Short Communication

Trial of Influenza HA Vaccination for Healthcare Workers in Consecutive Years

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SUMMARY: We investigated the trial of the influenza HA vaccination for healthcare workers in 2 consecutive years at Nihon University Itabashi Hospital. The vaccination rate increased significantly (P < 0.01) from the first season to the second season. The number of missed working days in the vaccinated group was significantly lower (P < 0.01) than that in the unvaccinated group in a mild-pandemic year. Furthermore, the relative risk of infection was 0.53 and the effectiveness rate of the vaccine was 46.8%. Absenteeism and influenza infection rates were also significantly lower in the vaccinated group. This study may support the possibility of influenza vaccination for healthcare workers to prevent the outbreak of influenza in hospitals.

The Centers for Disease Control and Prevention (CDC) in the United States recommends that "physicians who are treating patients at high risk of influenza infection should receive immunization against influenza" (1,2). However, around 1990, compliance remained poor among healthcare workers (HCWs) in North America and Europe, with only 2 to 51% receiving the influenza vaccination (3,4). Hospital staff who are in frequent contact with people susceptible to influenza infection are advised to receive influenza vaccination annually. Influenza outbreaks have been reported in neonatal intensive care units (NICUs) and other closed/circulatory units (5,6). The benefits of giving hospital staff influenza vaccinations include reduced absenteeism due to influenza and a smaller risk of nosocomial influenza virus infection for high-risk patients (1,7,8). During the 2001 - 2002 influenza seasons, we tried to prevent an outbreak of influenza in our NICU and pediatric ward by immunizing the entire healthcare professional staff of both units. We have reported the results of this effort after investigating adverse reactions, clinical utility, and influenza virus titers (9). We then expanded the use of influenza vaccinations to the entire hospital nursing staff. We have now investigated the trial of the influenza HA vaccination for HCWs in 2 consecutive years.

The study population consisted of the entire nursing staff (nurses, clerks, and nursery teachers) working at Nihon University Itabashi Hospital during the influenza seasons from November 2003 to March 2004 and from November 2004 to March 2005. The influenza HA vaccine for the 2003 - 2004 season contained A/New Caledonia/20/99 (H1N1) type, A/Panama/2007/99 (H3N2) type, and B/Shandong/7/97 type, whereas the influenza HA vaccine for the 2004 - 2005 season contained A/New Caledonia/20/99 (H1N1) type, A/Wyoming/3/2003 (H3N2) type, and B/Shanghai/361/2002 type. Each vial contained at least 0.5 μg/0.5 ml of hemagglutinin (HA) of each type. After obtaining informed consent from the subjects, the influenza HA vaccine was administered as a single, subcutaneous dose of 0.5 ml into the upper arm. The vaccine was given from November to December of each season, and then collected in April. For the 2003 - 2004 and 2004 - 2005 seasons, 860 and 908 subjects, respectively, filled out the questionnaire. The questionnaire items are shown in Table 1. Fever was defined as more than 37.5°C. Statistical analysis was performed by Fisher’s exact probability test and the unpaired t test, with P < 0.05 considered statistically significant.

During the 2003 - 2004 season, we distributed the questionnaire to 860 hospital staff and collected responses from 845. After eliminating 15 responses due to insufficient information, there were a total of 830 responses (response rate, 96.5%). During the 2004 - 2005 season, we distributed the questionnaire to 908 hospital staff and collected 850 responses (response rate, 93.6%). Among the staff members who responded, the numbers actually receiving the influenza HA vaccine were 515 (62.0%) and 703 (82.7%) during the 2003 - 2004 and 2004 - 2005 seasons, respectively. The vaccination rates increased significantly from the first to the second season (P < 0.01). Table 1 shows the number of subjects, gender ratio, ages, past history of influenza vaccination, past history of allergic reactions, and past history of adverse reactions to vaccination, and past history of allergic reactions.

There was almost no difference in the incidence of local adverse reactions such as redness and heat sensation between the first and second seasons (35.9 and 37.0%, respectively). Regarding systemic adverse reactions, there was again almost no difference in the incidence of fever (4.1 and 5.5%) (Table 1). The number of subjects with fever or cold-like symptoms, absenteeism, and changed work shifts during the two seasons according to vaccination status are shown in Table 2. The mean number of working days per month for the nursing staff was 21.5 days. The mean total working days over the 5-month study period was 107.5 days. Each item was compared

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according to the vaccination status. The number of missed working days in the vaccinated group was significantly lower than that in the unvaccinated group (*P* < 0.01) in the 2004-2005 season. In addition, the item corresponding to cold-like symptoms was significantly higher than in the vaccinated group (*P* < 0.05) in the 2003-2004 season.

A comparison of influenza infection, relative risk, and the effectiveness rate according to vaccination status is shown in Table 2. During the 2003-2004 influenza season, 6 out of 315 subjects (1.9%) in the unvaccinated group and 7 out of 515 subjects (1.4%) in the vaccinated group were infected with influenza virus. The relative risk of infection for vaccine was 0.71, and the effectiveness rate of the vaccine was 26.3%. However, during the 2004-2005 influenza season, 16 out of 147 subjects (10.9%) in the unvaccinated group and 41 out of 703 subjects (5.8%) in the vaccinated group were infected with influenza virus; i.e., the number was significantly lower (*P* = 0.025) in the vaccinated group. The relative risk of infection in vaccine was 0.53, and the effectiveness rate of the vaccine was 46.8%. Considering the influenza virus type, there were 3 type A, 12 type B, and 1 unknown type observed in the 16 infected subjects of the unvaccinated group, whereas there were 21 type A, 16 type B, and 4 unknown observed in the 41 infected subjects of the vaccinated group. Most of the diagnoses were made using a transnasal influenza rapid diagnosis kit. The data in Table 2 clearly indicate that the vaccinations significantly decreased influenza type B infection but not type A infection during the 2004-2005 season.

In Japan, Horiuchi reported in 1989 that influenza control should focus on immunization of both high-risk children and hospital staff (10). However, the hospital staff in those days did not fully accept this policy. Nonetheless, the recommendation for vaccination of hospital staff who treat patients at high-risk of influenza infection has gradually spread in Japan. Ito et al. reported the evaluation of influenza vaccination in HCWs using rapid antigen detection test. They indicated that the infection and absenteeism rates were lower in the group vaccinated against influenza (11). This study was conducted during the 2002-2003 season, but had results similar to our results from the 2003-2004 season.

Following the CDC recommendation, we administered influenza HA vaccine to our staff working in closed units,
the NICU, and the pediatric ward, and have reported on the safety of the vaccine and the high levels of influenza virus protective titers in the immunized staff (9). Based on our experience, we decided to follow the CDC recommendation to vaccinate the entire nursing staff in the hospital. While offering influenza HA vaccinations for HCWs, we conducted a survey focusing on adverse reactions, clinical utility, and the economic benefits of the influenza vaccination in 2 consecutive years.

The most useful finding in this study is that the vaccination rate for nursing staff improved significantly from 62.0 to 82.7% from the first to the second season. This result indicates that the hospital staff gradually accepted the CDC recommendation. However, even for HCWs in North America and Europe, the number of people who receive the influenza vaccination is low (3,4). The reasons for not receiving the vaccination include “adverse reactions may occur,” “not comfortable getting a shot,” or “vaccination process is not simple” (3). Eisenfeld et al. have reported poor acceptance of the influenza vaccination among NICU nursing staff (12). In their report, they encouraged the hospital staff to follow the recommendation regarding influenza vaccinations and emphasized the importance of education, the risk to newborns, and the safety and utility of vaccination so as to improve the rate of acceptance (12). According to a recent study of influenza vaccination for HCWs, researchers have found that knowledge about influenza and the importance of vaccination do not always result in a decision to receive the vaccine (13,14).

In this study, the influenza prevention program was expanded from the individual ward level to the entire hospital staff, and the immunization rate exceeded 80%, indicating that the hospital staff recognized the importance of the CDC recommendation.

REFERENCES