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.

outfitted with standard PPE as well as a personal air purifying respirator (PAPR) when appropriate, as per CDC guidelines.[4] In each circumstance, standard surgical site preparation was performed, routine instrumentation was used, and full paralysis was provided for every patient. Intraoperatively, vacuum-suctioning was used sparingly. Entry into the trachea was announced by the surgeon to allow for less essential personnel to briefly exit the room at the time of near-coincidental oral extubation and tracheostomy tube placement. To date, there have been no reported COVID-19 infections in our team staff using this protocol.

Historical open and percutaneous airway techniques and existing safeguards remain practical and relevant, even under the current duress of the pandemic crisis. Minimizing procedure personnel, using paralytic agents, economizing suction evacuation, and above all, communicating with anesthesia and nursing staff appear to be the key drivers in limiting COVID-19 transmission at our center. There is no surgical protocol that completely eliminates the risk of infection from aerosolized SARS-CoV-2 during tracheostomy. Preservation of essential hospital resources, including human, is a priority for the foreseeable future. To that end, we acknowledge the important contribution of surgical improvisation by well-intentioned operators, and advocate the usual caution in adopting any novel, but unvalidated, technique.

REFERENCES

1. Foster P, Cheung T, Craft P, et al. Novel approach to reduce transmission of covid-19 during tracheostomy. J Am Coll Surg 2020;230:1102−1104.
2. Tay JK, Khoo ML, Loh WS. Surgical considerations for tracheostomy during the COVID-19 pandemic: lessons learned from the severe acute respiratory syndrome outbreak. [Online ahead of print March 31, 2020]. JAMA Otolaryngol Head Neck Surg 2020.
3. Guidance for surgical tracheostomy and tracheostomy tube change during the COVID-19 Pandemic. Available at: https://www.entuk.org/tracheostomy-guidance-during-covid-19 pandemic. Accessed August 30, 2020.
4. Clinical management of critically ill adults with COVID-19. Available at: https://emergency.cdc.gov/coca/ppt/2020/V4_Combined_Critically-Ill-Adults-COCA 4.2.2020.pdf. Accessed August 30, 2020.

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Surgical Precautions and Algorithmic Decision-Making for Surgical Procedures During the COVID-19 Pandemic

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The article "Precautions for operating room team members during the COVID-19 pandemic" by Forrester and colleagues[1] is very interesting and well written. However, it does provoke some controversy, which I would like to highlight. Forrester and associates[1] reported an institutional algorithm to protect operating room team members during the COVID-19 pandemic and rationally conserve personal protective equipment (PPE).

In COVID-19, there may be abnormalities in objective tests, even if patients are asymptomatic. For example; in a study of patients with 24 asymptomatic COVID-19 infections, thorax CT was performed on all patients, with typical ground-glass opacities or irregular shadows in 50% of patients and atypical imaging findings in 20%.[2,3] Five of these patients had mild fever within a few days of diagnosis.[2] Another study conducted on 55 patients with asymptomatic infection detected by contact history showed that 67% had initial signs of pneumonia in CT initially, only 2 patients developed hypoxia, and all healed. In a study conducted with 1,014 patients in Wuhan, China, the sensitivity of the reverse transcriptase-polymerase chain reaction (RT-PCR) test and thorax CT in the diagnosis of COVID-19 was compared.[4] Considering the positivity rates of thorax CT with reference to the RT-PCR test (evaluated by 2 different radiologists); the sensitivity of thorax CT was 97% and its specificity was 25%.[5] Low specificity has been associated with other etiologic factors causing similar CT findings.

We have developed a comprehensive decision-making tree algorithm that includes precautions and guidelines for operating room team members to be used in emergency, urgent, and elective surgical procedures (Figs. 1 and 2). The RT-PCR test for COVID-19 has 60% sensitivity when a nasal swab is taken, and 31% lower

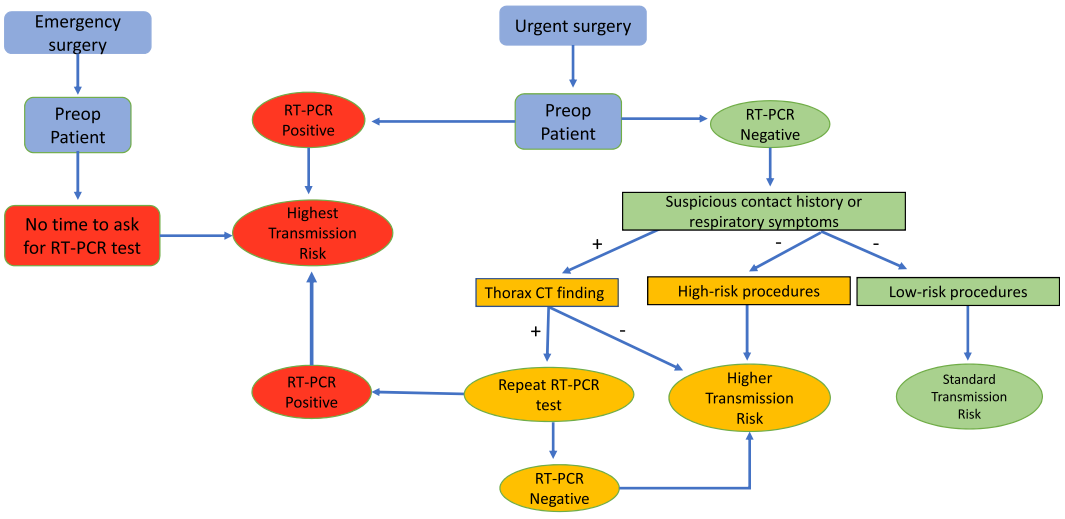

Figure 1. Algorithmic decision-making for the emergency and urgent surgical procedures COVID-19 pandemic.

sensitivity when using pharyngeal swabs.[1] In addition, some asymptomatic COVID-19 patients with false negative RT-PCR may potentially transmit the disease to others.[6] Therefore, due to the possibility of the RT-PCR test being false negative, thorax CT was recommended in patients with negative risk of RT-PCR test in case of suspicious contact history or clinical symptoms in patients undergoing surgical procedures. The RT-PCR test was repeated 24 hours later if the first one was negative. Therefore, the risk of false negativity of the test was also minimized (Figs. 1 and 2).

Viral pneumonia caused by COVID-19 is mostly compatible with ground glass opacification with the consolidation areas in line width. It was determined that pulmonary CT findings are frequently bilateral, peripheral, and involve the lower lobes, and less common findings include pleural thickening, pleural effusion, and lymphadenopathy.[7] The American College of Radiology (ACR) has suggested that chest CT should not be used for screening or diagnosis of COVID-19 and should be kept for diagnosis and treatment of hospitalized patients.[8] Therefore, in our algorithm, thorax CT was ordered for elective and urgent patients undergoing high-risk procedures only if they had a suspected history of contact or respiratory symptoms (Figs. 1 and 2). In addition, education and training for the proper fitting and removal of personal protective equipment (PPE) is essential for the safety of healthcare professionals. A mistake in fitting and removal

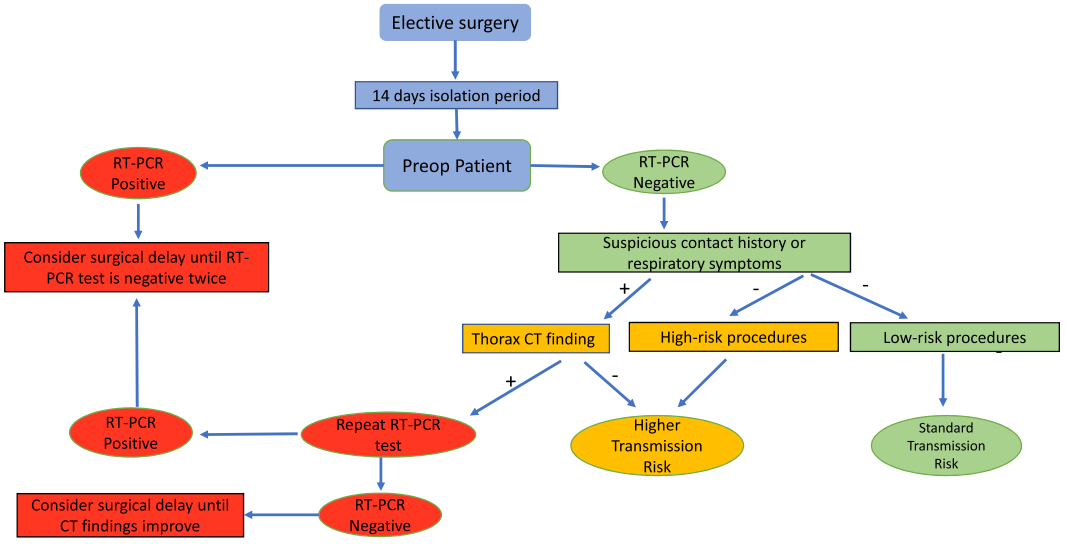

Figure 2. Algorithmic decision-making for the elective surgical procedures COVID-19 pandemic.

may be especially important in high-risk procedures for healthcare professionals.[9]

The treatment algorithm of patients infected with COVID-19 was reported by Forrester and coworkers.[1] It was limited to surgical risks of emergency surgical approaches only. The RT-PCR test result is not awaited due to the urgency of the cases. However, in publications on COVID-19, the number of asymptomatic patients in society can be up to 81%.[10] Thorax CT, with a sensitivity of 97%, has never been evaluated in the algorithm.[4] Patients with negative RT-PCR were considered at standard risk. However, according to the way the RT-PCR test is done, false negativity can be up to 60%.[5] In our algorithm, thorax CT was provided for patients with suspected symptoms and negative RT-PCR tests.

In addition to determining whether there is potential COVID-19, emphasis is now placed on antibody testing to determine whether individuals are recovering. Although these tests can detect an antibody response to a possible virus infection, it is not yet known whether the measured antibodies can effectively prevent infection. Therefore, there is no guarantee that patients or healthcare professionals will not be re-infected, even if they have serology tests that show that they have recovered from COVID-19. Until the value of the serology tests is determined, all healthcare professionals should follow the recommendations regarding the use of appropriate PPE to avoid COVID-19 infection, regardless of serology results.[11] If possible, in highest transmission risk patients, we planned to use experienced healthcare professionals who have recovered from COVID-19 completely, and/or who have antibodies to care for the high-risk patients.

The unprecedented COVID-19 global pandemic required rapid development of new guidelines and protocols. Because COVID-19 is a new, but apparently not a short-term, threat, we have attempted to develop a practical decision tree algorithm for optimal and rational safety of the patients and healthcare workers in emergency, urgent, and elective surgical procedures. The algorithm is expected to be widely adopted by healthcare providers.

REFERENCES

1. Forrester JD, Nassar AK, Maggio PM, Hawn MT. Precautions for operating room team members during the COVID-19 pandemic. J Am Coll Surg 2020;230:1098–1101.
2. Hu Z, Song C, Xu C, et al. Clinical characteristics of 24 asymptomatic infections with COVID-19 screened among close contacts in Nanjing, China. Science China Life Sciences 2020;63:706–711.
3. Wang Y, Liu Y, Liu L, et al. Clinical outcome of 55 asymptomatic cases at the time of hospital admission infected with SARS-Coronavirus-2 in Shenzhen, China. Available at: europepmc.org. Accessed May 10, 2020.
4. Ai T, Yang Z, Hou H, et al. Correlation of chest CT and RT-PCR testing in Coronavirus Disease 2019 (COVID-19) in China: A report of 1014 cases. Radiology 2020;296:E32–E40.
5. Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens. JAMA 2020;323:1843–1844.
6. Bai Y, Yao L, Wei T, et al. Presumed asymptomatic carrier transmission of COVID-19. JAMA 2020;323:1406–1407.
7. Zhao W, Zhong Z, Xie X, et al. Relation between chest CT findings and clinical conditions of coronavirus disease (covid-19) pneumonia: A multicenter study. Am J Roentgenol 2020;214:1072–1077.
8. Simpson S, Kay F, Abbara S, et al. Radiological Society of North America Expert Consensus Statement on Reporting Chest CT Findings Related to COVID-19. Endorsed by the Society of Thoracic Radiology, the American College of Radiology, and RSNA. J Thorac Imaging 2020;35:219–227.
9. Suen LKP, Guo YP, Tong D, et al. Self-contamination during doffing of personal protective equipment by healthcare workers to prevent Ebola transmission. Antimicrobial Resistance and Infection Control 2018;7:157.
10. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention. JAMA 2020;323:1239–1242.
11. Livingston EH. Surgery in a time of uncertainty: A need for universal respiratory precautions in the operating room. JAMA 2020 May 7. Online ahead of print.

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Concerns about Proposed Update to COVID-19 Screening Protocols before Surgery

In Reply to Yenigun and Colleagues

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In their letter, the authors suggest that reverse transcriptase polymerase chain reaction (RT-PCR) testing is not adequate for screening patients before surgery for COVID-19, and concurrently, that CT scans of the thorax should be integrated into the preoperative screening algorithm. While the authors are to be commended for adapting our previously published algorithm[1] to reflect their institutional limitations, we have some concerns with the algorithm that they propose. First, the authors report RT-PCR sensitivity of 60% for nasal swab, with a lower sensitivity for pharyngeal swab.[2] Although this may reflect the sensitivity of RT-PCR performed in their