

ORIGINAL ARTICLE

Perception about influenza and pneumococcal vaccines and vaccination coverage among patients with malignancies and their family members

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Summary

Purpose: Although influenza and pneumococcal vaccinations for high-risk populations are recommended by current guidelines, vaccination coverage rate (VCR) is still low in patients with malignancies and the family members living with them.

Methods: During the 2011-2012 seasonal influenza (SI), we surveyed 359 patients with solid or hematological malignancies. Data were recorded in an especially designed questionnaire after face to face interview.

Results: The median patient age was 57 years (range 18-90) and 177 (49.3%) patients were female. Overall vaccination rate was 17% and 4.2% for influenza and pneumococcus, respectively. VCR among family mem-

bers was 21.2%. The most common causes for not getting vaccinated were lack of knowledge for indication by the patients (33.5%), getting chemotherapy (22.1%), fear of side effects (12.5%), lack of efficacy (12.1%), and not advised by the attending physician (5.9%).

Conclusion: VCR was very low among patients with cancer and their family members. To eliminate misconceptions and improve vaccination coverage in this population, educational programs for patients and for physicians focusing on safety and efficacy of vaccine are needed.

Key words: cancer, high-risk population, influenza vaccine, pneumococcal vaccine, vaccine coverage

Introduction

SI is an acute viral infection caused by influenza virus and represents an important public health problem. Although most people recover within a week, SI can cause severe morbidity and mortality in people at high risk, such as adults older than 65 years, patients with chronic medical conditions, or immunocompromised patients. Each year 3-5,000,000 cases of severe SI occur worldwide, resulting in 250-500,000 deaths. Although antiviral drugs for influenza are available in some countries and effectively prevent and treat the illness, the best approach is prevention. Vaccination is the most effective way for prevention [1]. World Health Organization (WHO) recommends

annual influenza vaccination for nursing-home residents (the elderly or disabled), elderly individuals, people with chronic medical conditions, and other groups such as pregnant women, health care workers, those with essential functions in the society, as well as children aged from 6 months to 2 years. The Advisory Committee on Immunization Practices (ACIP) recommends other vaccines for different adult populations, but influenza vaccination is recommended for all persons aged \geq 6 months [2,3]. Influenza vaccination prevents infection in 70-90% of the general population and results in prevention of influenza-related hospitalization in 90% of the patients. Even though recent studies demonstrating efficacy and safety of vaccination for influenza, VCR in adult populations,

as well as in high-risk populations, remains low [4-8]. VCR for cancer survivors was 57.8% in two studies [9,10]. Patients with cancer are especially susceptible to SI and its severe complications like secondary bacterial pneumonias by streptococcus pneumoniae. The mortality rate of influenza can reach 9% in patients with cancer [5]. At the same time, influenza infection may indirectly lead to suboptimal treatment results by delaying or interrupting chemotherapy and hospitalization [11].

Despite the efficacy of influenza vaccination in patients with solid tumors or hematological malignancies being on chemotherapy is lower compared with normal population, most authors recommend vaccinating those patients with solid or hematological malignancies receiving chemotherapy. In addition, vaccination of all persons being in immediate contact with the patient is recommended [9,11].

Pneumococcal infections are a significant cause of morbidity and mortality worldwide, especially in persons with certain conditions. Pneumococcal vaccination reduces invasive pneumococcal disease. Routine vaccination of all adults aged ≥ 65 years and persons aged 2-64 years with high risk features such as chronic obstructive pulmonary disease, diabetes mellitus and immunocompromizing conditions is recommended [12-14]. Pneumococcal vaccination coverage rate is lower than VCR of influenza. In United States overall VCR in 2010 for high-risk adults aged 19-64 years and adults aged ≥ 65 years were 18.5% and 59.7%, respectively [2]. According to a recently published study, VCR with pneumococcal polysaccharide vaccination was 26.1% among people with established indication [14]. The VCR for cancer survivors was 48.3% [10].

In this study we aimed to investigate the perception about influenza and pneumococcal vaccines and vaccination coverage among patients with malignancies and their family members.

Methods

Between January 2 and March 2, 2012, 359 consecutive patients with solid tumors and hematological malignancies who were treated at the Medical Oncology Department of Ankara University Faculty of Medicine and who were diagnosed with cancer before the last SI were included in the present study. Data were recorded by face-to-face interview according to a standardized questionnaire about influenza and pneumococcal vaccination. The educational level was recorded after interview and then the patient's opinion about the next year's vaccination was asked.

Table 1. Patient characteristics

Characteristics	N	%
Age, years		
Median	57	
Range	18-90	
Age groups, years		
18-49	95	26.5
50-64	177	49.3
≥ 65	87	24.2
Gender		
Female	172	47.9
Male	187	52.1
Education		
Illiterate	28	7.8
Literate	15	4.2
Primary-Secondary School	186	51.8
High School	72	20.1
Graduate School	58	16.2
Type of malignancies		
Gastrointestinal	95	26.5
Lung and Pleura	87	24.2
Breast	88	24.5
Genitourinary	29	8.1
Sarcoma	17	4.7
Gynecological	11	3.1
Lymphoma	12	3.3
Other	20	5.6
Stage		
Non- metastatic	193	53.8
Metastatic	166	46.2
Vaccination rate		
Influenza	48	13.4
Pneumococcal	2	0.6
Both vaccines	13	3.6
Family member	76	21.2

Statistics

Statistical analysis was carried out using Statistical Package for Social Sciences 13.0 for Windows (SPSS, Inc, Chicago, IL, USA). Descriptive statistics like frequency (%) or median (range) were calculated for all variables. Chi square test was used to detect statistical differences in proportions. Odds ratio and its confidence interval were also calculated. All tests were two-tailed and a p value of less than 0.05 was considered significant.

Results

Baseline characteristics of the patients are summarized in Table 1. Patients aged 65 years or more had higher VCR ($p=0.019$). When VCR was analyzed according to tumor type, patients with lung or pleural cancer (21.8%) had higher VCR than patients with other types of cancer (12.9%) ($p=0.042$). Patients' beliefs about influenza and vaccination were different with respect to their educational status, but were similar with respect

Table 2. Perceptions of patients regarding influenza and vaccination by vaccination status

	Vaccinated (N=63)			Not vaccinated (N=296)			p-value
	No %	Yes %	No idea %	No %	Yes %	No idea %	
Family member vaccination rate	39.7	60.3	-	87.2	12.8	-	0.000
Influenza is a risk for my health	0	100	0	23.3	72.3	4.4	0.000
Influenza is a serious risk for my health	11.1	88.9	0	54.4	30.4	15.2	0.000
Influenza vaccine is protective	11.1	84.1	4.8	27.0	41.6	31.4	0.000
Influenza vaccine is safe	19	79.4	1.6	28.4	50	21.6	0.000
Patients' opinion for getting vaccine for the next year after interview	6.3	88.9	4.8	14.5	80.1	5.4	0.203

Table 3. Perceptions of patients regarding influenza and vaccination by vaccination status

	Lung or pleural cancer (N=87)			Other (N=272)			p-value
	No %	Yes %	No idea %	No %	Yes %	No idea %	
Vaccination rate after diagnosis of cancer	78.2	21.8	-	87.1	12.9	-	0.042
Family member vaccination rate	74.7	25.3	-	80.1	19.9	-	0.280
Influenza is a risk for my health	17.2	82.8	-	19.9	75.4	4.8	0.080
Influenza is a serious risk for my health	35.6	54	10.3	50.4	36.4	13.2	0.014
Influenza vaccine is protective	20.7	48.3	31.0	25.4	49.3	25.4	0.497
Influenza vaccine is safe	23	57.5	19.5	27.9	54.4	17.6	0.655
Patients' opinion for getting vaccine for the next year after interview	8	90.8	1.1	14.7	78.7	6.6	0.028

to gender and disease stage. Those graduated from high school or above believed that "Influenza is a serious risk for their health", "influenza vaccine is protective", and "influenza vaccine is safe" ($p=0.021$, $p=0.000$, and $p=0.009$, respectively). However, VCR was similar regarding the educational status ($p=0.540$) (Tables 2 and 3).

Vaccination was advised by medical oncologists and family physicians to most of the patients. The causes for absence of vaccination are summarized in Table 4.

Table 4. Causes for not getting vaccinated

Causes	N	%
Not advised by medical oncologist	18	5.9
Fear of side effects	35	12.5
Lack of efficacy	34	12.1
No need	73	23.9
Don't have information	102	33.5
Maybe not appropriate during chemotherapy	67	22.1

Discussion

In the present study, we observed that the VCR was less than 20% in our adult patients with cancer. VCR for pneumococcal polysaccharide vaccine and SI vaccine were 4.2% and 17%, respectively. Vaccination of family members was 21.2%. Although the VCRs reported in the literature are far from ideal, the VCR in the present study is even lower compared with previous reports [4,7,11,14-19].

VCR among patients with lung or pleural cancer was higher than among patients with other cancer types. However, VCR for influenza among these patients was also low (21.8%).

Although patients with cancer have a somewhat compromised immune system, influenza and pneumococcal vaccines are well tolerated and satisfactory serological responses have been observed [8]. The response rate to influenza vaccine is around 70-90% in healthy adults and 50-70% in patients with cancer, regardless of chemotherapy regimen. However, the response rate is lower in patients with hematological malignancies [9,20-24]. In particular, vaccination may not provide

adequate protection from influenza in patients treated with rituximab and two vaccine doses were reported to improve the response rate [25-27]. On the other hand, Xu et al. reported similar seroconversion to H1N1 vaccine for healthy individuals (80.0%), patients with solid tumors on myelosuppressive chemotherapy (72.2%), cancer patients without chemotherapy (87.0%), and patients with hematological malignancies (75.0%) [28]. Recently, Wong et al. reported that influenza vaccination reduced hospitalizations from pneumonia and influenza and the mortality rate in patients with cancer [19]. The results of the current study show that 41.6% and 84.1% of unvaccinated and vaccinated patients believed that vaccine was protecting them from SI. Sasson et al. suggested that influenza vaccine is effective for even terminally ill cancer patients [29]. According to analyses of Avritscher et al. influenza vaccine is cost-effective and they suggested vaccination for all cancer patients who have life expectancy of at least 3 months [30].

The most appropriate time for vaccination is not clear. Ortals et al. suggested that patients should be vaccinated inbetween chemotherapy courses. The seroconversion rate of patients vaccinated at the time of chemotherapy and inbetween chemotherapy courses were 50% and 93%, respectively [31]. According to a recently published study, vaccination during chemotherapy on day 4 provides better seroconversion than vaccination on day 16 in patients with breast cancer [32]. Nonetheless, for actively treated patients it is recommended that vaccination should be performed as distant as possible from the chemotherapy cycles [9].

Safety is another factor associated with VCR.

Previous reports generally have shown that vaccination is safe in patients with cancer [8,9,23,33]. Interestingly, the present study showed that only 50% and 79.4% of unvaccinated and vaccinated patients respectively believed that influenza vaccine was safe.

The vaccination of family members living with patients is another important issue that is usually neglected. Shih et al. reported that the overall vaccination rate among family members was less than 50% and they suggested that vaccination of cancer-free people, who are living together with cancer patients is beneficial [15]. In the present study, VCR for family members was 21.2%.

The main reasons for the low level of VCR that emerged in our study were lack of knowledge for indication by the patients (33.5%), getting chemotherapy (22.1%), fear of side effects (12.5%), lack of efficacy (12.1%), and not advised by the attending physician (5.9%). Nevertheless, after interview 88.9% of the vaccinated and 80.1% of the unvaccinated patients stated that they will get vaccine next year.

The results of present study revealed that routine assessment of vaccination status and educational programs are needed for patients with cancer.

In conclusion, improving VCR among patients with cancer and their family members requires educational support for both patients and attending physicians to increase awareness of the benefits of influenza and pneumococcal vaccines.

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