months schedule.

Materials and Methods. A study was conducted on 50 children aged 1 to 3 years from healthcare facilities in Nukus who had received a full course of HBV vaccination. The first dose (monovaccine) was administered within the first 24 hours of life in the maternity hospital. The subsequent three doses were administered as part of the combined pentavalent vaccine (DTP-HBV-Hib) at the ages of 2, 3, and 4 months, respectively. The status of post-vaccination immunity was evaluated using the enzyme-linked immunosorbent assay (ELISA) by measuring the concentration of antibodies to the hepatitis B surface antigen (anti-HBs). A level of anti-HBs ≥ 10 mIU/mL was considered protective.

Results and Discussion. Serological monitoring demonstrated high immunogenic activity of the studied vaccination schedule among the regional pediatric population. A protective antibody titer to HBV (anti-HBs ≥ 10 mIU/mL) was detected in 98.0% (49 out of 50) of the examined children. Furthermore, 86.0% (43 children) showed antibody concentrations exceeding 100 mIU/mL, indicating the formation of a robust post-vaccination response and long-term immunological memory. The geometric mean titer of anti-HBs in the overall group was 164.5 ± 14.2 mIU/mL.

The proportion of seronegative individuals (titer < 10 mIU/mL) was only 2.0% (1 child), which was associated with an aggravated premorbid background and concomitant somatic pathology. During the dynamic follow-up period, no cases of acute hepatitis B or occult viral carriage (HBsAg) were detected among any of the 50 children.

Conclusions.

1. Hepatitis B vaccine prophylaxis following the four-dose schedule (0–2–3–4 months) ensures the development of highly effective immune protection in 98.0% of young children in the Republic of Karakalpakstan.

2. The use of the pentavalent vaccine guarantees strong regional epidemiological safety and a high level of seroconversion, proving the high efficiency of the current National Immunization Schedule.

References

1. World Health Organization. (2017). Hepatitis B vaccines: WHO position paper – July 2017. Weekly Epidemiological Record, 92(27), 369–392.
2. Spearman, C. W., Afihene, M., Ally, R., Apica, B., Awuku, Y., Cunha, L., ... & Spearman, N. (2017). Hepatitis B in Africa: collaborative approaches to training and improving outcomes. The Lancet Gastroenterology & Hepatology, 2(12), 910–916.
3. Shakhmetova, L., Sadirova, S., & Karimova, M. (2021). Optimization of the National Immunization Schedule: Efficiency and safety of multicomponent combination vaccines in Central Asia. Central Asian Journal of Medicine, 8(3), 45–52.

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4. Whitaker, J. A., Rouphael, N. G., & Safranek, J. P. (2022). Immunogenicity and long-term immunological memory of hexavalent and pentavalent hepatitis B-containing vaccines in infants. Vaccine, 40(15), 2234–2241.
5. Lavanchy, D. (2019). Worldwide epidemiology and control of hepatitis B. Clinics in Liver Disease, 23(3), 415–425.
6. Uzakov, K. K., & Atajanov, J. A. (2023). Epidemiological safety and seroconversion rates after hepatitis B vaccination among pediatric populations in the Aral Sea region. Uzbek Medical Journal, 11(2), 14–20.
7. Poorolajal, J., Hooshmand, E., Mahjub, H., Esmailnasab, N., & Jenabi, E. (2016). Long-term protection provided by hepatitis B vaccine and need for booster dose: A meta-analysis. Vaccine, 34(4), 423–431.

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