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Guidelines

Timing of elective surgery and risk assessment after SARS-CoV-2 infection: 2023 update

A multidisciplinary consensus statement on behalf of the Association of Anaesthetists, Federation of Surgical Specialty Associations, Royal College of Anaesthetists and Royal College of Surgeons of England

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Summary

Guidance for the timing of surgery following SARS-CoV-2 infection needed reassessment given widespread vaccination, less virulent variants, contemporary evidence and a need to increase access to safe surgery. We, therefore, updated previous recommendations to assist policymakers, administrative staff, clinicians and, most importantly, patients. Patients who develop symptoms of SARS-CoV-2 infection within 7 weeks of planned surgery, including on the day of surgery, should be screened for SARS-CoV-2. Elective surgery should not usually be undertaken within 2 weeks of diagnosis of SARS-CoV-2 infection. For patients who have recovered from SARS-CoV-2 infection and who are low risk or having low-risk surgery, most elective surgery can proceed 2 weeks following a SARS-CoV-2 positive test. For patients who are not low risk or having anything other than low-risk surgery between 2 and 7 weeks following infection, an individual risk assessment must be performed. This should consider: patient factors (age; comorbid and functional status); infection factors (severity; ongoing symptoms; vaccination); and surgical factors (clinical priority; risk of disease progression; grade of surgery). This assessment should include the use of an objective and validated risk prediction tool and shared decision-making, taking into account the patient's own attitude to risk. In most circumstances, surgery should proceed unless risk assessment indicates that the risk of proceeding exceeds the risk of delay. There is currently no evidence to support delaying surgery beyond 7 weeks for patients who have fully recovered from or have had mild SARS-CoV-2 infection.

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Recommendations

1 Surgical patients should ideally be up to date with COVID-19 vaccinations. If not, this should be arranged in the community at the point of referral for consideration of surgery, with the most recent vaccination ideally administered at least 2 weeks before planned surgery.
2 Patients with known SARS-CoV-2 infection who require urgent surgery should be managed in dedicated pathways, isolated from others who are not infected with SARS-CoV-2 and with staff taking appropriate precautions.
3 Patients who develop symptoms consistent with SARS-CoV-2 infection within 7 weeks of planned surgery, including on the day of surgery, should be screened for SARS-CoV-2 infection.
4 Patients should be requested to notify the hospital if they test positive for SARS-CoV-2 infection within 7 weeks of their planned operation date. In this event, a discussion must take place between the peri-operative team and the patient about the risks and benefits of deferring surgery.
5 To avoid disease transmission, and because the course of each infection is uncertain, elective surgery should be avoided for 2 weeks after a positive SARS-CoV-2 test, unless there is a clear indication to waive this precaution.
6 After 2 weeks and up to 7 weeks after SARS-CoV-2 infection, surgery can proceed if the patient and surgery are low risk.
7 Where either the patient or surgery is not low risk, an individual risk assessment must be performed. This should consider: patient factors (age; comorbid and functional status); infection factors (severity of infection; ongoing symptoms; vaccination); and surgical factors (clinical priority; risk of disease progression; grade of surgery). This assessment should include the use of an objective and validated risk prediction tool and shared decision-making. In most circumstances, surgery should proceed unless the risk assessment indicates the risk of proceeding exceeds the risk of delay.
8 There is no benefit to delaying surgery beyond 7 weeks for patients who have fully recovered or have had mild SARS-CoV-2 infection.

In the pre-vaccine, wild-type phase of the COVID-19 pandemic, postoperative morbidity and mortality increased significantly with peri-operative SARS-CoV-2 infection [1, 2]. Moreover, pre-operative infection was associated with adverse outcomes, particularly when surgery was undertaken within 6 weeks of SARS-CoV-2 infection [3]. This drove recommendations to delay elective surgery for 7 weeks following SARS-CoV-2 infection unless the risks of deferring surgery outweighed the potential risks of surgery associated with pre-operative SARS-CoV-2 infection [4–6]. However, there was evolving evidence demonstrating reduced clinical severity associated with the Omicron SARS-CoV-2 variant, particularly in the context of widespread vaccination [7, 8]. Updated recommendations emphasising individual patient risk assessment and shared decision-making to determine the timing of surgery were published [9], but these relied on limited data regarding the peri-operative implications of vaccination and were outlined early in our understanding of the impact of the Omicron variant.

Since then, numerous sublineages of Omicron SARS-CoV-2 have emerged [10], and data have emphasised that severity of clinical illness was relatively favourable compared with wild-type and delta variants [11, 12]. National programs have successfully vaccinated large proportions of the population with safe and effective vaccines [13]. The increasing scale of the surgical backlog and implications for population health of delayed access to surgical care have underscored the need for mitigating barriers to surgery [14–16], although the overall impact of delayed care due to SARS-CoV-2 guidance is thought to be small [17]. Finally, data have begun to emerge on the impact of peri-operative infection on postoperative outcomes in the Omicron variant and vaccination era [18–20].

Therefore, there was a need to reassess existing guidance in the current context to determine if it currently reflects the needs of both the population and that of the individual patient. This updated statement aims to facilitate safe, effective and timely care for patients undergoing surgery. Whilst this document is primarily targeted for clinician use, we aim to provide recommendations that could assist policymakers, administrative staff, clinicians and, most importantly, patients regarding safe timing of surgery following SARS-CoV-2 infection.

Prevention of peri-operative SARS-CoV-2 infection

Prevalence of COVID-19 in the UK population remains high, ranging between 1 in 15 and 1 in 50 people at any given time [21]. It is likely that this will persist, meaning patients remain at risk of pre-operative exposure to SARS-CoV-2. Peri-operative infection with SARS-CoV-2 is associated with relative increases in postoperative morbidity and mortality [19, 20, 22, 23], but the absolute increase in risk is determined by pre-existing risk [9, 17].

Preventing pre-operative infection and nosocomial transmission has safety benefits for patients, staff and others. The most effective intervention to reduce the risk of severity of COVID-19 [19], and thus peri-operative risk, is up-to-date vaccination [24–26]. Therefore, patients not up to date with vaccination should be encouraged to receive pre-operative COVID-19 vaccination, ideally arranged in the community at the point of referral for consideration of surgery. The most recent vaccination should ideally be at least 2 weeks before surgery [27].

Prevention of nosocomial transmission to patients, staff and others has benefits to patient outcomes, workforce well-being and resilience and population health. Therefore, patients with known SARS-CoV-2 infection should be managed in dedicated pathways, ideally isolated from others who do not have SARS-CoV-2. Institutions should manage environmental ventilation, air filtering, decontamination and provision of respiratory protective equipment consistent with best practice. Healthcare workers should use appropriate high-filtering respiratory protective equipment in proximity to patients with SARS-CoV-2 infection [28].

Timing of elective surgery after SARS-CoV-2 infection

Data before the era of Omicron and widespread vaccination highlighted that surgery within 7 weeks of SARS-CoV-2 infection was associated with an increased risk of morbidity and mortality [3, 23]. More recent data have suggested that risks associated with surgery within 7 weeks of infection may be more modest than in previous phases of the pandemic [18, 20]. In the Omicron post-vaccination era, a population-based data platform analysis in England showed that surgery 2 weeks, 2–4 weeks, 4–7 weeks and > 7 weeks after SARS-CoV-2 infection was associated with a 30-day mortality rate of 1.1%, 0.5%, 0.3% and 0.2%, respectively [20]. Compared with equivalent data from the first year of the pandemic (i.e. pre-vaccine) these outcomes are more favourable (mortality 4.1%, 2.3%, 1.3% and 0.9%, respectively). However, compared with the pre-pandemic mortality rate reported in the study of 0.1%, there remains a significantly increased relative risk for all patients with pre-operative SARS-CoV-2 infection. Caution must be exercised when interpreting these population-based data [17]; these still show that peri-operative 30-day mortality risk remains increased when patients have surgery within 7 weeks of SARS-CoV-2 infection, though the risks are lower than in the first year of the pandemic. In addition, the variation in mortality may be affected by significant confounders such as case-mix and may not be due to the effects of infection. Since mandatory pre-operative screening for infection was not in place throughout this period, it is plausible that cases of infection were missed in the historical infection cohort. The mortality risk quoted in this study appears notably lower than anticipated from similar studies, making interpretation difficult. However, this finding of reduced population risk in the Omicron and vaccinated era is also supported by unpublished data from COVIDSurg 3 [29].

Another epidemiological database study in the USA assessed peri-operative risks of mortality and major adverse cardiovascular and cerebrovascular events (MACE) in patients following SARS-CoV-2 infection [19]. The study included data from patients with Omicron SARS-CoV-2 infection and those who were vaccinated. Compared with patients who did not have pre-operative COVID-19 (incidence of MACE 5.9%), surgery within 4 weeks, between 4 and 8 weeks and beyond 8 weeks was associated with an incidence of MACE of 7.5%, 6.1% and 5.5%, respectively (adjusted OR (95%CI) within 4 weeks of infection 1.28 (1.17–1.41)). This risk was impacted by disease severity, with mild disease having a minimal temporal impact on outcomes, whilst moderate (hospitalised) or severe (admitted to ICU and ventilated) COVID-19 had a progressively more significant influence. Vaccination was also associated with a reduced risk of MACE in patients with a history of COVID-19 (OR (95%CI) 0.87 (0.76–0.99)), as well as reduced postoperative mortality (1.2% vs. 1.8%).

A prospective observational study of 4928 patients who underwent surgery during the Omicron phase of the pandemic included 705 patients with pre-operative SARS-CoV-2 infection [18]. Infection up to 8 weeks pre-operatively was not associated with increased risks of postoperative pulmonary complications compared with no history of infection (3.4% vs. 2.75%; $p = 0.83$). Only patients with pre-operative SARS-CoV-2 infection and ongoing symptoms had an increased risk of postoperative pulmonary complications (OR (95%CI) 4.29 (1.02–15.8); $p = 0.04$). Whilst this study reports temporal and mortality outcomes, it was underpowered to draw any other conclusions and is somewhat at odds with other data.

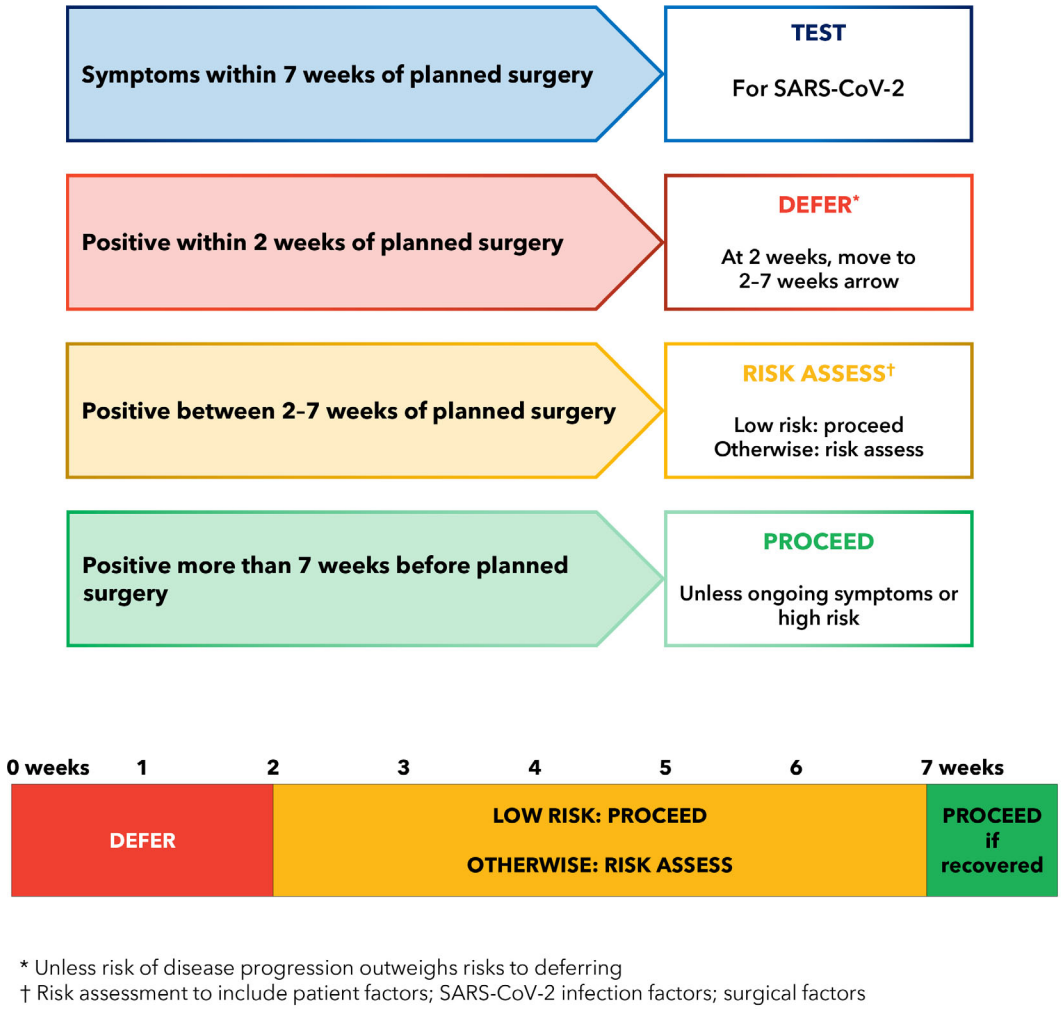

Figure 1 Graphic to support decision-making on timing of surgery after SARS-CoV-2 infection.

Overall, the data, including the Omicron wave and widespread vaccination, do not provide definitive answers but continue to suggest that SARS-CoV-2 infection 2 weeks before surgery is associated with increased morbidity and mortality for most patient cohorts. When surgery is undertaken between 2–4 weeks following infection, there remain increased risks to patients, but this appears to disproportionately affect patients who are unvaccinated, have more severe disease and greater medical and/or surgical complexity. Beyond 4 weeks, these risks reduce further before returning close to baseline risk for most patients at 7 weeks and beyond. This temporal waning of impact is a change from early reports in which risk was stably increased throughout a 7-week period [2, 3].

Given the above, elective surgery should be avoided for at least 2 weeks after a positive SARS-CoV-2 test or confirmed symptom onset unless the benefit of waiting is outweighed by the risk of deferring surgery. This is particularly important within the first 10 days following SARS-CoV-2 diagnosis as the patient may be infectious, which is a risk to other patients, staff and surgical pathways.

Patients who develop symptoms consistent with SARS-CoV-2 infection (e.g. fever, cough, sore throat, fatigue [30]) within 7 weeks of planned surgery, including on the day of surgery, should be screened for SARS-CoV-2 infection.

From 2 weeks to 7 weeks after SARS-CoV-2 infection, surgery can proceed if the patient and surgery are low risk (Fig. 1). Where either the patient or surgery is not low risk, a risk assessment should be performed, considering: patient factors (age, comorbid and functional status); infection factors (severity, ongoing symptoms and vaccination); and surgical factors (clinical priority, risk of disease progression and grade of surgery). This risk assessment should inform shared decision-making between the multidisciplinary team

and patient, with documentation of risks and benefits of the timing of surgery and the decision-making process. Patients with persistent symptoms, moderate-to-severe COVID-19 or who are immunosuppressed may still have increased risks beyond 7 weeks [18, 19]; these patients may require specialist assessment and individualised, multidisciplinary peri-operative management with consideration of further delay.

Baseline risk assessment should include the use of a validated tool such as the Surgical Outcome Risk Tool v2 (SORT-2) [31], which has the best combination of clinical utility and accuracy of any pre-operative risk assessment tool internationally [32]. Baseline risk assessment should take place at the time of scheduling surgery so that modifiable risk factors can be identified and sufficient time provided for optimisation. Assessing risks of surgery due to current or recent SARS-CoV-2 infection should include assessment of absolute risk, because any increase in relative risk impacts most those with the highest pre-existing absolute risk [9]. Patients should also be informed that a positive pre-operative SARS-CoV-2 test may trigger a review of the risks of proceeding with surgery. Whilst categorising risk can be challenging, examples classifying patients as low risk include ASA physical status 1–2; aged < 70 y; and being generally fit and well. Examples of low-risk surgery include most outpatient eye surgery; minor body surface or extremity surgery; and surgery with a low risk of death or complications. In undertaking these risk assessments, a risk communication tool can be considered [9], and all decision-making should be shared and documented.

Discussion

Didactic recommendations to defer surgery for 7 weeks following SARS-CoV-2 infection are not appropriate. Indeed, a blanket ban has never been recommended [4, 9], but there are some concerns that previous guidance has been interpreted in this manner. From a population perspective, recent data indicate that the absolute risk of surgery soon after SARS-CoV-2 infection might be lower in the UK than previously reported by COVIDSurg [3, 20]. Furthermore, there is a significant backlog of surgery which mandates every effort to mitigate barriers to surgery. As the same data also reconfirm a significantly increased relative risk of patient harm and death if surgery is undertaken soon after SARS-CoV-2 infection, population risk implications must be balanced against the needs of individual patients, with this increased risk varying from trivial to critical. This, in turn, must be balanced against the consequences for the individual of delaying surgery, which may range from inconsequential to increased mortality. Thus, these recommendations need to factor in population risk and national health needs, individual risk and the benefits or harm of delay. Guidance can rarely be compressed into a single sentence, as is the case here.

This guidance document supports more general clinical guidance on risk assessment prior to surgery: decision-making should be shared, individualised and consider the balance of risk associated with proceeding with surgery as planned, against other options. As is the case with most other risk factors which could be reduced or optimised over time, the risks of proceeding without delay will depend on the patient's other risk factors and magnitude and urgency of the surgery planned. For example, for major cancer procedures which are time-sensitive because of the risk of disease progression, decision-making must be shared between the patient and their multidisciplinary team (surgeons, oncologists, anaesthetists and critical care clinicians). Similarly, in a low-risk surgical setting (e.g. eye surgery under local anaesthesia, ambulatory gynaecological, general, orthopaedic or urological surgery) operations should proceed after 2 weeks unless there is a reason not to. Most of the surgery undertaken in the NHS is of this latter nature, and unnecessary delays to proceeding, particularly in the current context of long waiting times, can potentially cause disruption and upset to patients, which outweigh the potential benefit. For this reason, the use of an objective risk assessment tool, such as the SORT-2 or other validated approaches, is essential for understanding the risk to an individual patient of surgery and their relative risk of proceeding earlier than 7 weeks after SARS-CoV-2 infection.

For most patients undergoing low-risk surgery or for patients whose surgery is time sensitive, this guidance supports surgery proceeding 2 weeks after SARS-CoV-2 infection, if symptoms have resolved. A minority of patients require risk assessment and shared decision-making due to higher risk of morbidity or mortality and include: those who have ongoing symptoms; had moderate or severe SARS-CoV-2 infection; are significantly comorbid; or require major surgery.

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