

Risk of Postoperative Complications After Major Elective Surgery in Active or Resolved COVID-19

Yousaf Jan, Hussain M*, Neelma, Lalley G and Tahir I

Department of General Surgery, Hayatabad Medical Complex Peshawar, Pakistan

*Corresponding author:

Musarrat Hussain,
Department of General Surgery, Hayatabad
Medical Complex Peshawar, Pakistan,
Tel: +923339212173;
E-mail: drmusarrat9740@gmail.com

Received: 03 Feb 2022

Accepted: 15 Feb 2022

Published: 21 Feb 2022

J Short Name: AJSCCR

Copyright:

©2022 Hussain M. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and build upon your work non-commercially.

Citation:

Hussain M, Risk of Postoperative Complications After Major Elective Surgery in Active or Resolved COVID-19. *Ame J Surg Clin Case Rep.* 2022; 4(6): 1-5

Keywords:

DVT; Postoperative pulmonary embolism (PE); SARS-Cov-2

1. Abstract

1.1. Objective: To determine the affiliation among the timing of surgical procedure relative to the improvement of Covid-19 and the dangers of postoperative complications.

1.2. Background: It is unknown whether or not patients who recovered from Covid-19 after which underwent a prime elective operation have an increased danger of developing postoperative complications.

1.3. Material and Methods: The risk of postoperative complications for patients with Covid-19 research process, 18 primary forms of optionally available operations with inside the Covid-19 Research Database was evaluated the use of multivariable logistic regression. Patients were grouped through time of surgical procedure relative to Covid-19 infection i.e.

1. Pre-Covid-19: Surgical procedure performed earlier than January 2020
2. Peri-Covid-19: 0 to 4 weeks after Covid-19 infection
3. Early post-Covid-19: 4 to 8 weeks after infection
4. Late post-Covid-19: 8 weeks after infection.

1.4. Results: A total of 6479 patients who met study criteria were included in the study. Out of 6479 patients 3021 (46.6%) Peri-Covid-19 had an elevated risk of developing postoperative pneumonia in 44(1.4%) patients, respiratory failure in 69(2%), pulmonary embolism in 23(0.5%), sepsis in 35(1.1%), arrhythmia in 59(1.9%), renal failure in 75 (2.4%), UTI in 75(2.4%), DVT in 40(1.3%) patient's respectively when compared to pre-Covid-19 patients. Early post-Covid-19 patients had an increased risk of developing postoperative pneumonia in 16 (2.9%), respiratory failure in 15(2.7%), pulmonary embolism in 7(1.2%), sepsis in

13(2.3%), arrhythmia in 15(2.7%), renal failure in 13(2.3%), UTI in 17(3.1%), DVT in 10(1.8%) patients respectively when compared to pre-Covid-19 patients. Late post-Covid-19 patients did not have an increased risk of postoperative complications when compared to pre-Covid-19 patients.

1.5. Conclusions: Major, elective surgery 0 to 04 weeks after Covid-19 infection is related to an improved risk of postoperative complications. Surgery achieved four to eight weeks after Covid-19 infection remains related to an improved risk of postoperative pneumonia, while surgical treatment eight weeks after Covid-19 analysis is not related to improved complications.

2. Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-Cov-2) affected over 1.4 million people in Pakistan, amongst which about 1.2 million (98%) people had recovered by December 2021 [1, 2]. Many of these patients experienced pneumonia respiratory failure arrhythmias and thrombotic complications such as Pulmonary Embolism (PE) and Deep Vein Thrombosis (DVT) during active Covid-19 infection [3-5]. After these complications, more than 60% of patients may continue to have chronic symptoms [6-8]. It is unknown if people who have recovered from Covid-19 may safely undertake an elective major procedure. During the perioperative period, studies of elective or emergent operations on Covid-19 patients report pulmonary complications ranging from 24.2% to 51.2% [9, 10]. Thromboembolic events ranging from 6.8% to 13.4% shock ranging from 11% to 14%, and 30-day mortality ranging from 9.1% to 32.6% [11-13]. However, there is a scarcity of evidence on the risks of postoperative problems following Covid-19 recovery surgery.

The goal of this study is to look at the relationship between the

time of surgery and the development of (SARS-COV-2), as well as the risks of postoperative pulmonary problems and other significant issues.

3. Material and Methods

This is a retrospective study carried out at General Surgery Department of Hayatabad Medical Complex Peshawar from 1st January 2020 to 31st Dec 2021. After taking approval of hospital ethical committee / Institutional Review Board (IRB) patients were categorized into four groups based on the time of surgery relative to the Covid-19 diagnosis date. The “Peri-Covid-19” group was defined as surgery performed 0 to 4 weeks after the Covid-19 diagnosis date. These are patients with perioperative Covid-19 infection. The “Early post-Covid-19” group was composed of patients who underwent surgery between 4 and 8 weeks after the Covid-19 diagnosis date. “Late post-Covid-19” was defined as surgery performed 8 weeks or greater after the Covid-19 diagnosis date. For our control group, we selected patients who underwent surgery at least 30 days before their Covid-19 diagnosis date and had surgery between the dates of July 2019 to Dec 2019 “Pre-Covid-19” group. This group was selected as our reference group because they had not been infected with Covid-19 before surgery and any 30-day postoperative complication they developed could not be attributed to complications of Covid-19 infection. For this “pre-Covid-19” control group, we did not select patients who never developed Covid-19 because patients who never developed Covid-19 during the pandemic may have a different racial, ethnic, socio-economic, and geographic background from patients in the peri-Covid-19, early post-Covid-19 and late post-Covid-19 [14]. Informed consent was taken from all patients included in the study. Data was collected on preformed standardized proforma and was saved in ward computer.

Sample technique: Non probability sampling technique

Inclusion criteria: All patients who were operated on elective surgery lists.

Exclusion criteria:

- Patients operated on emergency lists
- Patients who underwent multiple operations
- HIV positive

4. Statistical Analysis

Patient characteristics and unadjusted outcomes were assessed using chi-square test for categorical variables and paired sample T-test was used for appropriate and continuous variables to compare the variable among the groups. P value ≤ 0.05 was considered statistically significant. Statistical analysis was performed using SPSS software version 27.0 for Windows.

5. Results

Total of 6479 patients who met study criteria were included in the study. Patients were distributed into four groups (fig 1).

1. Pre-Covid-19: Surgical procedure performed earlier than Dec 2019. (Before their Covid-19 diagnosis)
2. Peri-Covid-19: 0 to 4 weeks after Covid-19 infection. (Patients underwent surgery 0 days to 4 weeks after their Covid-19 diagnosis).
3. Early post-Covid-19: 4 to 8 weeks after infection (Patients underwent surgery 4 to 8 weeks after their Covid-19 diagnosis).
4. Late post-Covid-19: 8 weeks after infection. (Patients underwent surgery 8 weeks after their Covid-19 diagnosis) Figure 1

In “pre-Covid-19” 3021 (46.6%) patients underwent surgery before Dec 2019, at least 30 days before being diagnosed with Covid-19, “Peri-Covid-19” includes 980(15.1%) patients who underwent surgery 0 to 4 weeks after their Covid-19 diagnosis (peri-Covid-19), 545 (8.4%) patients underwent surgery 4 to 8 weeks after their Covid-19 diagnosis date (early post-Covid-19) and 1933 (29.8%) patients underwent surgery 8 weeks or more after their Covid-19 diagnosis date (late post-Covid-19).

“Pre-Covid-19” patients had an elevated risk of developing postoperative pneumonia 44(1.4%), respiratory failure 69(2%), pulmonary embolism 23(0.5%), sepsis 35(1.1%), arrhythmia 59(1.9%), renal failure 75 (2.4%), UTI 75(2.4%) and DVT in 40(1.3%) patients.

“Peri-Covid-19” patients had a significantly higher risk of developing postoperative pneumonia in 61(6.1%) patients, respiratory failure in 60(6.1%), pulmonary embolism in 18(1.8%), sepsis in 39(3.9%), arrhythmia in 17(1.7%), renal failure 39(3.9%), UTI in (26(2.6%) and deep vein thrombosis (DVT) in 20(2.0%) patients.

“Early post-Covid-19” patients had an increased risk of developing postoperative pneumonia 16 (2.9%), respiratory failure 15(2.7%), pulmonary embolism 7(1.2%), sepsis 13(2.3%), arrhythmia 15(2.7%), renal failure 13(2.3%), UTI 17(3.1%) and DVT in 10(1.8%) patients respectively.

For most complications, early post-Covid-19 patients did not have a higher risk when compared to pre-Covid-19 patients, however early post-Covid-19 patients did have a higher risk of developing postoperative pneumonia 16(2.9%). Notably late post-Covid-19 patients did not have a higher risk of developing postoperative complications when compared to patients in the pre-Covid-19 group.

Postoperative outcomes and risk of different complications for each time period of surgery for each group are detailed in Table 1.

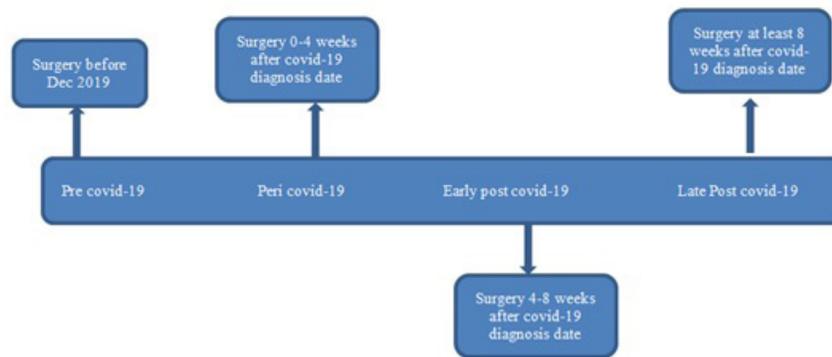


Figure 1: Surgery timing categories relative to Covid-19 diagnosis date.

Table 1: Postoperative outcome and risk of different complications

Outcomes	Pre-covid-19 (n=3021)	Peri-covid-19 (n=980)	Early post-covid-19 (n=545)	Late post-covid-19 (n=1933)	P Value
Post op pneumonia	44 (1.4%)	61 (6.1%)	16 (2.9%)	26 (1.2%)	<0.002
Post op respiratory failure	69 (2.0%)	60 (6.1%)	15 (2.7%)	50 (2.5%)	<0.001
Postop pulmonary embolism	23 (0.5%)	18 (1.8%)	7 (1.2%)	20 (1.0%)	0.041
Post op sepsis	35 (1.1%)	39 (3.9%)	13 (2.3%)	22 (1.1%)	<0.002
Post op arrhythmia	59 (1.9%)	17 (1.7%)	15 (2.7%)	40 (2.0%)	0.51
Post op renal failure	75 (2.4%)	39 (3.9%)	13 (2.3%)	60 (3.1%)	0.019
Post op urinary tract infection	75 (2.4%)	26 (2.6%)	17 (3.1%)	50 (2.5%)	0.087
Post op deep vein thrombosis	40 (1.3%)	20 (2.0%)	10 (1.8%)	36 (1.8%)	0.6
Any postop complication	292 (9.6%)	141 (14.3%)	62 (11.3%)	193 (9.9%)	<0.001

6. Discussion

We investigated the effect of surgery timing in relation to Covid-19 infection on the probability of developing postoperative complications in 6479 patients undergoing 18 different types of common, major, elective procedures. Patients who underwent surgery at the time of a Covid-19 infection had a higher chance of having postoperative pneumonia, respiratory failure, PE, and sepsis, according to this study. Surgery 4 to 8 weeks after Covid-19 infection was still related with a higher risk of postoperative pneumonia, but surgery 8 weeks after infection was not associated with an increased risk of postoperative problems [15]. It is worth noting that the great majority of patients in the research sample had mild to moderate Covid-19.

The number of patients who have recovered from Covid-19 infection yet require major surgery will continue to rise in the coming months. Previous research has indicated that people who have perioperative Covid-19 infection and have surgery have a higher risk of postoperative complications and 30-days mortality [16-17]. However, only a few studies have been conducted to investigate the influence of the timing of elective major surgery in relation to Covid-19 infection on the risk of postoperative complications. So far, only two studies have been conducted: one in Brazil and one multicenter study of predominantly European patients assessing postoperative risk following recovery after Covid-19 [18]. Baiocchi and colleagues studied the postoperative results of 49 Brazilian patients who had postponed elective surgery following a confirmed preoperative diagnosis of asymptomatic Covid-19. The authors found that asymptomatic Covid-19 patients who un-

derwent surgery delayed by a median of 25 days did not have an increased risk of postoperative complications when compared to patients with a negative preoperative Covid-19 test. The Covid-19 Surg Collaborative evaluated 3127 predominately European patients from 1674 hospitals and 116 countries who had a Covid-19 diagnosis and then underwent surgery after different time points.

It is noteworthy that Baiocchi et al and the Covid-19 Surg Collaborative included major and minor procedures in their analyses, while the COVID-19 Surg Collaborative additionally included urgent and trauma surgeries [19]. We examined only elective major surgeries in this study and did not include minor procedures or emergency operations in the analysis.

The findings of this study have significant implications for surgical treatment as we recover from the Covid-19 outbreak, which has caused widespread and many delays in surgical care. To avoid similar delays and cancellations during the pandemic's recovery, evidence-based recommendations for safely restoring surgical activity are desperately needed. Guidelines and preoperative protocols for the evaluation of patients who have recovered from Covid-19 and require surgery have been established in anticipation for a growing number of patients who have recovered from Covid-19 and require surgery [20]. However, due to the scarcity of evidence to determine the recovery timeline, suggestions for postponing surgery are mostly dependent on expert opinion or previous data from other post-viral syndromes [20].

The findings from our study could inform future guidelines on the timing of surgery in patients with recent Covid-19 infection. Importantly, our findings suggest that for most patients with con-

firmed Covid-19, delaying surgery for approximately 8 weeks may reduce the risk of developing major postoperative complications. Based on these findings, we recommend delaying surgery, if possible for at least 8 weeks after confirmed Covid-19 infection. However it is important to note that for certain cancer patients, delayed surgical treatment during non-pandemic settings has been shown to be associated with worse overall survival when compared to timely surgical treatment [21]. As such, the balance between the risk of postoperative complications and the risk of worse overall survival associated with delayed surgical treatment should be carefully discussed in a multi-disciplinary setting before deciding on whether surgery should be delayed.

There are several limitations to our study. First, because of its retrospective study design, results are subject to residual confounding. Second the Covid-19 research database did not have data on whether a patient with confirmed Covid-19 infection was asymptomatic or symptomatic. Depending on the region anywhere from 18% to 45% of individuals with Covid-19 have been reported to be asymptomatic [22].

We assume the percentage of asymptomatic Covid-19 cases in our study is similar in range. We used the date of the PCR test to estimate the Covid-19 diagnosis date however the patient could have been infected by Covid-19 or developed Covid-19 several days before. The Covid-19 record at our hospital does not include mortality information and we were unable to assess the risk of 30 or 90 day mortality associated with surgery at different time points with respect to Covid-19 infection. Quality of life measures and long-term survival data were not captured in the database. We were unable to assess preoperative measurements of frailty that may have been important in determining when a patient would be sufficiently recovered from Covid-19 to undergo surgery. The association between measurements of frailty and recovery from Covid-19 should be further investigated. In addition, future studies should evaluate how measurements of frailty could be used to inform preoperative assessments of surgical risk among patients recovered from Covid-19.

In conclusion, surgery conducted during or around the time of Covid-19 infection increases the risk of developing postoperative complications. Surgery conducted four to eight weeks after a confirmed Covid-19 infection carries an increased risk of acquiring postoperative pneumonia. Surgery conducted 8 weeks or later after a proven Covid-19 infection, on the other hand, is not linked with an increased risk of postoperative problems. Based on these data, we propose that the safe period for patients with recent Covid-19 infection who are candidates for elective surgery be at least 8 weeks following the first date of confirmed Covid-19 infection.

References

1. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSEE) at Johns Hopkins University (JHU). Johns Hopkins University. 2021.
2. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis.* 2020; 20: 533-4.
3. Nepogodiev D, Bhangu A, Glasbey JC, et al. Mortality and pulmonary complications in patients undergoing surgery with perioperative Covid-19 infection: an international cohort study. *Lancet.* 2020; 396: 27-38.
4. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med.* 2020; 382: 1708-20.
5. Aminian A, Safari S, Razeghian-Jahromi A, et al. COVID-19 outbreak and surgical practice: unexpected fatality in perioperative period. *Ann Surg.* 2020; 272: e27–e29.
6. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA.* 2020; 323: 1061-9.
7. Goyal P, Choi JJ, Pinheiro LC, et al. Clinical characteristics of Covid-19 in New York City. *N Engl J Med.* 2020; 382: 2372–2374.
8. Manolis AS, Manolis AA, Manolis TA, et al. COVID-19 infection and cardiac arrhythmias. *Trends Cardiovasc Med.* 2020; 30: 451-60.
9. Lei S, Jiang F, Su W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClinicalMedicine.* 2020; 21: 100331.
10. Bilaloglu S, Aphinyanaphongs Y, Jones S, et al. Thrombosis in hospitalized patients with COVID-19 in a New York City health system. *JAMA.* 2020; 324: 799-801.
11. Jonker PKC, van der Plas WY, Steinkamp PJ, et al. Perioperative Covid-19 infections increase mortality, pulmonary complications, and thromboembolic events: a Dutch, multicenter, matched-cohort clinical study. *Surgery.* 2021; 169: 264-74.
12. Knisely A, Zhou ZN, Wu J, et al. Perioperative morbidity and mortality of patients with COVID-19 who undergo urgent and emergent surgical procedures. *Ann Surg.* 2021; 273: 34–40.
13. Fraser E. Long term respiratory complications of covid-19. *BMJ.* 2020; 370: m3001.
14. Karmakar M, Lantz PM, Tipirneni R. Association of social and demographic factors with COVID-19 incidence and death rates in the US. *JAMA Netw Open.* 2021; 4: e2036462.
15. Xiong Q, Xu M, Li J, et al. Clinical sequelae of COVID-19 survivors in Wuhan, China: a single-centre longitudinal study. *Clin Microbiol Infect.* 2021; 27: 89-95.
16. Doglietto F, Vezzoli M, Gheza F, et al. Factors associated with surgical mortality and complications among patients with and without coronavirus disease 2019 (COVID-19) in Italy. *JAMA Surg.* 2020; 155: 691-702.

17. Buitrago-Garcia D, Egli-Gany D, Counotte MJ, et al. Occurrence and transmission potential of asymptomatic and presymptomatic Covid-19 infections: a living systematic review and meta-analysis. *PLoS Med.* 2020; 17: e1003346.
18. Kayani B, Onochie E, Patil V, et al. The effects of COVID-19 on perioperative morbidity and mortality in patients with hip fractures. *Bone Joint J.* 2020; 102: 1136-45
19. Baiocchi G, Aguiar S Jr, Duprat JP, et al. Early postoperative outcomes among patients with delayed surgeries after preoperative positive test for Covid-19: a case-control study from a single institution. *J Surg Oncol.* 2021; 123: 823-33.
20. Bui N, Coetzer M, Schenning KJ, et al. Preparing previously COVID-19- positive patients for elective surgery: a framework for preoperative evaluation. *Perioper Med (Lond).* 2021; 10: 1.
21. Mayne NR, Elser HC, Darling AJ, et al. Estimating the impact of extended delay to surgery for stage I non-small-cell lung cancer on survival. *Ann Surg.* 2021; 273: 850-57.
22. Mizumoto K, Kagaya K, Zarebski A, et al. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the diamond princess cruise ship, Yokohama, Japan, 2020. *Euro Surveill.* 2020; 25: 10.