



Contents lists available at ScienceDirect

North American Spine Society Journal (NASSJ)

journal homepage: www.elsevier.com/locate/xnsj

Commentary

The questionable rationale of a blanket 2-week ban for lumbar fusions after a positive COVID-19 test



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ARTICLE INFO

Keywords:

COVID-19
 Coronavirus
 SARS-CoV2
 Lumbar fusion

Using data from the National COVID Cohort Collaborative (N3C), a large database of 17.4 million people with 6.9 million COVID-19 cases, Chan et al. [1] analyzed the risk of perioperative complications following lumbar spinal fusion surgery in patients with a recent history of COVID-19 infection. The authors categorized patients into different time windows, with surgery occurring between 0 to 2 weeks, 2 to 6 weeks, or 6 to 12 weeks following an initial COVID-19 diagnosis. The study found that patients undergoing surgery within the first 2 weeks of their COVID-19 diagnosis displayed a statistically significant increase in the risk of complications, including venous thromboembolic events, sepsis, and mortality. However, the increased risk did not persist beyond the 2-week mark.

As documented by the current study, it seems reasonable to assume that a COVID-19 infection may pose an additional risk to patients undergoing surgery when compared to patients without a COVID-19 diagnosis. The literature has already demonstrated such type of additional risk, with previous data showing that patients with a COVID-19 infection display an increased likelihood of pneumonia, respiratory failure, pulmonary embolism, and sepsis after major elective surgery [2]. While the current study offers valuable evidence for the association between a recent COVID-19 diagnosis and perioperative complications after spinal fusion, it is important to highlight some of the particularities of this study's methodology as well as the multifaceted and complex nature of the issue at hand.

A critical aspect of the study's methodology is the definition of a COVID-19 diagnosis. It appears that the diagnosis of a COVID-19 infection was based purely on the presence of a positive COVID-19 test as documented in the N3C database, without any granular information on

the presence or timing of symptoms, or the type of obtained test. This approach seems quite problematic as it relies on the assumption that positive tests, as documented in this database, are sufficient to determine both patient status and the timing of said status. Ultimately, the main concern of this study is centered on the questionable validity of employing a positive COVID-19 test as a proxy for the presence of the physiological changes which characterize the acute stage of a COVID-19 infection.

As a large database study, the current study was not able to determine the exact timing between the positive test and any possible COVID-19 symptoms (either past, ongoing, remote or even non-existing). The CDC reports that COVID-19 PCR tests can remain positive for up to 90 days after an infection [3]. It is not exactly clear why some individuals test positive for so long; some data suggest that this may be related to the potential of the virus RNA to undergo reverse transcription and integration into the host genome, ultimately resulting in positive testing for an extended period [4]. This hypothesis, however, has been disputed by other experts [5].

The extended positivity of COVID-19 PCR tests for up to 90 days raises an intriguing question, namely whether the immune response and physiological changes induced by an acute COVID-19 infection actually persist for such a protracted period. The current literature indicates that normal immune function is typically restored in roughly 2 weeks after a COVID-19 infection [6]. Furthermore, the CDC indicates that even those who develop post-COVID conditions (the so-called long COVID) are not especially prone to testing positive past acute infection [7]. Such data suggests that a positive PCR test is likely a poor indicator of the acuteness of the infection and the associated immune and inflammatory re-

FDA device/drug status: Not applicable.

Author disclosures: **TS**: Nothing to disclose. **TAM**: Nothing to disclose.

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<https://doi.org/10.1016/j.xnsj.2023.100304>

Received 10 November 2023; Accepted 6 December 2023

Available online 9 December 2023

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sponses which may possibly lead to an increase in the risk of complications after elective spine surgery. Ultimately, it is still unclear which pathophysiological mechanism would explain how a continuously positive COVID-19 testing from a remote infection in an asymptomatic patient may be causally linked to increased perioperative risks.

Finally, the current study also does not specify the reasons behind the patients' testing. This is especially problematic as, at one point during the pandemic, many hospitals required a negative COVID-19 test for scheduling elective surgeries. Therefore, it is likely that the analyzed database included a substantial number of asymptomatic patients who were submitted to COVID-19 testing solely for the purpose of having their surgeries performed. In fact, without knowing the percentage of patients who had symptoms and those who were submitted to testing as part of a standard surgical scheduling protocol, it is almost impossible to consider the ultimate implications of the association between positive COVID-19 testing and the observed increased rates of perioperative complications. If testing was not performed for every surgical candidate, it may be that those who tested positive were more prone to adverse surgical events due to the presence of multiple comorbidities (such as COPD, for example), which were the very reasons why they received COVID-19 testing in the first place. In this scenario, the patient's surgical risk and the positive COVID-19 test are intertwined with external factors to the point that the comorbid states themselves (and not the COVID-19 positivity) may be the actual relevant variable which explains the increased risk of perioperative complications. In other words, in order to properly interpret the findings of the study by Chan et al., it seems essential to consider the extent that testing itself was influenced by external variables which may independently affect the surgical risk, something that cannot be pursued based on the presented data.

Given these intricacies, it is evident that employing a simple positive COVID-19 test as a proxy for a patient's health status and readiness for elective lumbar fusion is quite questionable. Ultimately, physicians should undertake a comprehensive assessment of the patient's overall health and the urgency of the surgical procedure to determine whether proceeding with surgery or delaying it would be the most suitable option. The presence of ongoing or recent COVID-19 symptoms, the patient's comorbidities, age, other risk factors, and the consequences of surgical delay should all be taken into account during the complex decision-making process at hand. These individualized considerations emphasize that a blanket policy of delaying lumbar fusion by 2 weeks following a positive COVID-19 test, at least based on the limited data provided by Chan et al., is of quite questionable rationality insofar as

it fails to consider the nuanced and multifaceted nature of this complex issue. Future research, including data of both positive COVID-19 tests and the proximity of infection symptoms to the testing itself, are necessary before evidence-based guidelines for delaying lumbar fusion following a COVID-19 positive test can be established. Until then, we should advocate that medical decisions regarding the timing of lumbar fusion (and, for that matter, any other spine surgery) in patients with a positive COVID-19 test should not become a matter of institutional policy, but should be reserved to the best judgement of the spine surgeon in charge who, having the patient's well-being as the ultimate guiding principle, is in a unique position to better judge and balance the relevant interests including the estimated perioperative risks and the possible consequences of delaying surgery.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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