

GUIDANCE FOR SURGERY AFTER COVID-19 INFECTION

Timing of Surgery Following Recovery from COVID-19 to Reduce Risk of Postoperative Mortality

BACKGROUND

Infection with SARS-CoV-2, the virus causing COVID-19, can impact virtually all major organ systems resulting in diminished physiologic resilience often for many weeks after infection. The timing of surgery after a COVID-19 diagnosis is an important factor to consider with respect to the risk of postoperative complications. Surgery within 7 weeks of infection is associated with increased morbidity and mortality regardless of the severity of infection, current physiologic status and/or symptoms. Therefore, careful consideration in weighing the risks and benefits of surgical intervention within the first 7 weeks of a COVID-19 diagnosis should be done.

WHAT WE KNOW

Current literature suggests that the greatest risk of having an anesthetic is within the first 4 weeks of a COVID-19 infection and that after 7 weeks the risk returns to baseline. There is greater risk in those patients with more severe COVID-19 illness and who have significant pre-existing co-morbid conditions. It is recognized that the literature on this is changing rapidly as such the guidance on this will change accordingly.

WHAT IT MEANS

As COVID-19 is a relatively new illness, the information presented below is meant to provide guidance to physicians when counseling patients pre-operatively about how their SARS-CoV-2 infection may impact their peri-operative course. In general, surgery within 4 weeks of a COVID-19 diagnosis should be delayed. Ideally, surgery should be postponed for 6 weeks after a COVID-19 diagnosis. It is recognized that this is not always feasible; therefore, the information below will help you and your patient make an informed decision.

TABLE 1: Recommendations timing of surgery following recovery from COVID-19 with the understanding that individual risk/benefits need to be weighed in clinical case planning

	MILD	MODERATE	SEVERE	CRITICALLY ILL
Clinical Severity of COVID-19 Infection	MILD (suspected or confirmed) COVID-19 and/or ASYMPTOMATIC and/or UPPER RESPIRATORY TRACT INFECTION	MODERATE SYMPTOMATIC COVID-19 NOT REQUIRING HOSPITALIZATION and/or PERSISTENT SYMPTOMS	LUNG INVOLVMENT REQUIRING HOSPITALIZATION and/or SIGNIFICANT COMORBIDITIES and/or IMMUNOCOMPROMISED	SEVERE COVID-19 WITH ICU ADMISSION and/or MEET CRITERIA FOR SEVERE DISEASE and/or SEVERELY IMMUNOCOMPROMISED
Priority of Surgical Procedure				
Urgent or Emergent < 2 weeks ACATS & PCATS Urgent within 3, 7 or 14 days	DO CASE Urgently / Emergently	DO CASE Urgently / Emergently	< 7 weeks post-infection consider non-operative options if safe and available	< 7 weeks post-infection consider non-operative options if safe and available
Urgent (28 or 42 days) 2-6 weeks ACATS /PCATS	4-7 WEEKS post infection	7 WEEKS post infection	7 WEEKS post infection	12 WEEKS post infection
Elective (>43 days) > 6 weeks ACATS /PCATS				

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RATIONALE (January 2022)

- Patients operated within 6 weeks of COVID-19 diagnosis are at an increased risk of 30-day postoperative mortality and 30-day postoperative pulmonary complications.
- Elevated risk persists in sub-groups defined by procedure complexity (major vs. minor surgery) and urgency (elective vs. emergency surgery) until 7 weeks post infection.
- Risk is consistent across both low-risk (age < 70 years, ASA physical status 1–2, minor surgery) and high-risk (age ≥ 70 years, ASA physical status 3–5, major surgery) sub-groups.
- Asymptomatic patients return to baseline peri-operative risk at 7 weeks post infection as patients without COVID-19.
- Patients with resolved symptoms and who are no longer symptomatic prior to surgery have slightly higher perioperative risk above baseline levels even after 7 or more weeks.
- Patients still symptomatic ≥7 weeks after infection have a higher mortality rate than patients whose symptoms have resolved or who have been asymptomatic, and may benefit from a further delay until their symptoms resolve.
- Patients who were severely or critically ill (ie: hospitalized and/or requiring ICU) with COVID-19 who are now considered recovered, with or without resolved symptoms, should ideally have their elective surgery delayed by 7-12 weeks. A longer delay of 12 weeks is preferable in those critically ill (ICU) +/- immunocomprised +/- severe disease.
- Acute risks of proceeding with surgery soon after recent COVID-19 must be weighed against the risks of delaying surgery for time-sensitive conditions.
- Whether or not the decision to proceed with surgery within 6 weeks after infection or delay for >7 weeks, information regarding the elevated perioperative risk should be conveyed as part of the informed consent process.
- Pediatric patients with prior COVID-19, whether symptomatic or asymptomatic, have increased risk of postoperative respiratory complications. However, these complications are generally less severe and the optimal delay of surgery post infection is unknown.
- Pediatric patients have a similar incidence of perianesthetic complications associated with other pediatric respiratory tract infections; and operative delays should be determined using guidelines similar to what has been followed in these other cases.

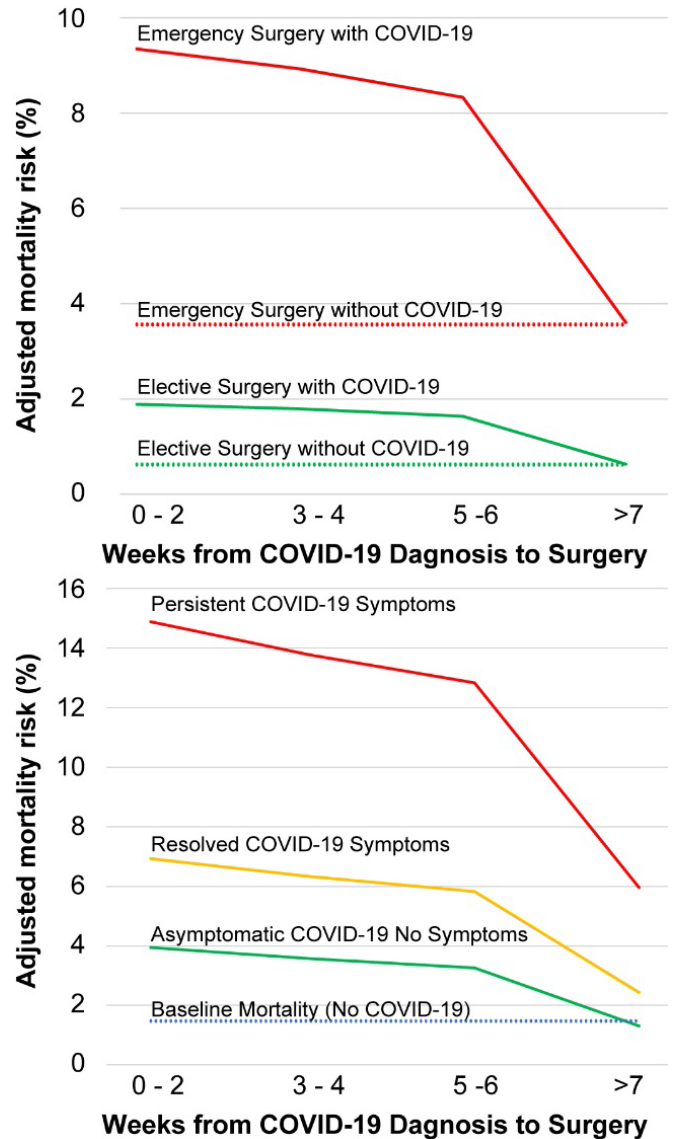


Figure 1: Changes in adjusted postoperative mortality risk with increasing time intervals from COVID-19 diagnosis to surgery.

(A) sub-groups defined based on whether patients had emergency surgery or elective surgery.
(B) sub-groups defined based on whether patients had an asymptomatic infection (green line), symptomatic infection with symptoms resolved by the time of surgery (orange line) or symptomatic infection with symptoms persistent up to surgery (red line). Dotted lines denote the adjusted postoperative mortality risk in patients without any known prior COVID-19 infection (adapted from Wijeyesundera DN, Khadaroo RG. 2021)

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RECOMMENDATIONS (January 2022)

1. Clinicians need to communicate with patients the reasons why surgery might be delayed in the presence of resolved but recent SARS-CoV-2 infection and to encourage patients to proactively report recent infections, thus optimizing the safety of the surgical procedure as well as mitigating the risks of accidental last-minute cancellations of scheduled surgery.
2. The appropriate interval between COVID-19 infection and surgery is based on clinical judgment and individual assessment of risk based on multiple factors, including but not limited to number of intervening weeks since diagnosis.
3. In general, adult elective surgery should not be scheduled within 7 weeks of a COVID-19 infection unless complications are outweighed by the risk of deferring surgery such as disease progression or other clinically important factors. Surgery in asymptomatic and mild COVID-19 infections can be scheduled at 4-6 weeks with the awareness that it comes with the potential of increased risk of postoperative morbidity and mortality.
4. Specialist assessment and personalised, shared decision-making regarding timing of surgery after SARS-CoV-2 infection between patient and multidisciplinary clinical teams must consider:
 - i. Severity of the initial infection
 - MILD or ASYMPTOMATIC suspected of confirmed COVID-19 - mild or absent symptoms managed in the community
 - MODERATE suspected or confirmed COVID-19 - clinical signs of pneumonia, SpO₂ ≥ 90% on room air, no signs of *severe* pneumonia, and not expected to deteriorate
 - SEVERE suspected or confirmed COVID-19 - characterized by severe respiratory distress, hypoxemia (SPO₂ < 94% on room air), or shock
 - CRITICALLY ILL - hospitalized and/or ICU adult patients who meets criteria for severe disease (as above) and requiring high flow supplemental oxygen, mechanical ventilation or extracorporeal membrane oxygenation
 - ii. Ongoing symptoms of COVID-19
 - iii. Comorbid and functional status (before and after COVID-19) including immunocompromised status, significant underlying lung disease, severe diabetes, obesity (BMI > 30 kg/m²), chronic kidney disease (eGFR < 60 mL/min/1.73 m²), and/or congestive heart failure (New York Heart Association class II, III, or IV)
 - iv. Clinical priority and risk of disease progression
 - v. Complexity of surgery
 - vi. Non-operative options available
5. Pediatric elective surgeries should be delayed for at least four weeks after full resolution of symptoms attributable to COVID-19 regardless of the severity of infection. A delay longer than four weeks should be considered in children who still have residual symptoms or underlying comorbidities that would place them at risk for postoperative respiratory complications.
6. Most COVID-19 patients have either transient or asymptomatic disease and require no additional considerations beyond a 7-week delay, but those who have persistent symptoms or have been hospitalised require special attention and may benefit from a further delay until their symptoms resolve.
7. When the optimal choice for an individual patient is to proceed with surgery within 6 or fewer weeks after COVID-19 infection, the patient must be informed of the elevated perioperative risk as part of a revised informed consent process.
8. Clinics, outpatient pre-operative evaluation clinics and hospitals will need to develop new processes-of-care to facilitate early identification of patients with recent COVID-19.

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LIMITATIONS OF THE EVIDENCE (January 2022)

There are limitations to the available evidence. Firstly, the majority of published studies focus on a window of peri-operative risk rather than the absolute timing of surgery since diagnosis, with no work comparing risk of COVID-19 to other pre-operative respiratory illnesses (i.e. pneumonia, upper respiratory tract infection). This limits generalizations and extrapolation to actual personal risk such that best clinical judgment and individual patient risk assessment should be part of case planning. Secondly, the optimal timing of surgery after SARS-CoV-2 infection is based on the 2021 international, multicenter, prospective cohort study of 140,231 patients prior to the manifestation of the Omicron variant. While the morbidity associated with Omicron seems lower than with other variants, current evidence suggests that asymptomatic and mild COVID-19 infections have persistent, if lower risk than more severe disease, up to 7 weeks following diagnosis. The relationship between underlying pathophysiological inflammatory insult resulting from a SARS-CoV-2 provoked immune response and the clinical symptomology observed requires further elucidation. Finally, the majority of studies are adult focused, such that the data on children is sparse. However, available evidence shows that pediatric patients with prior COVID-19, whether symptomatic or asymptomatic, have increased risk of postoperative respiratory complications however the optimal delay of surgery post infection is unknown. Current guidelines recommend that pediatric COVID-19 infections follow the current standard of practice for elective surgeries in children with significant (non-COVID-19) Upper Respiratory Tract Infection where elective surgeries be delayed for four weeks after full resolution of symptoms attributable to COVID-19 regardless of the severity of infection. These guidelines are based on current (January 2022) best evidence and this living document will be updated as new data arises.

EVIDENCE (January 2022)

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