RESEARCH ARTICLE

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COVID-19 Course in Patients Receiving Pneumococcal Vaccine

ABSTRACT

Objective: The coronavirus pandemic emerged at the end of 2019 and still affects the whole world, causing severe deaths. The COVID-19 vaccine is highly anticipated, but the emphasis is also given to other vaccines. In this study, the data of 16 cases known having received a pneumococcal vaccine during the COVID-19 period were examined.

Methods: Of the 200 COVID-19 cases aged over 65, data of 16 patients who have had pneumococcal vaccination were accessed using the hospital health registry and the national health system records (https://enabiz.gov.tr/). Prognostic factors and COVID-19-related findings of these patients were given in frequency tables. In addition, all raw data were presented in a detailed table.

Results: Most of the cases were PCR positive (68.75%), and in 68.75% of the persons, the CT was compatible with COVID-19. Fourteen of the cases were treated by hospitalization. One patient was followed as an outpatient, and one case had already died when brought to the emergency room.

Conclusions: Data on cases known to have received the pneumococcal vaccine, which became important during the COVID-19 outbreak, were presented. This work will motivate researchers to conduct large-scale studies.

Keywords: Vaccine, Pneumococcal Vaccine, Covid-19, Coronavirus, Pandemic.

Pnömokok Aşısı Olduğu Bilinen Hastalarda Covid 19 Seyri

ÖZET

Amaç: 2019 yılı sonlarında ortaya çıkan ve halen tüm dünyayı etkileyen coronavirüs pandemisi ciddi sayıda vaka ve ölümlere neden olmaktadır. Covid-19 aşılarının dünyada hızla yapılmaya başlandığı bu dönemde diğer aşılar da önemsenmektedir. Özellikle pnömokok aşısının etkileri bu dönemde merak edilmektedir. Bu çalışmada pnömokok aşısı olduğu bilinen 16 vakanın covid 19 dönemindeki verileri incelendi.

Gereç ve Yöntem: 65 yaş üstü 200 kişilik covid 19 pozitif hastanın içinden pnömokok aşısı olduğu bilinen 16 vakanın verilerine hastane sistemleri ile ulusal sağlık sisteminden yararlanılarak ulaşıldı. Bu vakalara ait kronik hastalık ile covid dönemi prognostik faktörleri frekans tabloları ile verildi. Ayrıca tüm vakalar detaylı bir tablo ile çözümlendi.

Bulgular: 16 vakanın hepsinde kronik hastalık tanısı vardı. Hastalardan dördünün durumu ölümle sonuçlandı. Vakaların çoğu PCR pozitifti (%68.75) ve yine %68.75 kişide BT Covid ile uyumluydu. Vakalardan 14 tanesi hastaneye yatırılarak tedavi edildi. 1 tanesi ayaktan takip edildi. Bir vaka ise ölü olarak acil servise getirilmişti.

Sonuç: Son derece önemli olan ve covid 19 döneminde önemi gittikçe artan pnömokok aşısının önceden yapıldığı bilinen 16 vakaya ait veriler verildi. Bu çalışmanın büyük ölçekli çalışmalara kaynak niteliğinde olacağı öngörülmektedir.

Anahtar Kelimeler: Aşı, Pnömokok Aşısı, Covid-19, Koronavirüs, Pandemi.

INTRODUCTION

In December 2019, a new coronavirus caused multiple cases of severe pneumonia in Wuhan, China (1, 2). Afterward, it was named by the World Health Organization (WHO) "Coronavirus disease 2019" (COVID-19), and its etiological agent was determined as "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2) (3). The human-to-human transmission was first confirmed in January 2020, and the WHO declared COVID-19 a Public Health Emergency. Later, the WHO announced that the COVID-19 is a global pandemic, with 400,000 thousand cases being recorded worldwide (3, 4). More than 90 million cases and over two million deaths were reported by January 2021 (5).

Currently, no approved specific drug or method is available to treat COVID-19, other than palliative and preventive medicine. Authorities all over the world recommend hand washing, wearing masks, and social distancing to their citizens. As a result of various studies conducted in many countries around the world, many vaccines have now been approved to prevent COVID-19 (6). However, immunological and clinical evidence of the benefits of influenza, pneumococcal and tuberculosis vaccines related to COVID-19 continues to be discussed (7, 8). These vaccines can have a direct or indirect effect on COVID-19 with different types of immune responses.

Additionally, these vaccines may have indirect effects by reducing the burden of viral and bacterial respiratory diseases on patients and countries during the pandemic period (9). In this respect, a limited number of studies showing the effects of these vaccines on COVID-19 are seen in the literature. This study aimed to present the results of 16 people who had COVID-19 disease and were known to have the pneumococcal vaccine before the pandemic as registered in the national health system.

MATERIAL AND METHODS

Research Type: Our study is a retrospective descriptive and observational study.

Case Selection: Sixteen of the 200 patients over the age of 65 with positive COVID-19 PCR results detected until June 2020 in the Kocaeli province were included in the study. Patients over the age of 65 were selected because the pneumococcal vaccine was free for this group.

Information on chronic diseases, such as diabetes mellitus, hypertension, heart disease, chronic lung diseases, and kidney disease, was derived from data systems and recorded to control additional factors that could affect the clinical course.

Data Collection Tools: COVID-19 Polymerase Chain Reaction (PCR) test result, computed tomography (CT) result, sex, age, presence of chronic disease, intensive care stay, intubation status, mortality status, and hospitalization information were obtained through the data system provided by the provincial health directorate. Additionally, the pneumococcal vaccination status of the patients within the last 1 year was obtained from the national health record system and E-health (https://enabiz.gov.tr/) data system.

Permissions: Necessary permissions for the study were obtained first from the Turkish Ministry of Health and then from the Kocaeli Provincial Health Directorate. Besides, an ethics committee approval was obtained from the Health Sciences University Kocaeli Derince Training and Research Hospital Clinical Research Ethics Committee (28.05.2020; 2020/67).

Statistical Analysis: Descriptive statistics were presented as means and standard deviations for numerical data and as numbers and percentages for categorical data. The Statistical Package for the Social Sciences (SPSS, version 23X, IBM, Armonk, New York 10504, NY, USA) was used in the analyzes.

RESULTS

Data were presented for 16 patients who were COVID-19 (PCR and/or CT) positive and who had a pneumococcal vaccine within the last year. All cases were of domestic origin. The patients were diagnosed during March, April, May, and June 2020. Furthermore, one patient had an influenza vaccine before developing COVID-19. The mean age of these patients was 73.44±5.69. Half of the patients were male, and half were female. All patients had at least one chronic disease. Most of the patients were married. The sociodemographic data of the patients and their chronic conditions are given in detail in Table 1.

Table 1. Descriptive data and chronic disease status of the patients.

	Features	**n**	**%**
Age (mean ± SD)		73.44±5.69	
Gender	Male	8	50.0
	Female	8	50.0
Marital status	Married	10	62.5
	Widowed	5	31.3
	Single	1	6.3
Presence of Hypertension and/or Heart Disease	Present	13	81.3
	Absent	3	18.8
Diabetes Mellitus	Present	8	50.0
	Absent	8	50.0
Chronic Renal Failure	Present	4	25.0
	Absent	12	75.0
COPD and/or Asthma	Present	3	18.3
	Absent	13	81.3

COVID-19 PCR results, CT results, admission status to the hospital and intensive care unit, the presence of pneumonia, mortality, and intubation were examined. While 68.8% (n=11) of the patients were PCR positive, 31.3% (n=5) were PCR negative. While no CT findings were found in 3 (18.8%) patients, significant findings concerning COVID-19 were observed in the CT of the remaining patients. The disease ended up with death in four (25.0%) patients, while the others recovered. PCR, CT results, and other prognostic data of all patients are given in Table 2.

Table 2. Distribution of some prognostic data, PCR, and CT results

	Features	**n**	**%**
PCR	Positive	11	68.75
	Negative	5	31.25
CT	COVID-19 compatible	11	68.75
	Viral pneumonia compatible	2	12.50
	No CT available	3	18.75
Hospitalization	Yes	14	87.50
	No	2	12.50
Pneumonia	Yes	7	43.75
	No	9	56.25
Follow-up in Intensive Care	Yes	5	31.25
	No	11	68.75
Intubation Status	Yes	4	25.00
	No	12	75.00
Result	Admitted with symptoms and died	4	25.00
	Admitted with symptoms, improved after admission	3	18.75
	Applied for screening or due to contact without symptoms	9	56.25

Table 3 shows raw COVID-19 data of all cases. It is seen here that a patient with mortality was not hospitalized. Records indicated that this case arrived in the emergency room with cardiac arrest. As the table suggests, those diagnosed with chronic obstructive pulmonary disease and asthma recovered, while all patients who died had hypertension or heart disease. In addition, the antiaggregant and anticoagulant treatment status of the patients before COVID-19 was also examined (Table 3).

Table 3. Descriptive and prognostic data of all cases

Patients	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16
Age	85	76	66	69	73	76	82	69	72	76	71	67	82	68	73	70
Gender (F: female, M: male)	F	M	M	F	M	F	M	F	M	M	M	F	F	F	M	F
Marital status (M: married, S: single, W: widow)	W	M	M	M	M	M	W	W	M	M	M	W	W	M	S	M
Month (Ap: April)	May	Ap	March	June	May	May	May	May	Ap	Ap	Ap	Ap	Ap	Ap	May	Ap
Presence of symptoms		√		√	√	√			√				√		√	
PCR +	√	√	√	√		√	√	√		√		√			√	√
CT (N: Normal, C: COVID, V: Viral)	N	N	N	C	C	C	C	C	C	C	C	C	C	C	V	V
HT or HD	√	√	√	√		√	√	√	√			√	√	√	√	√
DM	√	√					√	√		√		√	√	√		
CRF							√			√					√	√
COPD or Asthma					√				√		√					
Hospitalization	√			√	√	√	√	√	√	√	√	√	√	√	√	√
Pneumonia				√		√			√		√	√	√		√	
Intensive Care		√				√	√						√		√	
Intubation		√				√							√		√	
Taking AA or AC Drugs			√			√	√		√						√	
Flu vaccine		√														
Death		√				√							√		√	

Yes (√), Chronic Obstructive Pulmonary Disease (COPD), Chronic Renal Failure (CRF), Hypertension (HT), Heart Disease (HD), Computed Tomography (CT), Antiaggregant (AA), Anticoagulant (AC).

DISCUSSION

In this retrospective study, the COVID-19 infection process of 16 cases known to have been immunized against pneumococci before getting COVID-19 was detailed. Pneumococcal vaccine is recommended for routine use in elderly adults in Turkey as well as in many countries and is provided free of charge in primary health care institutions (10-13). Still, it was seen that very few patients preferred to receive the pneumococcal vaccine before COVID-19. However, it is known that after the COVID-19 pandemic, there is a raised interest in pneumococci and other vaccines (7, 8).

Studies show that immunocompromised people have low pneumococcal vaccination rates (14). This situation demonstrates that it will be challenging to prevent pneumococcal deaths during the COVID-19 period. As a matter of fact, it was seen in our study that only 16 out of 200 COVID-19 positive patients over the age of 65 were vaccinated against pneumococci. However, the most blamed source of infection during the pandemic and seasonal infections is known as pneumococci (15, 16). In some studies, it was reported that pneumococcal bacteria were isolated from a small number of patients from COVID-19 patients (17). This may be related to the early initiation of antibiotherapy.

Nevertheless, pneumococcal vaccination rates should be increased, especially in people over 65 and people with chronic diagnoses. However, there is a risk of COVID-19 transmission during the vaccination of these people. Despite these handicaps, the health systems of countries should take measures to reduce the risk of transmission of patients and find ways to reach and vaccinate a large number of people not affected by the epidemics. Besides, it is known that people's interest in this issue is increasing (7).

In our study, deaths occurred despite the pneumococcal vaccine. This condition may be related to the fact that all patients had at least one chronic disease and were elderly. It has been shown in many studies that death proportions increase with age and the presence of chronic diseases (2, 18). On the other hand, hypertension or heart disease, diabetes mellitus, chronic obstructive pulmonary diseases, and chronic kidney diseases were present in most of our cases; the possible reason being our selection of patients over the age of 65. The outcome of all intubated cases resulted in death. This is similar to published data and is usually associated with the intubation of worsening patients.

The primary limitation of the study is the insufficient number of cases. Furthermore, since there was no control group, a comparison with COVID-19 positive patients without pneumococcal vaccine could not be made. Another limitation is that we could not present other laboratory data of the studied cases.

CONCLUSION

It is known that in the COVID-19 pandemic affecting the whole world, vaccines are more crucial than during other times. Today as well as in different eras, vaccines have always been the most essential factor in preventing diseases. In our study, it is seen that the pneumococcal vaccine is less preferred in people over 65 years of age. That the interest in vaccines should increase all over the world after the COVID-19 outbreak is over.

Declaration of Competing Interest: The authors declare no conflict of interest.

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