

SPECIFIC PROPHYLAXIS OF INFLUENZA

Masharipova Shakhista Sabirovna

Urganch State Medical Institute, Urgench, Uzbekistan

Abstract

Influenza is one of the most widespread infectious diseases worldwide and has a significant impact on public health and the economy. This study evaluated the effectiveness and immunogenicity of seasonal influenza vaccination. During the 2023–2024 influenza season, a total of 122 participants were enrolled and divided into two groups: vaccinated (62 individuals) and control (60 individuals). The results demonstrated that the incidence of influenza, influenza-like illness, and related complications was significantly lower in the vaccinated group. Immunological analysis revealed a significant increase in antibody titers. The vaccination was found to be safe and well tolerated.

Keywords: influenza, vaccination, specific prophylaxis, immunogenicity, hemagglutination inhibition, antibody titer, seroconversion, seroprotection

Introduction

Influenza is an acute respiratory viral infection characterized by high transmissibility and manifests annually in the form of seasonal epidemics. The influenza virus is known for its continuous antigenic variability, which contributes to its widespread distribution and repeated infections. Children, the elderly, pregnant women, and individuals with chronic diseases are considered high-risk groups.

Severe forms of influenza and its complications, including secondary bacterial pneumonia, exacerbation of cardiovascular diseases, and even death, may occur. Therefore, specific prophylaxis plays a crucial role in its prevention. Currently, vaccination is recognized as the most effective and scientifically proven method for controlling influenza.

The purpose of the study is to analyze specific methods of influenza prevention, evaluate the effectiveness and immunogenicity of seasonal vaccination, and explore the prospects for developing new types of vaccines.

Materials and Methods

The study was conducted as a prospective clinical trial during the 2023–2024 influenza season. A total of 122 participants were enrolled and divided into two groups: the vaccinated group (n=62) and the unvaccinated (control) group (n=60).

Inclusion and Exclusion Criteria

The study included individuals over the age of 18, including the elderly and patients with chronic diseases. Written informed consent was obtained from all participants. The following conditions were established as exclusion criteria:

- Acute febrile illness at the time of the study;
- Hypersensitivity to vaccine components;
- Severe adverse reactions following previous vaccinations;
- Other medical contraindications.

Procedure and Follow-up

Participants in the vaccinated group received a standard single dose of the inactivated seasonal influenza vaccine in accordance with the national immunization schedule. All participants were followed up for a period of 6 months.

During the observation period, laboratory-confirmed influenza cases, influenza-like illnesses (ILI), and complications (secondary bacterial infections, exacerbation of chronic diseases) were recorded.

Assessment of Immunogenicity

To evaluate immunogenicity, venous blood samples were collected pre-vaccination and 21–28 days post-vaccination. Antibody titers were determined using the

hemagglutination inhibition (HI) assay. Seroconversion and seroprotection rates were calculated based on international criteria.

Statistical Analysis

Statistical analysis was performed using standard methods. Numerical data were presented as mean \pm standard deviation, while qualitative indicators were expressed as percentages. Differences between groups were evaluated using the χ^2 (chi-square) test and Student's t-test. A value of $p < 0.05$ was considered statistically significant.

Results

A total of 122 participants were included in the study: 62 in the vaccinated group and 60 in the control group. There were no statistically significant differences between the groups regarding age, gender, or the prevalence of chronic diseases ($p > 0.05$).

During the follow-up period, laboratory-confirmed influenza cases were recorded in 5 participants (8.1%) of the vaccinated group, compared to 14 participants (23.3%) in the control group ($p < 0.05$). This indicates that vaccination significantly reduces the incidence of influenza.

The frequency of influenza-like illnesses (ILI) was also lower in the vaccinated group at 16.1%, whereas it reached 31.7% in the control group.

Complications, including secondary bacterial pneumonia and exacerbations of chronic diseases, were observed in 3.2% of the vaccinated group and 11.7% of the control group.

The results of the immunological analysis showed a significant increase in antibody titers post-vaccination ($p < 0.001$). The seroconversion rate reached 72.5%, and seroprotection exceeded 78.4%.

Safety and Adverse Reactions

Analysis of adverse effects demonstrated the safety of the vaccine.

- Mild local reactions (pain at the injection site) occurred in 14.5% of cases.

- Mild systemic reactions (low-grade fever, fatigue) were observed in 9.6% of cases.

All reactions resolved spontaneously within 1–3 days. No serious adverse events were recorded.

Discussion

The results obtained confirm the high efficacy of seasonal influenza vaccination. A significant reduction in laboratory-confirmed influenza cases and influenza-like syndromes was observed in the vaccinated group compared to the control group. These findings further demonstrate the crucial preventive value of vaccination.

The analysis of immunogenicity indicators showed a reliable increase in antibody titers following vaccination. The seroconversion and seroprotection rates complied with international standards, confirming the potency and effectiveness of the administered vaccine.

Furthermore, the vaccine was well-tolerated, with only mild and transient adverse effects recorded. These results underscore the safety profile of the vaccination procedure among the study population.

Due to the continuous antigenic drift of the influenza virus, the development of new vaccine strains remains a constant necessity. Future research should prioritize the creation of universal vaccines, the prolongation of the immune response, and the achievement of broad-spectrum protection.

Conclusion

The study results confirm that seasonal influenza vaccination is an effective and safe method of prevention. In vaccinated individuals, the incidence of influenza, influenza-like illnesses, and associated complications was significantly reduced.

Immunological indicators demonstrated high rates of seroconversion and seroprotection, indicating the formation of a robust immune response following

vaccination. Furthermore, the vaccination was well-tolerated, with adverse effects limited to mild, short-term reactions.

Given the continuous antigenic variability of the influenza virus, annual vaccination remains the most reliable measure for reducing morbidity and preventing complications. Expanding vaccination coverage, particularly among high-risk groups, remains of critical importance.

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