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## Can patients with asymptomatic SARS-CoV-2 infection safely undergo elective surgery?

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### Summary

Current or recent infection with SARS-CoV-2 increases the risk of perioperative morbidity and mortality. Consensus guidelines recommend delaying elective major surgery after acute SARS-CoV-2 infection for 7 or 8 weeks. However, because of the growing backlog of untreated surgical disease and the potential risks of delaying surgery, surgical services may be under pressure to reduce this period. Here, we discuss the risks and benefits of delaying surgery for patients with current or recent SARS-CoV-2 infection in the context of the evolving COVID-19 pandemic, the limited evidence supporting delays to surgery, and the need for more research in this area.

**Keywords:** COVID-19; elective surgery; outcomes; patient safety; perioperative medicine

The COVID-19 pandemic has caused a fundamental shift in the delivery of healthcare worldwide. Over the last 2 yr, previously routine healthcare has been disrupted in many countries. This is particularly true of perioperative care, where there has been substantial disruption to elective surgery, in part because of infection control procedures reducing patient capacity and in part because of constraints on available staffing. Consequently, many hospitals are unable to accommodate pre-pandemic numbers of patients undergoing surgery.<sup>1–3</sup> In this issue of the *British Journal of Anaesthesia*, Lieberman and colleagues<sup>4</sup> address the topical issue of the time interval between SARS-CoV-2 infection and elective surgery: what is a safe amount of time to wait before scheduling a patient for surgery? They argue that current guidelines are based on data from earlier waves of the pandemic and may not be relevant to current practice.<sup>5–8</sup> To investigate this, the authors performed a single-centre retrospective observational study, including all patients over 18 yr of age who presented with a positive SARS-CoV-2 polymerase chain reaction test between March 2020 and January 2022. This amounted to just over 28 000 patients, with four distinct surges across this time period. When comparing outcomes (admission to hospital, COVID-19 pneumonia, and ICU admission) between the final wave (December 2021 to January 2022) and the three previous waves (March 2020 to December 2021), Lieberman and colleagues<sup>4</sup> demonstrated a significant reduction in all three outcomes measures (admission to hospital: 19.1% vs 53.7%,  $P<0.001$ ; COVID-19 pneumonia: 0.2% vs 10.7%,  $P<0.001$ ;

admission to ICU: 1.4% vs 7.7%,  $P<0.001$ ). The authors conclude that their data show less severe disease associated with SARS-CoV-2 infection compared with earlier in the pandemic, and that this supports a reduction in the delay between a positive SARS-CoV-2 test and elective surgery amongst asymptomatic patients.

These data, along with other reports from around the world, which suggest an improving clinical picture of SARS-CoV-2 infection, are encouraging. The observed trends towards less severe infection and fewer complications associated with SARS-CoV-2 infection, compared with 2020, are likely to be attributable to a combination of reduced virulence of circulating variants, vaccination programmes, and natural immunity from previous infection.<sup>9</sup> However, the inference that this should translate to a reduction in perioperative complications of SARS-CoV-2 infection, and a subsequent modification of the suggested interval between infection and elective surgery, is premature.<sup>4</sup> The principal limitation of this retrospective single-centre study is that the patient sample did not specifically include patients undergoing surgery, which substantially reduces the external validity with respect to patients undergoing surgery. Other limitations include the retrospective design and the single-centre nature of the study, which further limit generalisability. Although it is encouraging that all infections appear less severe amongst patients admitted to hospital for acute medical conditions, it is unclear how this translates to perioperative patients and the subsequent impact on morbidity and mortality after surgery. The assertion that the interval between asymptomatic SARS-CoV-

2 infection and elective surgery could be reduced to 5 days is, in our opinion, not supported by evidence from patients undergoing surgery.

Multiple independent analyses earlier in the pandemic highlight a substantial risk of postoperative complications for patients with SARS-CoV-2 infection who are undergoing surgery.<sup>5,6,10</sup> A large international cohort study reported that patients undergoing surgery with SARS-CoV-2 infection were at high risk of developing postoperative pulmonary complications or dying after surgery.<sup>6</sup> This is supported by a nationwide study using data from over 2.6 million patients who underwent surgery in the National Health Service in England. The authors report a substantially increased risk of death after surgery for patients infected with SARS-CoV-2.<sup>5</sup> Amongst patients undergoing elective surgery, there is a five-fold increase in the risk of postoperative mortality. However, these data were generated before mass vaccination was widespread and population immunity was likely to be much lower than currently. Consequently, it is possible these data may overestimate the contemporary risk of perioperative morbidity amongst patients with SARS-CoV-2 infection.

Internationally, probably the best available evidence on the safety and timing of surgery after SARS-CoV-2 infection is from the prospective CovidSurg Week study.<sup>11</sup> These data included patients undergoing both elective ( $n=97\ 442$ ) and emergency ( $n=42\ 778$ ) surgery during October and November 2020 and were globally representative of care for patients in 116 countries. The adverse effects of SARS-CoV-2 infection persisted up to 7 weeks after infection in both asymptomatic and symptomatic patients undergoing both major and minor surgeries. This is reflected in multidisciplinary consensus guidelines published by the Centre for Perioperative Care ([www.cpoc.org.uk](http://www.cpoc.org.uk)), which recommend a delay of 7 weeks after infection with SARS-CoV-2, including patients without symptoms, before proceeding to surgery.<sup>12</sup> A very recent update to these guidelines highlights the lack of evidence on the influence of vaccination or of the Omicron variant on perioperative outcomes, and argues against the assumption that mild or asymptomatic infection does not increase the risk of perioperative complications.<sup>13</sup> Similarly, recent guidelines by the Australian and New Zealand College of Anaesthetists recommend deferring non-urgent surgery for a minimum of 4 weeks for minor procedures and 8 weeks for major procedures, provided patients are symptom-free and back to their baseline level of function.<sup>7</sup> As the severity of the COVID-19 phenotype in the general population (both vaccinated and unvaccinated) decreases in the wake of the Omicron variant, it is biologically plausible that the impact on patients with perioperative SARS-CoV-2 infection may lessen.<sup>14,15</sup> However, there is mature evidence that the additional physiological insult of surgery in the presence of SARS-CoV-2 conveys risk beyond SARS-CoV-2 infection alone. In 2020, the adverse effects of SARS-CoV-2 infection after surgery persisted up to 7 weeks after infection in both asymptomatic and symptomatic patients.<sup>11</sup> Contrary to the assertion of Lieberman and colleagues,<sup>4</sup> the predominant risk of operating on patients with SARS-CoV-2 infection does not necessarily come from onwards transmission, but from the individual risk of perioperative mortality.<sup>4-6</sup> The safety benefit of delaying surgery for patients with SARS-CoV-2 infection is principally to reduce the risk of perioperative morbidity for those patients with SARS-CoV-2, in addition to

preventing further nosocomial infection and protecting healthcare workers.<sup>16</sup> Relaxation of infection control procedures and allowing mixing of patients with asymptomatic SARS-CoV-2 infection within established 'green' surgical pathways pose an unknown and unquantifiable risk of additional perioperative morbidity.<sup>17</sup>

The increased risk of perioperative morbidity amongst patients with SARS-CoV-2 infection needs to be balanced against the risk of delaying surgery, at both individual and population levels.<sup>1,18</sup> The reduction in surgical throughput attributable to reconfiguration of healthcare delivery has left many healthcare systems with a large deficit in surgical activity and subsequent backlog of patients waiting for surgery. In England and Wales, we have estimated the waiting list for surgery to be in excess of 2.3 million patients.<sup>3,19</sup> This is only likely to worsen, as surgical activity struggles to keep up with demand. Unfortunately, the degree of morbidity associated with delayed surgery or undiagnosed surgical pathology is only beginning to be understood. For cancer, emerging data suggest upstaged disease presentations and poorer 1-yr survival outcomes amongst patients with delayed cancer surgery.<sup>20</sup> Amongst patients awaiting elective surgery, such as joint arthroplasty or heart valve replacement, a worsening of their condition while waiting is likely to increase their physical and mental suffering and make future treatment technically challenging and less likely to succeed.<sup>2,21</sup> In addition, the impacts on patients waiting for minor procedures, for example revision of perianal seton, removal of metalwork, bunionectomy, etc., are largely unmeasured, but they are likely to have significant influence on quality of life. Consequently, it is difficult to balance the risk of surgical morbidity because of SARS-CoV-2 infection at the patient level, against the unknown risk of morbidity as a result of delayed surgery at the population level, particularly in the context of widespread vaccination.

Increasing surgical activity and minimising the delay between diagnosis and surgery are clearly of the utmost importance.<sup>18,22</sup> However, further research is urgently required to inform this discussion. The COVIDSurg Collaborative is seeking to address this issue through a novel prospective cohort study launched in January 2022, which will provide data about both the impact of vaccination and the Omicron variant on the risk of perioperative morbidity amongst patients with SARS-CoV-2 infection (protocol available online at <https://globalsurg.org/covidsurg3/>). It is plausible that there may be a point in the future when no delay is required for vaccinated patients with asymptomatic infection, particularly in the context of changing viral pathogenicity, increased vaccination rates, and natural immunity. Equally, there may be a future where even patients with symptomatic disease might be managed in a similar fashion to patients with upper or lower respiratory tract infection, with delays only as long as it is required to become asymptomatic and returned back to baseline health. However, it is unclear if or when we will get to this point and in which contexts.

The decision to delay surgery or proceed with surgery may be influenced by multiple competing risks, which may vary across countries and health systems. We support the use of consensus guidelines, which take account of the best available evidence. However, we acknowledge limitations of the evidence base within the rapidly changing international clinical landscape.

We urge the perioperative care community to join a research collaboration, conduct their own well-designed independent investigation, and to continue to make data-driven decisions to maximise patient safety during the perioperative period.

## Declarations of interest

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