JBI EVIDENCE SUMMARY

CORONAVIRUS (COVID-19): MANAGEMENT OF INFECTED PATIENTS IN PERIOPERATIVE SETTINGS

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Question

What is the best available evidence regarding changes to planning in perioperative settings for the optimal care of COVID-19 patients during the COVID-19 pandemic?

Clinical Bottom Line

The outbreak of the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), known as coronavirus disease 2019 (COVID-19), has caused healthcare organizations to activate infection prevention and control protocols specific for use during pandemics.[1,2,3,4,5,6] Planning for optimal patient care for those patients suspected of, or with confirmed diagnosis of, COVID-19, in perioperative settings have needed to be amended.[123]

- An observational study described strategies for addressing challenges for surgical departments during COVID-19. Four critical issues were identified: frequent communication throughout the department backed by the development of a cohesive leadership team and system; ensuring adequate hospital capacity (acute care and intensive care unit [ICU] beds); safeguarding supplies of blood products and personal protective equipment (PPE) to protect the patients and providers; and preparing for an unstable (and potentially dwindling) workforce due to illness and competing personal priorities. Recommendations were developed regarding PPE for use by anesthetists and surgical staff, and a three-tiered, color-coded algorithm was developed based on the number of suspected or confirmed COVID-19 cases presenting at the hospital for use of operating rooms (ORs):[1] (Level 3)
  - When a patient awaiting surgery is under investigation (PUI) or confirmed of COVID-19 (COVID+), the anesthesia provider and all surgical/nursing/scrub staff must wear a single-use N95, a face shield, goggles or a powered air-purifying respirator (PAPR), a gown, and double gloves.
  - When no staffing shortages and < six PUI/COVID+ (green): Surgeons and ORs should be available to rapidly discharge ED patients and have capacity for surgery of urgent cases; preparative services should be put on hold for seven days; non-urgent cases should be reviewed.
  - When staffing shortage < 15-20% and seven to 24 PUI/COVID+ (yellow): as for green; close OR schedule for elective surgery (high priority surgery to be assessed case-by-case); debrief at 6:30am Monday to Friday.
  - When staffing shortage > 21% and > 24 PUI/COVID+ (red): as for yellow; close to all transfers.
- A cross-sectional study investigated how surgeons dealing with emergency surgery had reacted to the COVID-19 pandemic. Surgeons from multiple regions in Italy were asked to complete an online survey about their behaviors towards COVID-19-positive patients needing urgent surgery. From the cross-section, 80.3% of the hospitals treated COVID-19 patients, and in 69.1% of these, an updated work-plan was necessary; advanced PPE was required for staff in 12.7% of ORs. In 33.8% of hospitals, at least one

member of the surgical team was quarantined and 28.2% of surgeons tested positive for COVID-19. Authors confirmed there had been a 'dramatic' change in surgical practices with urgent cases more challenging despite reduction in number of surgeries (73.9% of surgeons operated on urgent cases only, while 21.7% continued a limited number of oncological surgeries). A number of surgical staff moving to emergency departments was also seen (46.5%) despite the overall number of surgeons staying the same.[2] (Level 4)

- Clinical guidelines and expert opinion, focusing on changes to perioperative settings during the rapid evolution of the COVID-19 pandemic, provided the following recommendations:[3,4,5,6,7] (Level 5)
  - To confirm necessity of surgery, patients should be reviewed by two surgeons, when available,[4] and non-emergency surgery should be cancelled or postponed.[3,4,5,6]
  - One of more dedicated ORs should be identified and equipped with a negative pressure system ensuring an appropriate negative pressure level;3-7 the dedicated OR should be labeled "infectious surgery".[6]
  - All OR staff should be notified of a patient's need for surgery, immediately after the need for surgery is established.[3]
  - Patients with suspected or confirmed COVID-19 infection requiring surgery should undergo a chest X-ray and/or a chest ultrasound and/or a chest CT to look for bilateral interstitial pneumonitis (peripheral ground-glass consolidations).[4]
  - Preoperative documentation should be completed before the patient begins the journey to OR.[34]
  - Designated pathways (including lifts/elevators) must be designed for transporting patients to OR; patients must be transported directly and safety. This involves the coordination of all teams involved.[34]
  - Patients must wear a surgical mask during transportation (where intubation is not required).[4]
  - Patients should undergo secondary triage by the anesthesiologist (medical history, brief physical examination including temperature, and review of the chest CT or X-ray) before being taken to the OR.[6]
  - Minimal numbers of healthcare workers should be involved in transporting the patient to OR in order to minimize risk of infection (e.g. those transporting the patient should position the patient on the OR bed prior to exiting the room, to minimize the number of people in the room at one time).[3,4,6]
  - Risk stratification tools are recommended for guiding priorities and goals of care (Portsmouth Physiological and Operative Severity Score for the enumeration of mortality and Morbidity [P-POSSUM], Predictive OpTimal Trees in Emergency Surgery Risk [*POTTER*], and National Emergency Laparotomy Audit [NELA]).[4]
  - All healthcare workers should wear white medical gowns, medical gloves, eye protection shields, disposable surgical caps, and surgical masks or test-fit N95 masks or respirators during transportation, to be removed when leaving the OR and placed in a designated receptacle.[3,4,6,7]
  - Anesthesiologists may use N-93/FFP3 masks for intubations, if available.[4]
  - Movement of patients and healthcare workers should be limited within the perioperative environment in order to preserve patients' safety and to limit the viral spread.[5]
  - Isolation of the patient should continue for the postoperative period.[4,6]
  - Consideration may be given to using a topical local anesthetic during airway manipulation in order to minimize aerosolization from coughing.[3]
- A position paper from the World Society of Emergency Surgery provided consensus-based general guidelines for surgical patient management during COVID-19 pandemic in an emergency setting. The following recommendations were identified:[8] (Levels 1 and 5)

- Screening for COVID-19 infection at the emergency department of all surgical patients with clinical and epidemiologic features suspected for COVID-19 disease who are waiting for hospital admission and urgent surgery. The screening consists of performing an RT-PCR nasopharyngeal swab test and a baseline (non-contrast) chest CT or chest X-ray or lung ultrasound, depending on skills and availability.
- Completion of the COVID-19 screening (RT-PCR nasopharyngeal swab test + chest imaging) for all acute surgical patients before admission in the surgical ward or operating room. If the RT-PCR swab test result is not available to confirm the diagnosis, the patient needs to be isolated and treated as COVID-19 (+) patients with all the mandatory precautions. The acute care surgeon is the only responsible for the decision of possible delaying of a surgical procedure in the emergency setting during the pandemic. Timing of Acute Care Surgery (TACS) classification is a good tool to evaluate timing of surgery. According to this classification, surgery cannot be postponed for class1 (immediate surgery) and class 2 (surgery in 1 hour, as soon as possible) patients even if diagnosis of COVID-19 is not yet confirmed by RT-PCR swab test.
- If it is not possible to confirm diagnosis of COVID-19 disease in an acute surgical patient by RT-PCR swab test, the patient should be managed as though he/she is COVID-19 (+) with all the mandatory precautions against viral infection, that include all the protective measures and a dedicated pathway for the operating room, to decrease the risk of environmental contamination and health personnel exposure. If a dedicated pathway for COVID-19 (+) patients is not available in the hospital, it should be an option to transfer hemodynamic stable suspected patients to the nearest COVID-19 hub hospital for appropriate management.
- In case of RT-PCR test and chest CT scan unavailability, completing the COVID-19 screening with chest X-ray or lung ultrasound can help assess the severity of COVID-19 pneumonia. If the nasopharyngeal swab test is positive, the patient is a COVID-19 confirmed patient.
- In evaluating the necessity to perform emergency surgery in COVID-19 (+), international guidelines about immediate surgery or nonoperative strategies should be used, evaluating each case and resource availability. According to TACS classification, class 1 and 2 patients require surgical treatment in a very short delay.
- If an immediate surgical procedure needs to be performed, whether laparoscopic or via open approach, every effort should be made to protect the operating room staff, and the safety of the patient. To perform a safe surgical procedure, the necessary PPEs and an established protocol for the preoperative, perioperative and postoperative management of the COVID-19 surgical patient should be observed.
- Prophylactic anticoagulation with low molecular weight heparin should be administered as soon as possible in COVID-19 surgical patients to reduce thromboembolic risk related to the virus, sepsis and emergency surgery. The dosage of the anticoagulant therapy has to be adjusted according to the risk of surgical bleeding, renal function and weight of the patient. If it is not possible to administer an antithromboembolic prophylaxis, intermittent pneumatic compression should be considered in case of immobilized patient; the patient should be mobilized as soon as possible.
- Antibiotics should be carefully administered in COVID-19 surgical patients at high risk for resistant bacteria, especially in patients admitted in ICU for mechanical ventilation. Early empirical antibiotic treatment should be targeted to results from cultures, with de-escalation of treatment as soon as possible.
- After an emergency surgical procedure, re-admitting is recommended in Covid-ICU patients with severe pneumonia for management and monitoring.
- After hospital discharge, all confirmed surgical COVID-19 patients should be kept in isolation for at

least two weeks after the date of their first positive nasopharyngeal swab test and until negative RT-PCR nasopharyngeal swab test is obtained.

- A systematic review investigated the management of oncology and surgical patients and identified recommendations that cover the entire field of surgical care, from preoperative management of positive and suspected cases to organization of the operating theaters and postoperative patient care:[9] (Level 3)
  - Mandatory postponement of elective surgery, however, for patients with cancer, case-by-case evaluation should be performed and surgery may be warranted in patients in whom a delay would lead to negative long-term outcomes.
  - Routine screening, particularly 48 hours prior to surgery, for all patients scheduled for surgery to avoid perioperative transmission. Negative patients should continue with the surgical management as planned, however, positive patients should be treated in dedicated hospitals or units with further care of the infection or managed at home until testing negative for COVID-19.
  - Consider all patients admitted to the hospital as suspected SARS-CoV-2 cases.
  - Use PPE.
  - Team members who will manage COVID-19 cases for the day must be identified along with the adoption of relatively long shifts to reduce potential COVID-19 exposure.
  - Regular screening of health care workers.
  - When surgery is decided, consent and charting should be filled out electronically.
  - The suspected or confirmed infected patients should be transported to the operating theater via a designated route, designed to minimize contact with others. All patients should wear a surgical mask.
  - Creation of COVID free hospitals or units, to guarantee the best possible care to surgical care patients, minimizing the risk of COVID-19 infection during hospitalization.
  - When surgery is planned, a team meeting should be organized to accurately plan anesthesia and surgical approaches that may decrease the exposure of the operating staff and shorten the duration of surgery.
  - Regional anesthesia is preferred if feasible. If general anesthesia is mandatory, a definitive airway with an endotracheal tube is then preferred.
  - Operating room staff should be limited to people who are necessary to complete the procedure. Trainees should not be involved if not necessary, and staff who are not needed should preferably be left out.
  - Necessary surgical equipment should be selected in advance and brought to the designated operating room. Preference should be given to single-use equipment.
  - Identify a separate theater or small operating room complex for suspected or confirmed COVID-19 patients and such a room should ideally be a negative pressure environment. Frequent air changes (25 per hour) should be guaranteed.
  - Specific areas should be identified for donning and doffing of PPE. All doors of the operating room should be locked, and traffic in and out the theater should be strictly controlled. The principle of “3 zones and 2 passages” should be followed, with identification of a contaminated zone, a potentially contaminated zone, and a clean zone, separated by adequate buffer areas.
  - Place hand sanitizing devices and disinfection caps for syringes and hubs in proximity to the providers.
  - Proper patient decolonization, using pre-procedural Chlorhexidine tips, nasal povidone iodine, and Chlorhexidine mouth rinse are critical.
  - At the end of every surgery, extensive cleaning should be carried out. Staff should be given the opportunity to shower and change into clean scrubs.

- Patient recovery should be carried out in the same operating room as where the surgery was performed. Anesthetic drugs could also be selected to minimize recovery whenever possible.
- A high index of suspicion for COVID-19 is necessary to monitor for the development of post operative fever or respiratory manifestations, so as to minimize the time for diagnosis and thus reduce the risk of negative outcomes.
- Follow-up visits should also be limited to essentials. Telemedicine should also be extensively adopted in follow-up.

Characteristics of the Evidence

This summary is based on a structured search of the literature and selected evidence-based health care databases. The evidence included in this summary is from:

- A descriptive observational study undertaken at a 1,000-bed hospital across three campuses.[1]
- A cross-sectional study involving 71 questionnaires from surgeons.[2]
- Clinical practice guidelines and expert opinon.[3,4,5,6,7,8,9]
- A position paper informed by a systematic review and consensus-based process.[8]
- A systematic review of 28 retrospective studies.[9]

Best Practice Recommendations

- Patients for surgery should be screened and tested for COVID-19. (Grade A)
- It is recommended that all healthcare professionals involved in the surgery of patients who tested positive for COVID-19 should use all the necessary protective equipment to minimize possible transmission, including wearing a single-use N95, a face shield, goggles or a PAPR, a gown, and double gloves during surgery. (Grade B)
- One or more dedicated ORs should be assigned for surgery of COVID-19 patients only. (Grade B)
- Cancellation or postponement of non-emergency surgeries may be considered, where safe to do so. (Grade B)
- Movement of patients and surgical staff should be kept to a minimum. (Grade B)
- During the postoperative period, isolation of patients may be considered. (Grade B)
- COVID-19 positive patients for surgery should be managed using established protocols for Covid-19 surgery. (Grade B)

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Archived Publications

1. JBI-ES-60-1 (Published at 12 October 2021)

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For details on the method for development see Munn Z, Lockwood C, Moola S. The development and use of evidence summaries for point of care information systems: A streamlined rapid review approach. Worldviews Evid Based Nurs. 2015;12(3):131-8.