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The effect of previous SARS-Cov-2 infection positivity on Gynecological Surgery: A Tertiary Hospital Experience

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ABSTRACT

Objective: The study aimed to investigate whether a history of preoperative SARS-CoV-2 infection differs in terms of peroperative complications and prognosis in patients who had undergone gynecological surgery in the last one year compared to patients who did not.

Materials and Methods: This retrospective case-control study included 632 patients who underwent laparotomic, laparoscopic, urogynecological and oncological surgeries for various indications between July 2020 and July 2021. The patients were divided into two groups according to positive and negative SARS-CoV-2 RT-PCR (Real-time Polymerase Chain Reaction) test results performed preoperatively. The two groups were compared in terms of demographic characteristics, the operation performed, the type of anesthesia applied during the operations, the status of blood transfusion, operation and hospitalization times, and intraoperative and postoperative complications.

Results: While 5.5% (n=35) of the patients had positive SARS-CoV-2 RT-PCR test results in the preoperative period (group 1), 94.5% (n=597) had negative SARS-CoV-2 RT-PCR test results preoperatively. The following parameters, including age, body mass index (BMI), gravida, parity, number of smokers, and number of patients with the comorbid disease, were similar between the two groups. Moreover, no difference was detected in terms of mean hospitalization time, mean operative time, and the number of patients with intraoperative-postoperative complications between the two groups. However, there was a significant difference between the groups in terms of blood product transfusion requirement [0 patients (0%) vs. 55 patients (9.2%) (p=0.05)].

Conclusion: History of SARS-CoV-2 infection in gynecological surgery does not affect intraoperative and postoperative complications except blood product transfusion requirement.

Keywords: SARS-CoV-2 infection, gynecological surgery, complication

INTRODUCTION

COVID-19 disease (SARS-CoV-2) spread rapidly from the city of Wuhan in China to the whole world in December 2019, was declared a pandemic by the World Health Organization (WHO) in March 2020 and started to be seen rapidly in our country in the same period. Since the disease is seen in a wide spectrum from asymptomatic carriage to severe pneumonia resulting in mortality, all elective surgical interventions within the scope of routine health care services had to be postponed. In a statement published in March 2020 by the American College of Surgeons (ACS), all gynecological-oncological diseases were recommended to be treated as triage, except for some emergency operations such as ectopic pregnancy, adnexal torsion, and emergency cerclage (1). In the next period, because the pandemic was relatively under control, the epidemic curve was flattened, and the vaccination programs, as of March 2021, elective surgical operations could also be performed within the framework of certain rules (2). The long delay of elective surgical interventions has also delayed the study of the effect of SARS-CoV-2 infection on surgery. Therefore, there are very few studies in the literature. In a published multicenter study, it was reported that a history of SARS-CoV-2 infection in patients who had undergone benign gynecological surgery did not cause an increase in the rate of postoperative complications (3). However, due to the limited number of studies, this issue continues to be discussed.

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Our aim in this study is to investigate whether the history of COVID-19 affects intraoperative and postoperative complications in patients who underwent surgery for gynecological reasons.

MATERIAL and METHODS

The data of 925 patients hospitalized in Etlik Zübeyde Hanım Gynecology Training and Research Hospital Gynecology Service were analyzed retrospectively between July 2020 and July 2021. Patients who underwent laparotomic, laparoscopic, urogynecological and oncological surgery for various indications in the gynecology clinic within the date range determined were included in the study. Patients hospitalized for medical treatment only (menorrhagia+anemia, pelvic inflammatory disease, vulvar abscess) and patients who underwent minor surgical procedures (endometrial sampling under anesthesia, operative/diagnostic hysteroscopy, conization/Loop Electrosurgical excision procedure [LEEP], suturation for postcoital bleeding) were excluded from the study. At the end of the review process, 632 patients whose data were available were included in the study. A total of 293 patients, 127 patients who were discharged after receiving medical treatment and 161 patients who underwent minor interventional procedures, were excluded from the study. In addition, five patients were not included in the study because their data were missing (**Figure 1**).

Operation preparation, hospitalization, and discharge procedures were planned in accordance with the ACS Recommendations (4) and the Turkish Ministry of Health's SARS-COV-2 Pandemic Working Guide in Health Institutions and Infection Control Precautions (5) for the patients whose operations were performed in accordance with their indications. In the preoperative period, the patients were screened for SARS-COV-2 symptoms, and SARS-COV-2 PCR tests were performed within 48 hours before the operation after hospitalization. Accompaniment was not accepted. Intraoperative anesthesia, surgery, and allied health personnel team used PPE (personal protective equipment) appropriately. Early recovery procedures were preferred in the postoperative period, and early discharge was planned.

Demographic data of the included patients; Age, gravida, parity, body mass index (BMI), smoking, and comorbid diseases were recorded. The operation performed, type of anesthesia applied during the operations, blood transfusion status, operation and hospitalization times, intraoperative and postoperative complications were recorded. The data of the whole study group were compared by dividing them into two groups as positive and negative SARS-CoV-2 RT-PCR (Real-time Polymerase Chain Reaction) test results performed at any time preoperatively.

Statistical Analysis

SPSS 22.0 (IBM Corp, Armonk, NY, USA) program was used for statistical analysis. The mean, standard deviation, and percentage of the data were used. Non-parametric tests (Mann-Whitney U) were used to compare variables that did not fit a normal distribution, and parametric tests (Student's t-test) were used to compare variables with normal distribution. The Chi-square test was used to compare categorical data between groups. $p<0.05$ was considered statistically significant.

RESULTS

While 35 (5.5%) of the 632 patients included in the study had positive SARS-CoV-2 RT-PCR test results in the preoperative period (group 1), the preoperative SARS-CoV-2 RT-PCR test results of the remaining 597 (94.5%) patients were negative (group 2). It was determined that 35 patients underwent surgery at least 22 days and at most 330 days after the SARS-CoV-2 RT-PCR positive results in the preoperative period [Median 134 (22-330)].

The following parameters including age (50.26±8.27 vs 48.19±9.54, p=0.21); BMI 28.23±3.49 vs 28.12±4.53, p=0.89); gravida [3 (0–9) vs 3 (0–11), p=0.20)]; parity [3 (0–8) vs 2 (0–8) (p=0.10)]; number of smokers [5 patients (14.2%) vs 60 (10%) (p=0.42)]; the number of patients with comorbid disease [10 patients (28.6%) vs 154 patients (25.2%) (p=0.71)] were similar between two groups. Hypertension was the most common comorbid disease in both groups. (17.3% vs 13.4%). Demographic findings are shown in **Table 1**.

In the preoperative period, the most frequently performed operation in the first group was Total Abdominal Hysterectomy (TAH) performed in 8 (22.8%) patients, while the most frequently performed operation in the other group was TAH and Bilateral Salpingoopherectomy performed in 132 (22.1%) patients. There was no significant difference between the groups in terms of the surgeries performed (p=0.89). In the first group, 29 (82.9%) patients were operated on by general anesthesia and 6 (17.1%) patients by spinal anesthesia; in the other group, there were 500 (83.8%) patients who were administered general anesthesia and 97 (16.2%) patients who were administered spinal anesthesia.

There was no significant difference between the groups in terms of the type of anesthesia applied during the surgery (p=0.88). In the first group, blood products were not transfused during and after the operation; however, blood products were transfused in 55 (9.2%) patients in the other group, and a significant difference was found between the groups in terms of blood product transfusion requirement (p=0.05).

There was no difference in terms of mean hospitalization time [2.66±1.11 days vs. 2.95±2.14 days, (p=0.42)], mean operative time [1.92±0.58 vs 1.86±0.63 hours, (p=0.56)], number of patients with intraoperative-postoperative complications [1 patient (2.9%) vs 52 patients (8.3%), (p=0.24)] between the two groups. In the first group, the hematoma was observed in one patient in the postoperative follow-up, and no additional surgical intervention was performed on the patient. The most common complication in the other group was fever, which was observed in 14 (2.3%) patients. These patients were consulted to Infectious Diseases, and when the SARS-CoV-2 RT-PCR samples were negative, appropriate follow-up and treatment were planned. The intraoperative and postoperative findings of the patients are shown in **Table 2**.

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Figure 1. Flowchart of patients

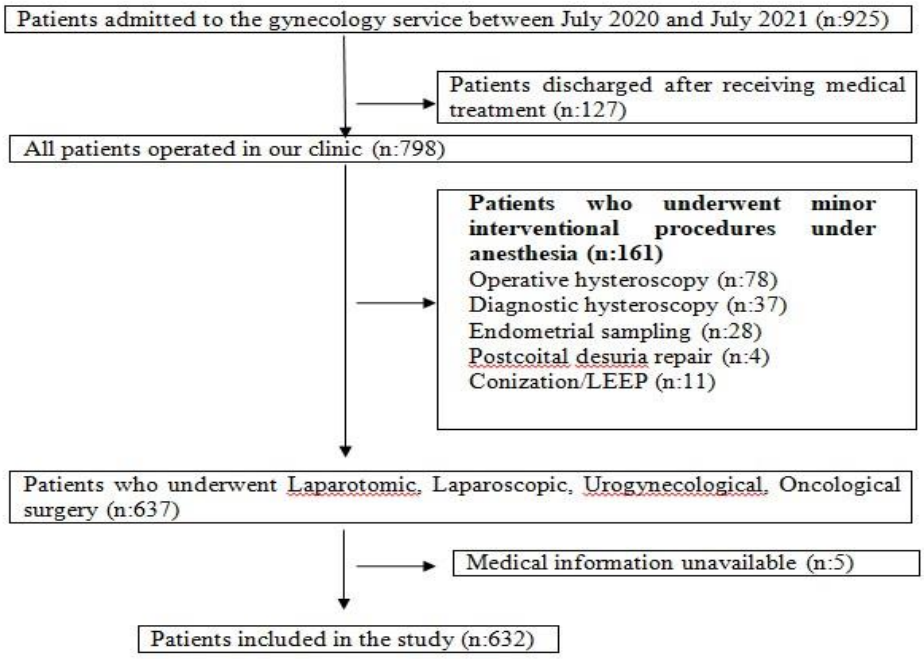

Table 1. Demographic data of the patients

Parameters	Total (n:632)	Grup 1 Preoperative RT PCR pozitivity (n:35)	Grup 2 Preoperative RT PCR negativity (n:597)	P
Age (mean±SD) (year)	48.1±9.48	50.26±8.27	48.19±9.54	0.21*
BMI (mean±SD) (kg/m^2)	28.13±4.48	28.23±3.49	28.12±4.53	0.89*
Gravida (mean±SD)	3.03±1.77	3.40±1.57	3.01±1.78	0.20*
Parity (mean±SD)	2.43±1.26	2.77±1.33	2.41±1.26	0.10*
Smoking (number, %)				0.42**
No	567 (89.7)	30 (85.8)	537 (90)	
Yes	65 (10.3)	5 (14.2)	60 (10)	
Additional Disease (number, %)				0.71**
no	468 (74.1)	25 (71.4)	443 (74.8)	
Asthma	12 (1.8)	-	12 (2.0)	
DM	16 (2.5)	2 (5.7)	14 (2.3)	
DM+ HT	29 (4.6)	1 (2.8)	28 (4.7)	
Epilepsy	1 (0.1)	-	1 (0.1)	
Fibromyalgia	2 (0.3)	-	2 (0.3)	
hypothyroidism	2 (0.3)	-	2 (0.3)	
HT	86 (13.6)	6 (17.3)	80 (13.4)	
CAD	3 (0.4)	-	3 (0.5)	
Cholelithless	2 (0.3)	-	2 (0.3)	
Breast Ca	1 (0.1)	-	1 (0.1)	
Migraine	2 (0.3)	-	2 (0.3)	
MS	1 (0.1)	-	1 (0.1)	
Panic attack	1 (0.1)	-	1 (0.1)	
Psoriasis	2 (0.3)	1 (2.8)	1 (0.1)	
RA	2 (0.3)	-	2 (0.3)	
Vertigo	2 (0.3)	-	2 (0.3)	

DM; Diabetes, HT; Hypertension, DM HT; Diabetes and Hypertension, CAD; Coronary Artery Disease, MS; Multiple Sclerosis, RA; Rheumatoid Arthritis
mean±SD; mean ±std deviation, * Student's t-test ** Chi-square test

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Table 2. Intraoperative and postoperative data of the patients

Parameters	Total (n:632)	Grup 1 Preoperative RT PCR pozitivity (n:35)	Grup 2 Preoperative RT PCR negativity (n:597)	p
Type of Surgery Performed, number, %				
Myomectomy	37 (5.9)	-	37 (6.2)	
Tubaovarian Abscess Surgery / Laparoscopy	6 (0.9)	-	6 (1)	
Tubaovarian Abscess Surgery/Laparotomy	5 (0.8)	-	5 (0.8)	
Unilateral Salpingooopherectomy/Laparotomy	29 (4.6)	3 (8.6)	26 (4.4)	
Ovarian detorsion/Laparotomy	3 (0.5)	-	3 (0.5)	
Sacrohysteropexy	3 (0.5)	1 (2.9)	2 (0.3)	
Anteroposterior repair+perineoplasty	30 (4.7)	2 (5.7)	28 (4.7)	
Total Abdominal Hysterectomy (TAH)	124 (19.7)	8 (22.8)	116 (19.4)	0.89*
TAH + Bilateral Salpingooopherectomy	139 (22)	7 (20)	132 (22.1)	
Vaginal Hysterectomy	59 (9.3)	2 (5.7)	57 (9.5)	
Total Laparoscopic Hysterectomy	72 (11.4)	6 (17.1)	66 (11.1)	
Unilateral Salpingoopherectomy/Laparoscopy	35 (5.5)	-	35 (5.9)	
Ovarian cystectomy/Laparoscopy	23 (3.6)	1 (2.9)	22 (3.7)	
Trans-vaginal-tape operation	26 (4.1)	3 (8.6)	23 (3.9)	
Staging surgery	34 (5.4)	2 (5.7)	32 (5.4)	
Bartholin Cyst Excision	7 (1.1)	-	7 (1.1)	
Anesthesia (number, %)				
General	529 (83.7)	29 (82.9)	500 (83.8)	0.88**
Spinal	103 (16.3)	6 (17.1)	97 (16.2)	
Transfusion (number, %)				
No	577 (91.2)	**35 (100)**	542 (90.8)	**0.05****
Yes	55 (8.8)	-	**55 (9.2)**	
Hospitalization time (days) (mean±SD)	2.93 (±2.10)	2.66 (±1.11)	2.95 (±2.14)	0.42*
Operation time (hours) (mean±SD)	1.86 (±0.63)	1.92 (±0.58)	1.86 (±0.63)	0.56*
Complications (number, %)				
No	581 (91.9)	34 (97.1)	547 (91.7)	0.24**
Postoperative complication				
Fever	14 (2.2)	-	14 (2.3)	
Dyspnea	12 (1.9)	-	12 (2)	
Cuff hematoma	4 (0.7)	-	4 (0.7)	
Hematoma	2 (0.3)	1 (2.9)	2 (0.3)	
Wound infection	10 (1.6)	-	9 (1.5)	
Ileus	3 (0.5)	-	3 (0.5)	
Intraoperative complication				
Bladder Injury	6 (0.9)	-	6 (1)	

DISCUSSION

In this study, which included a large number of patients in the field of gynecological surgery, the importance of previous SARS-CoV-2 infection in terms of surgical results and the risk of postoperative complications was investigated. There was no difference between the groups in terms of demographic characteristics and intraoperative and postoperative complications. Only the postoperative blood transfusion requirement was found to be higher in the group that had not had a previous SARS-COV-2 infection.

The COVID-19 epidemic, which has caused serious mortality and morbidity all over the world and in our country in the last two years, has led to many changes in the field of gynecological surgery, such as surgical operation indication, operation type, postoperative follow-up. Elective surgical operations were postponed with the first attack of the pandemic. Except for gynecological emergency operations such as ectopic pregnancy rupture and adnexal torsion, gynecological and oncological operations can be performed by forming a triage.

Therefore, it is seen that there are few studies on the effect of SARS-CoV-2 on general gynecological surgery in the first year of the pandemic (3,6). In this period, publications in the field of gynecological oncology were dominant (7, 8, 9, 10). Ayhan et al. reported the perioperative incidence of SARS-CoV-2 as 6.7% in patients who underwent major gynecological cancer surgery. While the need for intensive care and mechanical ventilation in patients with perioperative SARS-CoV-2 was 8.7% and 4.3%, respectively, the mortality rate was reported as 0% (7). In a multicenter study in which 200 patients who underwent gynecologic oncologic surgery were retrospectively evaluated by Dursun et al.; SARS-CoV-2 was not found in any of the patients preoperatively, PCR positivity was observed at a rate of 1% postoperatively, and the mortality rate was again found to be 0% (9). Comparing gynecological and oncological surgeries performed before and during the COVID-19 pandemic, Akıllı et al. found similar intraoperative and postoperative complication rates, but the previous SARS-CoV-2 history was not evaluated in the study (10).

Similar to the study of Akıllı et al., a study comparing oncological surgeries performed before and during the pandemic, both intraoperative and postoperative complication rates were found to be similar; only the duration of hospitalization was found to be shorter during the pandemic (5.6±3.3 vs. 8.5±9.3 days) (8).

Laparoscopic surgery has decreased significantly during the SARS-CoV-2 pandemic because the SARS-CoV-2 virus is not only an aerosol-transmitted infectious agent but also can be detected in body fluids and pneumoperitoneum and can even spread to the operating room during insufflation (11-14). In subsequent studies, it was reported that there was no vertical transmission in the urinary and genital system of women who contracted SARS-CoV-2 and in pregnant women (15, 16). Jones et al. investigated the SARS-CoV-2 antigen in peritoneal and vaginal fluid in preoperative SARS-CoV-2 PCR negative women who underwent laparotomic and laparoscopic surgery. Postoperative PCR positivity was detected in one patient (1%), and PCR-antibody (past infection) was detected in 4 patients (13%). No virus was found in any patient's peritoneal and vaginal samples, including the PCR positive patient. Thus, it was emphasized that laparoscopic surgeries can be performed safely during the pandemic (17). Kale et al. found the rate of postoperative SARS-CoV-2 development to be 0.39% in the first 14 days and 0.5% in the 15-30 days in 765 patients who underwent elective gynecological and oncological surgery. Toptas et al. published the peroperative COVID-19 development rate as 1.4% (4/276) in the gynecology clinic in the first year of the pandemic, and only 1.8% of healthcare workers were found to be positive for COVID-19 in this process (18). The most comprehensive COVID study in this area is a multicenter study involving 3423 patients. In the study, the effects of the previous SARS-CoV-2, peroperative and postoperative SARS-CoV-2 exposure on complications were examined, and 43 patients (1.3%) with a positive history of SARS-CoV-2 and 39 patients (1.1%) who developed postoperative SARS-CoV-2 was detected. The rate of perioperative complications was found to be similar between patients with and without a history of SARS-CoV-2 (3). In our single-center study with a very large number of patients, patients with a history of SARS-CoV-2 were compared with patients who did not have SARS-CoV-2 before, and complication rates were found to be similar to the literature. Only the need for blood transfusion was found to be significantly higher in the group that did not have SARS-CoV-2. The reason for this increase may be the relatively few patients with a positive history of SARS-CoV-2 and the fact that patients known to have had SARS-CoV-2 were evaluated and treated before. In the light of these findings, it can be said that elective surgery does not have a serious effect on the transmission of SARS-CoV-2 and can be performed safely.

The study's limitations are that the hospital is not a pandemic hospital and the study is a retrospective study.

CONCLUSION

We think that having a SARS-CoV-2 infection does not have a significant effect on the results of gynecological surgeries in terms of complications. Considering that its impact will continue in the coming years, we think that elective gynecological surgical operations should not be postponed.

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Ethical approval: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by Local Ethical Committee (21.09.2021, 11/37) and the Ministry of Health Scientific Research Platform. All procedures performed in studies with human participants met the ethical standards of the Institutional Research Commission and the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards.

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