Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Invited Commentary

Surgery during the COVID-19 pandemic: Don't wait to vaccinate

It is the middle of May 2022, and we are nearing a grim milestone in the United States: soon, we will tally one million deaths directly attributable to infection with SARS-CoV2, the cause of the historic COVID-19 pandemic.[1] The burden of this infection goes well beyond that alarming total, including the emotional, economic, and psychosocial losses of family members as well as the disruption to our social infrastructure—not to mention the potentially devastating effects of post-acute sequelae of SARS-CoV2 (PASC, or "long COVID"). While some degree of early control was achieved with masking and social distancing, the rapid development and distribution of highly effective mRNA vaccines, notably BioNTech (Pfizer) and Spikevax (Moderna), were a turning point. In randomized clinical trials, both vaccines significantly reduced rates of severe infection, including hospitalization, and mortality, and extent of community uptake has been directly associated with lower community burden of severe disease.[2,3] The primary series of both of these vaccines is administered as two doses given 3–8 (Pfizer) or 4 to 8 (Moderna) weeks apart. However, relatively little analysis has been reported on the timing of administration of the primary series in the context of hospitalization for surgery, and specific guidance is not available. Understanding the risks and benefits of SARS-CoV2 immunization in this context could inform peri-operative guidance and understanding post-operative outcomes in the context of such immunization could assist surgeons in deciding when to safely operate on their patients without subjecting them to increased risk.

In the article "Partial COVID-19 vaccination associated with reduction in postoperative mortality and SARS-CoV-2 infection", Prasad et al. extensively examined SARS-CoV2 vaccination status and its association with post-operative clinical outcomes.[4] Using a large database from the Veteran's Health Administration (VA) in the U.S., they analyzed over 87,000 surgical patients at over 1200 medical facilities and investigated how vaccination status impacted post-operative outcomes. They assessed three major groups (unvaccinated, partial vaccination, full vaccination) with additional subgroup analysis of the partially vaccinated for various pulmonary and vascular oriented complications after surgery. The investigators found that compared to those unvaccinated, both partial and fully vaccinated patients had significantly lower rates of all-cause mortality and post-operative COVID-19 infections.[4] Further, they noted a decrease in COVID-19 infection, pneumonia, and pulmonary failure among fully vaccinated patients relative to those who were partially vaccinated. Overall, their data suggests that any degree of vaccination confers protection against post-operative complications associated with SARS-CoV-2.

The analysis by Prasad et al. is important for other reasons. The VA patient populations is racially and ethnically diverse, with a high prevalence of comorbidities, including obesity. The disproportionate toll that the pandemic has taken on racial and ethnic minorities in the U.S. has been evident from the early days, and the count is still being tallied.[5,6] Moreover, comorbidities, especially those common in the VA patients, including obesity, cardiac and renal disease, and hypertension, increase risk of severe COVID-19 and death. Thus, the analysis provides insight on the importance of vaccination in mitigating COVID-19 infections and mortality for surgical patients most at risk for significant morbidity and mortality. These strengths are counterbalanced, of course, by the relative underrepresentation of women and other racial and ethnic groups in the database. Further, by virtue of their comorbidities, the patients studied were—independent of COVID-19—at increased risk for post-surgical complications. Multiple factors impacting outcomes like vascular complications may explain the lack of statistical powering of said variables. Assessing emergent and elective surgeries was another aim of this study but with 80% of the patients in each subgroup categorized as elective surgery, it is difficult to ascertain the implication of findings.

The development and distribution of safe and effective SARS-CoV-2 vaccines has been one of the inarguably bright spots in the past two years of this pandemic. Prasad et al. contribute to the literature documenting this achievement by demonstrating in a large patient sample that any level of vaccination status mitigates post-operative complications, especially all-cause mortality and COVID-19 infection. These data provide a solid foundation to assist surgeons in making decisions about the timing of general surgery, although further work should evaluate these questions with regard to elective versus emergent surgery, and in a more diverse patient population. Most importantly, we must contextualize the study's findings and its implications in the rapidly evolving pandemic. This study investigated a timeframe dominated by the first (alpha) variant of SARS-CoV-2. Since that time, we have seen epidemiologic surges due to several different variants, notably delta and omicron. While the mRNA vaccines assessed in this study still offer considerable protection against severe disease, hospitalization, and mortality, it is concerning to many experts that omicron has evidenced some immune escape, manifesting in very high rates of infection even in fully vaccinated persons.[7] Indeed, the nature of coronaviruses is to adapt to become more infectious; whether increased virulence will characterize future strains is not clear. The development and use of vaccines will need to keep pace with the emergence of new variants; in the meantime, we must accept that our approach to COVID-19 in relation to surgical decision making will continue to be reactive and limited to the tools we have. That said, Prasad et al.'s findings in a large population of high-risk, vulnerable patients should emphasize to healthcare providers, both surgical and non-surgical, that we must increase our commitment to optimizing our patient's health, including increased vaccination

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advocacy, in hopes of minimizing modifiable surgical risks.

Declaration of competing interest

Neither Dr. Marrazzo nor Dr. Cochrun have any conflicts of interest with this commentary.

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