

Coronavirus-19 pandemic and its impact on elective neurosurgical operations

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Ethics Committee Approval

This study was carried out in accordance with the Declaration of Helsinki and was approved by the Sivas Cumhuriyet University Human Research Ethics Committee (registration no: 2021-02/20).

Signed statements of informed content to participation and publication were obtained from participants before the study.

All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest

No conflict of interest was declared by the authors.

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Abstract

Background/Aim: The Coronavirus-19 (COVID-19) pandemic disrupted all planned, elective surgical procedures and appointment-based health services due to the decreased capacity of hospitals, healthcare professionals' focus on fighting the pandemic and efforts to protect patients, society and healthcare workers from the pandemic. The purpose of this study was to ascertain the perspective of patients on elective surgery, who applied to neurosurgery outpatient clinics at two different centers as clean and non-clean hospitals.

Methods: This cross-sectional prospective study was performed between March 2021 and July 2021, during the COVID-19 pandemic. 160 patients who were offered elective surgery for various indications in neurosurgery outpatient clinics were enrolled in the study. To this end, a questionnaire was administered to patients that included information about their demographics, pandemic processes and their anxiety levels during this process. Age, level of education, COVID-19 infection and vaccination status were all questioned in the survey. Univariate and multivariate analysis were used to determine the factors that might influence a patient's decision towards surgery.

Results: In the univariate analysis of the factors, educational status, pandemic-induced anxiety and whether the hospital is a pandemic hospital or not were identified as statistically significant effective factors in patients' decision to accept surgery ($P<0.05$).

Conclusion: We observed that the acceptance rate of patients for elective neurosurgical operations decreased during the pandemic period, but this situation was less felt in clean hospitals. We think that separating hospitals into two parts of clean and non-clean hospital is a beneficial health policy for the continuation of elective treatment procedures.

Keywords: COVID-19, Pandemic, Neurosurgery, Elective surgery

Introduction

While the world has been fighting with the COVID-19 pandemic for two years, which was declared a global pandemic by the World Health Organization in March 2020 [1], it seems appropriate to investigate the extent to which the pandemic has influenced patients' attitudes toward surgery, where many elective and emergency surgical interventions occur on a daily basis.

The COVID-19 pandemic disrupted all planned, elective surgical procedures and appointment-based health services due to hospitals' decreased capacity, healthcare professionals' focus on fighting the pandemic and efforts to protect patients, society and healthcare workers from the pandemic [2-4].

Apart from disrupting the routine operation of the health system, it is well established that the COVID-19 pandemic had a significant impact on the mood and feelings of society, with numerous studies confirming the existence of this panicked and fearful state [5].

The purpose of this study was to ascertain the perspective of patients who applied to neurosurgery outpatient clinics at two different centers, where COVID-19 patients were accepted and rejected, and were recommended to be operated in these departments where the surgical decision made during the pandemic period.

Materials and methods

Between March and July 2021, during the COVID-19 pandemic, this cross-sectional prospective study was conducted.

The purpose of this study was to examine the effect of the Covid-19 pandemic process and hospital status on patient acceptance of surgery in neurosurgery clinics at Sivas Numune Hospital, a pandemic hospital, and Sivas Cumhuriyet University Medical Faculty Hospitals, which isn't a pandemic hospital. The study enrolled a total of 160 patients. Considering the number of patients who applied to the neurosurgery outpatient clinic of our hospital and the other hospital in Sivas in the pandemic period, and were recommended elective surgery by us, "sample calculation in cases with known prevalence" performed to calculate the sample size with alpha: 0.05, power: 80% G*power values.

To this end, a questionnaire was administered to patients that included demographic information, information about pandemic processes and information about their anxiety levels during this process. Age, education level, COVID-19 infection status (infected before or not) and COVID-19 vaccination status were questioned in the survey.

Univariate analysis was used to determine the factors that might influence a patient's decision to accept surgery. In statistical analysis, a cut-off value of 50 years was used for the patient's age. On the other hand, educational status was classified as secondary school and below and above secondary school. Patients' anxiety levels were scored on a scale of 1 to 5, with values greater than 3 indicating that they were extremely anxious and values less than 3 indicating lower anxiety. The effect of the pandemic and hospital status on the patient's surgical admission

decision was scored on a 10-point scale, with a cut-off value of 5.

Statistical analysis

The SPSS 22 software program was used to conduct the statistical analysis. The Chi-square test or the Fisher's exact test was used to compare categorical variables, as appropriate. We used univariate and multivariate analysis to determine independent variables that could influence the surgical decision. $P < 0.05$ was chosen as the level of statistical significance.

Results

Of the 160 patients in the study, 69% (n = 110) were recommended for elective surgery at the Sivas Cumhuriyet University Faculty of Medicine Neurosurgery clinic, while 31% (n = 50) were recommended for elective surgery at the Sivas Numune Hospital Neurosurgery clinic. The median age of the participants was 48 (22–79). Of the patients in the study, 51% were female, and 45.4% had a high school diploma or higher education (Table 1). While 79% of patients questioned during the study stated that they were not infected with COVID-19 before, 38% stated that they had received at least one dose of COVID-19 vaccine. While 53% of patients agreed to the proposed elective surgery, the remaining desired to postpone the procedure (Table 1).

Table 1: Survey Participants Characteristics (n = 160)

Variables	n	%
Gender		
Female	82	51.3
Male	78	48.7
Vaccination status		
Yes	60	37.5
No	100	62.5
Covid-19 status		
Infected	34	21.3
Non-infected	126	78.7
Surgical indications		
Lumbar disc herniation	105	65.6
Cervical disc herniation	12	7.5
Peripheric entrapment neuropathy	8	5.0
Cranial tumors	35	21.9
Educational status		
Middle school and below	88	54.6
High school and above	72	45.4
Effect of the pandemic*		
<5	105	65.6
≥5	55	34.4
Effect of the hospital*		
<5	67	41.9
≥5	93	58.1
Consideration about the surgery		
Accepted	84	52.5
Not accepted	76	47.5

* The effect of the pandemic and hospital status on the patient's surgical admission decision was scored on a 10-point scale, with a cut-off value of 5.

In the univariate analysis of the factors that may influence patients' decision to accept surgery, educational status, the effect of the pandemic period and whether the hospital is a pandemic hospital or not were found to be statistically significant effective factors (Table 2). While it was concluded that patients with a low level of education and those who applied to the clinic at a non-pandemic hospital were more likely to accept elective surgery, it was discovered that this decision was inversely related to pandemic anxiety.

When a multivariate analysis was performed for the factors that may affect patients' decision to accept surgery, only the presence of the pandemic was found to be a statistically significant effective factor (Table 3).

Table 2: Factors affecting the decision to accept surgery - Univariate Analysis

	Consideration about the surgery				P-value
	Accepted		Not accepted		
	N	%	N	%	
Age					
<50	43	48.9	45	51.1	0.309
>50	41	56.5	31	43.1	
Gender					
Male	42	51.1	40	48.8	0.739
Female	42	53.8	36	46.2	
Status of vaccination					
Vaccinated	26	43.3	34	56.7	0.072
Not-vaccinated	58	58.0	42	42.0	
Educational status					
Middle school and below	53	60.2	35	39.8	0.030
High school and above	31	43.1	41	56.9	
Covid-19 status					
Infected before	19	55.9	15	44.1	0.656
Non-infected before	65	51.6	61	48.4	
Effect of the pandemic*					
<5	74	70.5	31	29.5	<0.001
≥5	10	18.2	45	81.8	
Effect of the hospital*					
≤5	45	67.2	22	32.8	0.002
>5	39	41.9	54	58.1	

* The effect of the pandemic and hospital status on the patient's surgical admission decision was scored on a 10-point scale, with a cut-off value of 5.

Table 3: Factors affecting the decision to accept surgery - Multivariate Analysis

	OR	Lower	Upper	P-value
Educational status				0.203
Effect of the pandemic	2.97	1.93	4.58	<0.001
Effect of the hospital				0.508

Discussion

The COVID-19 pandemic will go down in history as an extraordinary period that severely curtailed humanity's social life and had a direct impact on countries' health policies.

During the early stages of the pandemic, the unpredictable course of the disease, the lack of effective treatment and the absence of an effective preventive vaccine altered not only the dynamics of the health sector but also the approaches to intervention in both emergency and non-emergency health problems [6, 7].

The purpose of this study was to determine the factors that influenced patients' decision-making processes when they were indicated for elective neurosurgical surgery during the pandemic period. As a result, our study was conducted during a time when hospitals' capacity to perform elective surgery during the pandemic period was once again questioned. It was determined that patients with a low educational level and who were less concerned about the pandemic period were more courageous in elective surgery decision-making. Additionally, the rate of elective surgery acceptance was found to be higher in the hospital that does not serve as a pandemic hospital and does not treat COVID-19 patients. Apart from these factors, it was determined that the pandemic period lowered the rate of elective surgery acceptance.

We concluded in our study that gender and age had no effect on elective surgery acceptance during the pandemic period. In a study of 722 people recommended for orthopedic elective surgery, it was discovered that age had no effect on decision-making, but that men's attitudes toward elective surgery were more favorable [8].

Plastic surgeons reported in a study conducted during the COVID-19 pandemic that people living in low socioeconomic countries had more favorable attitudes toward aesthetic interventions, with or without surgery [9]. In our study, we discovered that individuals with low levels of education were more receptive to elective neurosurgical surgery.

Additionally, we discovered that surgical acceptance rates were lower in the neurosurgery clinic at the hospital where COVID-19 patients were followed than in the clinic that did not operate as a pandemic hospital in our study. Taking into account our country's health policy during the pandemic period, the capacity of some hospitals to combat COVID-19 and efforts to maintain some hospitals as sterile hospitals, this result is predictable and expected.

Strengths and limitations

Our study is a cross-sectional and had a sufficient sample-size study examining the factors affecting elective neurosurgical procedures during the pandemic period. Our study was conducted in a clinic where neurosurgical procedures were performed intensively before and during the pandemic. It is the first study examining the interaction of neurosurgery daily practice during the pandemic and examining the factors affecting it. Albeit sufficient sample size, our study has some limitations. Due to its design in a single city during pandemic, it may be insufficient to reflect the whole population.

Conclusion

This extraordinary period caused by COVID-19 has generated a plethora of new research topics, and any research conducted during this time period is valuable. As neurosurgeons, we sought to determine the factors that may influence our patients' attitudes toward non-emergency surgical procedures during this time period. We observed that the acceptance rate of patients for elective neurosurgical surgeries decreased during the pandemic period, but this situation was less felt in clean hospitals. We think that separating hospitals into two parts like a pandemic hospital or not, is a beneficial health policy for the continuation of elective treatment procedures. We believe that by sharing our findings, the research during this period are taken to the next level.

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