

Evaluation of the Outcome of Surgeries in Patients with Covid-19 in the Obstetrics Ward of Motahhari Hospital in Urmia, Iran, From March 2020 To March 2021

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Article Info

 [10.30699/jogcr.7.3.192](https://doi.org/10.30699/jogcr.7.3.192)

Received: 2021/07/20;

Accepted: 2021/08/07;

Published Online: 12 Jan 2022;

Use your device to scan and read the article online



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ABSTRACT

Background & Objective: At the beginning of the pandemic COVID-19, most health facilities suspended non-emergency surgeries to ensure emergency care capacity. Due to the need for surgery, and insufficient information about the complications of surgery in these patients, the present study aimed to investigate the outcome of surgeries in patients with COVID-19 in Motahhari Hospital in Urmia.

Materials & Methods: This cross-sectional study was performed on 112 patients diagnosed with COVID-19 who underwent surgery. A Checklist including the following data was extracted from the patients' medical records, symptoms, laboratory tests, and any complications related to surgery up to one month after separate surgery.

Results: A total of 6.3% of patients had limited complications due to the incision site after the surgery. The results did not show a significant relationship between age, type of anesthesia, and the type of operation with complications. However, the highest percentage of complications was seen in less than 40 years and emergency surgeries. It was found that patients with a history of diabetes had the highest rate of complications (57.1%), although there was no significant relationship between the underlying disease and complications ($P = 0.40$). In our study, none of the patients experienced complications such as vascular thrombosis or embolism, respiratory failure, and heart failure, or the need for cardiopulmonary resuscitation. Overall, 17.9% of patients needed ICU admission (mean 2.16 ± 1.50 days), indicating a higher ICU hospitalization demand. Also, in terms of in-ward hospitalization, patients with complications had a longer hospital stay than uncomplicated patients (7.85 ± 3.36 days) vs. (5.13 ± 1.66), which was not statistically significant ($P = 0.88$).

Conclusion: The results show that surgery is not directly associated with an increased risk of mortality and complications in patients with COVID-19. On the other hand, Underlying diseases, age, and the urgency of surgery are associated with a higher risk for complications than COVID-19.

Keywords: COVID-19, Mortality, Complications, Surgery



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Introduction

In December 2019, the outbreak of COVID-19 (new type of coronavirus, 2019-nCoV) caused by the coronavirus SARS 2 (SARS-CoV-2) occurred in Wuhan, China (1-3). On January 31st, 2020, the World Health Organization (WHO) declared the pandemic as a world health emergency (4). The most common manifestations of COVID-19 include fever, dry cough, shortness of breath, fatigue, and chest radiographic evidence (5, 6). Despite recent evidence of known clinical respiratory manifestations, sometimes the disease is manifested by unusual symptoms in the gastrointestinal tract, heart, skin, and central nervous system, which can cause several complications,

including acute respiratory distress syndrome [ARDS], arrhythmia, shock, acute heart injury, secondary infection, acute kidney injury, and in severe cases death (7).

Rapid identification and isolation of cases, quarantine of close contacts, and active monitoring of other communications have effectively suppressed the outbreak's expansion and have implications for other countries experiencing outbreaks (8, 9).

The World Health Organization's status report shows that the United States ranks first with the highest number of cases, hospitalizations, and deaths, and the European

region ranks second (10). It is estimated that the number may even be much more than the reported figures in some areas. The challenge of COVID-19 has been proven worldwide due to its lack of proven treatment and the complexity of its transmission. All health services worldwide have made significant changes to their management rules to address the challenges posed by COVID-19. These changes aim to reduce the prevalence and complications of the disease and reduce contact to minimize disease transmission (11).

Epidemiological studies have shown that in patients with underlying diseases (including asthma, tuberculosis, diabetes mellitus, hypertension, kidney disease, liver disease, and heart disease), smoking and substance use history, male gender and age older than 60 years, the probability of death or adverse consequences is more common (12). Surgery during the virus outbreak was challenging for patients with COVID-19, health care workers, and non-COVID-19 patients (13). The outcome of patients with coronavirus infection who have undergone surgery is highly variable. Some studies have shown that postoperative mortality and complications are very high in patients with COVID-19 (14).

However, some studies have not been able to identify significant complications among patients with COVID-19 who have undergone surgery (1, 15-23). Health systems addressed two major issues with this pandemic in surgery. First, to postpone many non-emergency surgical procedures to reduce the burden on the system, which can slow transmission, reduce potential surgical complications in patients, and conserve resources, including health professionals, medications, beds, and ventilators. Second, to perform intensive care and follow-up in patients requiring emergency surgery. This has led to a significant reduction in the burden of surgical procedures (16).

In the obstetrics and gynecology ward, surgeries were divided into three categories: emergency, semi-emergency, and non-emergency (17). Emergency surgery is a surgery in which the existing conditions pose an acute threat to life, and surgery must be performed without delay (such as an emergency cesarean section). Semi-emergency conditions are the ones that, although not immediately life-threatening, if they are delayed, can cause severe pain or dysfunction or more damage (like most oncology surgeries) that surgery should not be delayed. Non-emergency surgery is planned for conditions unlikely to cause dysfunction or injury (such as reconstructive surgery).

In the obstetrics wards, as in other ones, patients with COVID-19 sometimes require emergency surgery. Also, studies have shown that a small number of asymptomatic patients during the latent period have undergone surgery. The actual effect of postoperative outcomes in patients with COVID-19 remains unknown. A 2020 study by David Phelps et al., which reviewed 14 related articles on surgical outcome in patients with COVID-19, concluded that possible risk

factors were associated with an increased risk of mortality included males, age 70 years, and underlying comorbidities. But in these studies, the possibility of increased complications and mortality after surgery was not seen in patients with COVID-19 (18).

Due to the high prevalence of the disease, the need for surgery, and insufficient information about the complications of surgery in these patients, this study aimed to investigate the outcome of surgeries in patients with COVID-19 in the obstetrics ward, Motahhari Hospital in Urmia from March 2020 to March 2021.

Materials and Methods

This cross-sectional study was performed after obtaining approval from the University Medical Ethics Committee (with ethics ID IR.UMSU.REC.1399.327) from March 2020 to March 2021 in Motahhari Hospital in the gynecology and obstetrics department have undergone surgery. The study was done on all patients who had a COVID-19 nasopharyngeal swab laboratory test, and a positive PCR test, or clinical manifestations and laboratory signs and positive imaging in favor of COVID-19 and have been approved by an infectious and internal medicine specialist.

A total of 112 patients were included in the study. From the records of these patients in a completely confidential manner and in accordance with the principle of patient confidentiality (and if necessary by a phone conversation), a checklist that included the following information was extracted and recorded : demographic information (such as age, level of education, economic level, occupation, and marital status), medical history background (such as blood pressure, diabetes, lung problems, heart disease and kidney disease), history of medication use and type of medication used, history of hospitalization or death of a family member due to COVID-19, the cause of hospitalization and early symptoms at the time of arrival to the hospital, cause of surgery (type of surgery, emergency or non-emergency), duration of surgery, type of anesthesia, clinical condition of the patient after surgery (such as vital signs, blood oxygen level, exacerbation of symptoms and course of the disease) , laboratory data (such as CBC-LDH-CRP) before and after surgery, assessment of oxygen demand and the need for endotracheal intubation, initiation of drug treatment and type of treatment and duration of drug administration, duration of hospitalization and the need for hospitalization in the intensive care unit, and any complications related to surgery up to one month after surgery.

Data analysis was performed using SPSS software version 22, and descriptive statistics, nonparametric statistical analysis, and descriptive statistics were used to summarize the data. Nonparametric tests such as Mann-Whitney and Spearman correlation coefficients were used. The significance level was considered as $p = 0.05$.

Results

This is a cross-sectional study among all patients who had a COVID-19 nasopharyngeal swab laboratory test and a positive PCR test, or who had clinical manifestations, laboratory signs, and positive imaging in favor of COVID-19 that have been approved by Infectious and internal medicine specialists and have undergone surgery in the obstetrics and gynecology ward of Motahhari Hospital from March 2020 to March 2021. A total of 112 patients were included in the study. The mean age was 30.27 ± 9.54 years. Of this number, 100 patients (89.28%) had a positive test for PCR and 12 (10.72%) had positive chest imaging and laboratory results confirmed by internal medicine and infectious disease specialist with a diagnosis of COVID-19. Out of 112 patients, 47 (42%) had the underlying disease (32 with diabetes, 10 with high blood pressure, 4 with hypothyroidism and 1 with a history of seizures) and 65 (58%) had no underlying disease.

Among the patients, 46 (41.1%) had a history of surgery (40 cases of cesarean section, 5 cases of diagnostic or therapeutic curettage, and 1 case of abdominal myomectomy), and 66 patients (58.9%) had no history of surgery. A history of drug use due to underlying disease was observed in 41 patients (36.6%) out of 47 patients with a history of the disease.

Out of 112 surgeries, 84 cases (75%) were cesarean section, and 28 cases (25%) were non-cesarean section (7 cases of hysterectomy laparotomy, 2 cases of cystectomy laparotomy, 2 cases of Laparotomy Salpingectomy, 1 case of myomectomy laparotomy, 13 cases of evacuation curettage, 1 case of diagnostic curettage, 1 case of mole suction, and 1 case of Wertheim). Of these, 98 cases (87.5%) underwent emergency surgery and 14 cases (12.5%) had non-emergency surgery.

The reason for hospitalization for surgery is shown in [Table 1](#). The most common causes were labor pain in 58 patients (51.8%), bleeding in the first trimester and Incomplete abortion in 13 patients (11.6%), bleeding in the third trimester in 9 patients (8%), and fever and labor pain in 7 patients (6.2%).

Common causes of surgery in this study were 40 patients (35.7%) due to labor pain and previous cesarean section, 25 patients (22.3%) due to fetal meconium excretion, 13 patients (11.6%) bleeding in the first trimester, and abortion.

Comparing the initial symptoms before/after surgery and upon arrival at the hospital are shown in [table 3](#). Also, [Table 4](#) shows Compared results of the laboratory findings before/after surgery.

Table 1. The distribution of absolute and relative frequency of the hospitalization caused in women infected by COVID-19 at the beginning of hospitalization for surgery

Cause of hospitalization	Relative frequency	Absolute frequency
labor pain	52.2	58
Rupture of the amniotic sac and labor	2.7	3
Fever + labor pain	6.3	7
Third trimester bleeding + labor pain	8.1	9
Headache	1.8	2
Headache + high blood pressure	1.8	2
high blood pressure	0.9	1
Fever and cough	0.9	1
Shortness of breath	0.9	1
Molar pregnancy	0.9	1
Pregnancy trophoblastic neoplasia	0.9	1
Cervical cancer and abnormal uterine bleeding	0.9	1
Abnormal uterine bleeding	4.5	5
Abdominal mass	0.9	1
Uterine adenocarcinoma	0.9	1
Abdominal pain with the possibility of ectopic pregnancy	1.8	2
First trimester bleeding + incomplete abortion	11.7	13
Uterine myoma	2.7	3
Total	100	112

Table 2. Distribution of absolute and relative frequency of surgical cause of women with COVID-19

Cause of surgery	Relative frequency	Absolute frequency
Labor pain, History of cesarean section	36	40
Meconium	22.5	25
Fetal heart drop + meconium	0.9	1
Fetal heart drop	2.7	3
Preeclampsia	4.5	5
Placental abruption	8.1	9
Fetal macrosomia	0.9	1
Myoma	2.7	3
First trimester bleeding and incomplete abortion	11.7	13
Abnormal uterine bleeding	5.4	6
Mole	0.9	1
Abdominal pain and ectopic pregnancy	1.8	2
Rupture of the uterus	0.9	1
Uterine adenocarcinoma	0.9	1
Abdominal mass	0.9	1
Total	100	112

Table 3. Comparison of vital signs findings before surgery and after surgery in women with COVID-19

Variable	Average(mean) difference	After surgery	Before surgery	p
bps	-1.04±0.91	103.50±13.76	109.54±17.52	0.25
bpa	1.07±0.58	69.07±11	85.59±11.69	0.58
PR	1.79±0.87	92.70±10.61	91.79±9.90	0.04
RR	3±0.91	17.87±2.18	26.33±3.17	0.004
BT	0.79±0.14	37.79±0.61	36.71±1.37	0.0001
Sat. O2	2.76±0.61	96.20±2.97	96.1±3.28	0.02

Table 4. Comparison of laboratory findings before surgery and after surgery in women with COVID-19

Variable	Average(mean) difference	After surgery	Before surgery	p
WBC 10 ³	93±0.98	11.52±9.75	10.59±5.39	0.34
LYm %	0.74±0.92	82.17±10.77	65.18±11.38	0.42
Hb	1.85±0.85	10.16±0.49	12.01±0.89	0.03
LDH	94.18±18.1	508.75±202.86	490.65±214.3	0.34
PLT 10 ³	25.21±11	227.02±124.11	248.27±116.25	0.05
Neu%	0.97±0.11	70.25±11.78	70.37±11.25	0.91

Out of 112 patients with COVID-19, only one patient (0.9%) required respiratory intubation after cesarean section (for one day).

Out of 112 operated cases according to the infectious and internal medicine service visit, 32 patients (28.6%) needed to start medication treatment, and 80 patients (71.4%) did not need to take medications.

Of all cases, 20 patients (17.9%) needed to be admitted to the ICU, and 92 patients (82.1%) did not need ICU admission and stayed in the ward. The mean duration of hospitalization in patients with compli-

cations and admitted in ICU was 2.16 ±1.50 days for 19 patients. In just one case, it was 7 days, and none of them had a complication after surgery.

Out of 112 patients with COVID-19 who underwent surgery, 7 (6.3%) developed postoperative complications (cases (4.5%) developed skin infection at the site of cesarean section wall, 1 case (0.9%) with fascia opening after cesarean section, and 1 case (0.9%) with subcutaneous hematoma at the incision site of hysterectomy), and 105 patients (93.8%) had no complications related to surgery up to one-month follow-up after the surgery.

Of the 7 patients with complications, all 7 were in the age group less than 40 years. According to Fisher's Exact Test, there is no significant relationship between postoperative complication and age group in patients with COVID-19 ($P = 0.41$).

Of 7 patients with complications, 6 patients (85.7%) underwent spinal anesthesia, and one (14.3%) underwent general anesthesia. According to the Chi-square test, there is no significant relationship between

the complication after surgery and the type of anesthesia in patients with COVID-19 ($P = 0.94$).

Out of 7 patients with postoperative complications, 6 had emergency surgery, and 1 had non-emergency surgery. According to Fisher's Exact Test, there is no significant relationship between the complication and the type of operation in patients with COVID-19 ($P = 0.38$).

Table 5. Relationship between postoperative complications in women with COVID-19 after surgery by type of operation

Complication	Type of operation		Total
	Elective	Urgent	
Positive	1 (14%)	6 (86%)	7 (100%)
Negative	13 (12.4%)	92 (87.6%)	105 (100%)
Total	14 (12.5%)	98 (87.5%)	112 (100%)

Out of 7 patients who had postoperative complications, 1 (14.3%) had a family history of hospitalization because of COVID-19 and 6 (85.7%) had no family history of COVID-19. According to the statistical test of Chi-square, there is no significant relationship between family history of COVID-19 hospitalization and postoperative complications ($P = 0.36$).

Out of 7 patients with postoperative complications, 4 (57.1%) had an underlying disease (all four had a history of diabetes) and 3 (42.9%) had no underlying disease. According to the Chi-square test, there is no significant relationship between the underlying disease and complications after surgery ($P = 0.40$).

Of 7 patients with complications, 3 (42.9%) had a history of drug use because of an underlying disease (all three were treated with insulin) and 4 (57.1%) had no medication uptake. According to the Chi-square test, there is no significant relationship between drug use and complications after surgery ($P = 0.74$).

The mean duration of hospitalization in patients with complication and need for ICU admission was as below; one patient was admitted to ICU for 7 days (fascia opening after cesarean section) and the other 19 patients on average needed 2.16 ± 1.50 days of ICU admission, which was not statistically significant according to Mann-Whitney nonparametric test ($P = 0.1$). Also, in terms of admission in the ward, patients who had complications after surgery had a longer hospital stay than patients without complications, 7.85 ± 3.36 days vs. 5.13 ± 1.66 days; which was not statistically significant Mann-Whitney nonparametric test. ($P = 0.88$).

In this study, none of the patients required cardiopulmonary resuscitation after surgery. Also, none of the patients experienced complications such as vascular thrombosis or embolism, respiratory failure, renal failure and heart failure after surgery. In this study, there was no case of patient mortality in one-month follow-up after surgery.

Discussion

Due to the high prevalence of COVID-19 in the community and the possibility of needing surgery in this group of patients and the impossibility of delaying in emergency surgeries, as well as the chance for not diagnosing the disease before surgery and insufficient information about complications of surgery in patients with COVID-19, This study aimed to evaluate the outcome of surgeries in patients with COVID-19. This study was done in the obstetrics and gynecology ward of Motahhari Hospital in Urmia from March 2020 to March 2021. A total of 112 women in need of surgery with a mean age of 30.27 ± 9.54 years were included in the study. Of these, 85 patients (75.8%) underwent emergency surgery and 12 patients (24.2%) underwent non-emergency surgery.

Also, 84 (75%) underwent cesarean section and 28 (25%) underwent non-cesarean section surgeries. In our study, 17.9% of the operated patients needed to be admitted to the ICU and 28.6% needed to start drug treatment. In the study of Knisely et al., the admission rate in the intensive care unit was 36.1% in patients with COVID_19 in the study group compared to the control group with 16.4%, with a significant difference between the two groups (13). In the study by Semangn et al., the rate of postoperative ICU admission was higher among COVID-19 patients (14). The results of these studies are in line with the findings of our study that patients with COVID-19 require longer hospital stays in the intensive care unit.

In our study, 7 patients (6.3%) had postoperative complications after surgery, limited to the surgical incision site. The findings of our study did not show a significant relationship between age groups, type of anesthesia, and type of surgery with postoperative complications. However, the highest percentage of postoperative complications was in the age group less than 40 years and with emergency surgery. This study found that patients with a history of diabetes had the

highest percentage of postoperative complications (57.1%), although there was no significant relationship between the underlying disease and postoperative complications. In the study of Knisely et al., the serious complication after surgery in patients with COVID-19 was 58% and the postoperative mortality rate was 17 % (20). In our study, these complications did not occur and the complications were limited to the surgical incision site.

In the study by Shaoqing Lei et al., out of 34 patients, 15 patients needed intensive care unit (ICU) during the illness and 7 patients died after admission to the ICU (21). In comparison, patients admitted to the ICU were older, most of whom had an underlying disease or underwent more complex and lengthy surgery. In general, the mortality rate was not related to gender and was mostly related to risk factors such as underlying diseases, which is partially consistent with the results of our study, so that women with underlying diseases had more complications after surgery.

In a study conducted by Himi Bizkurt et al., out of 25 patients, 20 were discharged without any complications, but 5 patients had complications. One person was required to be admitted to the intensive care unit and needed a ventilator, two died, and two developed exacerbations of pulmonary symptoms such as shortness of breath and cough. These results are inconsistent with the findings of our study on postoperative complications. In our study, patients who developed complications after surgery required, on average, longer hospital stays in the intensive care unit as well as the ward compared to patients without complications, so that the average length of hospitalization in the ICU of a person with postoperative complications was 7 days for one patient and the other 19 uncomplicated patients, the mean was 2.16 ± 1.50 days.

Also, in terms of hospitalization in patients with postoperative complications, the duration of hospitalization was 7.85 ± 3.36 days and in uncomplicated patients, the mean was 5.13 ± 1.66 days.

In the study of Semangn et al., the duration of hospitalization and the rate of admission to the postoperative ICU were significantly higher in the study group than in the control group (20). These findings are consistent with the results of our study that patients with COVID-19 had a longer postoperative hospitalization in the intensive care unit and ward.

In the Babar Kayani et al. study, the mean hospital stay in patients with COVID-19 was 13.8 days and in patients with negative COVID-19 was 6.7 days (1). This study

was also consistent with the results of our study. A study by Knisely et al. and the other one by Shaoqing Lei et al. reported mortality following surgery in a group of patients with COVID-19 (19, 21). There was no postoperative mortality in patients in our study.

Conclusion

In this study, 6.3% of COVID-19 patients who underwent surgery had postoperative complications, which were limited to the surgical incision site. The results did not show a significant relationship between age group, type of anesthesia, and type of operation with postoperative complication. However, the highest percentage of postoperative complication was seen in the age group less than 40 years and emergency surgery. This study found that patients with a history of diabetes had the highest percentage of postoperative complications (57.1%), although there was no significant relationship between the underlying disease and postoperative complications ($P = 0.40$).

In our study, none of the patients experienced complications such as vascular thrombosis or embolism, respiratory failure, renal failure, and heart failure, or the need for cardiopulmonary resuscitation after surgery. 17.9% of patients needed ICU hospitalization after surgery (mean 2.16 ± 1.50 days), which indicated a higher need for ICU hospitalization. Also, in terms of hospitalization in the ward, patients who had complications after surgery had a longer hospital stay than patients without complications (7.85 ± 3.36 days vs. 5.13 ± 1.66).

In this study, patients with COVID-19 who underwent emergency surgery were more likely to have postoperative complications. The study results showed that surgery was not directly associated with an increased risk of mortality and postoperative complications in patients with COVID-19; the underlying disease, age, and urgency of the surgery are associated with a higher risk of postoperative complications compared to COVID-19.

Acknowledgments

The authors thank all the obstetrics and gynecology department of Motahhari Hospital, Urmia, for their help and suggestions.

Conflict of Interest

The authors do not declare it.

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How to Cite This Article:

Ayatollahi H, Ghasemzadeh S, Ghasemiyan Dizaj Mehr S. Evaluation of The Outcome of Surgeries In Patients With Covid-19 in The Obstetrics Ward of Motahhari Hospital in Urmia, Iran, From March 2020 To March 2021. *J Obstet Gynecol Cancer Res*. 2022; 7(3) :192-199.

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