

## Surgery in the COVID-19 Era: A Narrative Review

### Abstract

The coronavirus disease 2019 (COVID-19) pandemic affected the delivery of surgical care and services. This review article aims to appraise the impact of COVID-19 on surgical care. The authors discuss the literature on surgery and COVID-19 under the following themes: emergency case triaging, elective surgery triaging, operating on a COVID-19-positive patient, surgical smoke, management of scarce resources, and restarting elective surgery. Most of the large surgical societies recommended and most surgical departments all over the world implemented the cancellation of elective surgeries, while emergency surgeries proceeded as usual. Elective surgeries were triaged taking into consideration the COVID-19 infection rate in the locality, availability of resources, and the need for intensive care unit beds and ventilators. A COVID-19-positive patient should not be denied surgery if indicated, and the recommended precautions and use of personal protective equipment should be adhered to. The generation of surgical smoke occurs in both laparoscopic and open surgeries, and it has not been shown to contain this novel virus. Smoke generation should be minimized and laid down guidelines followed. Laparoscopic surgery seems to have an advantage over open surgery in this regard. In resuming elective surgeries, the local infection rates, bed occupancy rate, and availability of resources should be taken into cognizance. We should learn from this pandemic so as to be prepared for future occurrences, which is a significant possibility.

**Keywords:** COVID-19, review article, surgery

### Abstrait

La pandémie de maladie à virus Corona 2019 (COVID-19) a affecté la prestation de soins et de services chirurgicaux. Cet examen dans notre article vise à évaluer l'impact des Covid-19 sur la chirurgie des soins. Les auteurs discutent de la littérature sur la chirurgie et Covid-19 sous les thèmes suivants: cas d'urgence triaging, la chirurgie élective triant, opérant sur un patient positif Covid-19, la fumée chirurgicale, la gestion des ressources rares et le redémarrage de la chirurgie élective. La plupart des grandes sociétés chirurgicales recommandaient, et la plupart des services de chirurgie du monde entier ont mis en œuvre l'annulation des chirurgies électives tandis que les chirurgies d'urgence se déroulaient comme d'habitude. Sur électifs Guéries ont été triés en prenant en considération la Covid -19 taux d'infection dans la localité, la disponibilité des ressources et la nécessité d'I intensive C sont Unit (USI) lits et des ventilateurs. Un Covid -19 patients positif ne doit pas se voir refuser la chirurgie si cela est indiqué, et les précautions recommandées et l'utilisation d'Équipement de protection PERSONNEL LES (EPP) doivent être respectées. La génération de fumée chirurgicale se produit à la fois en chirurgie la périscopique et en chirurgie ouverte et il n'a pas été démontré qu'elle contenait ce nouveau virus. La production de fumée doit être réduite au minimum et des directives établies doivent être suivies. La chirurgie laparoscopie semble avoir un avantage sur la chirurgie ouverte dans ce domaine. En résumant les chirurgies électives, t- il des taux d'infection locale, le taux d'occupation des lits et la disponibilité des ressources devraient être prises en connaissance. Nous devons tirer les leçons de cette pandémie pour nous préparer à de futures occurrences, ce qui est une possibilité importante.

**Mots clés:** chirurgie, COVID-19, article de synthèse

### Introduction

The novel severe acute respiratory syndrome coronavirus-2 (SARS CoV-2) also known as coronavirus disease 2019 (COVID-19) was

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discovered in Wuhan, China after a cluster of patients presented with atypical pneumonia.<sup>[1]</sup> Aided by international transport, the virus spread worldwide prompting the World Health Organization (WHO) to declare it a pandemic on March 11, 2020.<sup>[2]</sup> This pandemic has caused a crisis never before seen by anyone

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alive today except perhaps for the living Second World War veterans. As on August 12, 2020, 20,162,474 people had been affected worldwide with 737,417 deaths.<sup>[3]</sup> The economy and virtually all aspects of life were adversely affected including health care. Healthcare facilities had to brace up to the storm and had to reorganize healthcare delivery with the COVID-19 patients as the focus. This affected the status quo in departments in hospitals including the Departments of Surgery and led to a new way of doing things. The guiding principles in the response of surgical systems to this pandemic are to sort out and dispense surgical care to patients for maximal benefit akin to what is done in mass casualty events and to ensure the safety and preservation of the workforce.<sup>[4]</sup> The aim of this paper is to review the effects of COVID-19 pandemic on surgical service delivery under the following themes: emergency and elective case triaging, operating on a COVID-19 patient, surgical smoke, management of scarce resources, and resumption of elective surgeries.

### The Role of a Surgeon in a Crisis

By virtue of their training, surgeons are particularly well adapted to managing crisis situations. Trauma care, disaster management, and emergency preparedness are an integral part of residency training.<sup>[5]</sup> Their familiarity with “donning and doffing” of personal protective equipment (PPE) in trauma situations and in the operating room is useful for education in this regard. Their knowledge of surgical asepsis, infection control, and critical care can be harnessed in the COVID-19 crisis. Triaging is an exercise performed by the surgeon on a regular basis as taught in Advanced Trauma Life Support courses. The principles are similar to triaging with respect to the COVID-19 pandemic. The surgeon can assume leadership roles in triage and resource management.<sup>[4,6]</sup> It must also be emphasized that a COVID-19 patient may require surgical intervention.

### Impact of COVID-19 Pandemic on the Surgical Community

The COVID-19 pandemic has taken its toll on surgical units worldwide. Globally, most departments of surgery at some point had to cancel all elective surgeries.<sup>[7-10]</sup> Surgeries performed were life- and limb-threatening emergencies and urgent cancer surgeries. The aim is to protect the patients and staff as well as to conserve manpower, PPE, and bed spaces in the intensive care unit (ICU) and wards in the event of a surge in COVID cases. Some surgical wards were converted to isolation centers and even some operating theaters were converted to ICUs.<sup>[10,11]</sup> In localities with a high infection rate, surgeons were pulled out of the operating room and deployed to the emergency department and ICU.<sup>[12]</sup> Clinic visits across board were reduced by about 60%, being especially worse among surgical specialties.<sup>[13]</sup> There was an increase in telemedicine visits. Consequently, the number of surgeries performed also dropped worldwide leading to a backlog of about 25 million elective cases.<sup>[8]</sup> In response to physical distancing and travel restriction laws,

in-person statutory meetings of most surgical departments were cancelled.<sup>[9,10]</sup> These include morning reviews, morbidity and mortality meetings (M&M), and multidisciplinary team (MDT) meetings. These were replaced by virtual meetings as recommended.<sup>[9,14]</sup> There were also disruptions of medical students and residents training. Some statutory examinations of surgical colleges for residents were postponed,<sup>[15,16]</sup> and the meetings of several surgical associations, societies, and colleges were cancelled.<sup>[17,18]</sup> The Clinical Congress of the American College of Surgeons, which is the largest academic meeting of surgeons in the world, will be held virtually in November 2020.<sup>[19]</sup> There has also been a rapid proliferation of publications on COVID-19 in the surgical literature.<sup>[20]</sup>

### Emergency Case Triaging

Management of life- and limb-threatening conditions is to continue as usual.<sup>[4]</sup> Personnel should don appropriate PPE during the evaluation of such patients. Where logistics for testing are available, it is encouraged in all patients to undergo emergency surgery during the pandemic. Where testing facilities are lacking, triaging using temperature checks and questions on travel, a history of cough, fever, difficulty in breathing, contact and cluster, should be sought. If these are in the affirmative, the patient should be isolated in a holding area and the appropriate authorities notified. If feasible and backed by evidence, alternative, conservative treatment methods for a given condition should be instituted.<sup>[4,21]</sup> It is of utmost importance to ensure that the appropriate PPE is available and the required safety precautions are observed in the theater. If other options for anesthesia are available, general anesthesia (GA) requiring intubation should be avoided as it is an aerosol-generating procedure.<sup>[22]</sup> The Royal College of Surgeons of England guidelines on surgical prioritization categorizes cases based on the urgency of need for surgical intervention.<sup>[23]</sup> Priority 1a patients have life-threatening conditions and require intervention within 24 h and priority 1b within 72 h.<sup>[23]</sup> Priorities 2, 3, and 4 patients are less urgent cases and require surgery within 1, 3, and beyond 3 months, respectively.

Surgical cases that are emergencies include the acute abdomen, all trauma cases, fractures and crush injuries, and others under the different subspecialties.<sup>[22]</sup> Complicated hemorrhoids may become emergent and conservative management such as sitz baths, ice packs, and analgesia may suffice. If they do not improve, surgery is indicated.<sup>[22]</sup> Perianal abscesses can be drained in the office. Large complex abscesses with cellulitis should be handled in the theater.<sup>[22]</sup> All cases of pneumoperitoneum due to perforated peptic ulcer and typhoid perforations should be promptly managed operatively. Intestinal obstruction from post-operative adhesions should be managed initially conservatively, with surgery reserved for when conservative treatment fails.<sup>[22]</sup> Other forms of obstruction, for example, from external herniae should be treated surgically. Studies have suggested that antibiotic therapy for uncomplicated appendicitis may be appropriate.<sup>[24]</sup>

In this pandemic, this alternative is acceptable. It should be borne in mind that in 8% of patients, antibiotic therapy will fail in the present admission, and of those who are discharged, 20% will have a recurrence.<sup>[24]</sup> Complicated appendicitis save for appendix mass should be treated surgically. Acute cholecystitis should be initially treated conservatively, followed by an interval cholecystectomy. Cholecystostomy may suffice in very ill patients.

### Elective Case Triage

There are several guidelines on how to triage elective surgical cases.<sup>[22,23]</sup> The elective surgery acuity scale developed in St Louis University by Sameer Siddiqui is one of the most common and easy to use models.<sup>[25]</sup> The scale sorts patients into tiers based on their diagnosis, where such patients can be seen and recommends actions to be taken.<sup>[25]</sup>

Apart from cosmetic surgery, the cases which we term electives are actually Medically Necessary Time Sensitive (MeNTS) procedures.<sup>[26]</sup> They are time sensitive in the sense that surgery is required to control pain, stop disease progression, prevent complications, and improve quality of life. The University of Chicago developed a scoring system, the MeNTS score, taking into consideration 21 parameters under the three domains: disease factors, patient factors, and procedure-related factors.<sup>[26]</sup> The minimum and maximum scores are 21 and 105, respectively.<sup>[26]</sup> A higher score is associated with poor perioperative outcomes, increased risk of COVID-19 transmission to healthcare workers, and an increased consumption of hospital resources and it is recommended that such cases be deferred.<sup>[26]</sup> The MeNTS scoring system enables surgeons to objectively triage elective surgery cases and reduces the ethical burden of guilt that comes with allocation of scarce resources in times like this.<sup>[26]</sup> The University Hospital, Warzburg also developed a triaging system for prioritization of elective cases.<sup>[27]</sup>

In patients with cancers, the benefits of surgery should be balanced against the effects of diversion of resources from potential COVID-19 patients, as well as the risk of the patients developing COVID-19 in the course of treatment.<sup>[28]</sup> The case status, local prevalence of COVID-19, the number of COVID-19 patients in the hospital, and the availability of resources should all be considered. The decision to operate on a cancer patient in the pandemic should ideally be taken by a multidisciplinary team.<sup>[28]</sup> Other forms of therapy such as chemotherapy, hormonal therapy, and targeted therapy should be considered. Using breast cancer as a prototype, the American College of Surgeons classified the possible scenarios into three phases. In PHASE 1, there are few COVID-19 cases, hospital resources are not exhausted, ICU and ventilatory capacity are present, and there is no rapid rise in the trajectory of COVID-19 infections.<sup>[28]</sup> Surgery in this scenario should be restricted to those who will have compromised survivorship if surgery is not performed within 3 months. These include patients finishing treatment with neoadjuvant chemotherapy, clinical

stage T2 or N1 hormone receptor-positive patients, triple negative tumors, discordant biopsies likely to be malignant, and excision of local recurrence.<sup>[28]</sup> In PHASE 2, the hospital has many COVID patients on admission, resources are limited, and there is a rapidly escalating COVID-19 infection trajectory. Surgery should be reserved for patients who are likely to have a compromised survival if surgery is not performed in a few days.<sup>[28]</sup> They include incision and drainage of abscesses, evacuation of hematomas, and revision of ischemic mastectomy flaps. All other procedures should be deferred.<sup>[28]</sup> PHASE 3 describes the worst possible scenario in which hospital beds are filled with COVID-19 patients and all hospital resources are exhausted. Surgery should be reserved for the patients who may not survive if surgery is not performed in a few hours.<sup>[28]</sup> All other breast procedures should be deferred. A similar stratification can be applied to other malignancies taking locoregional factors into cognizance. These measures have been proven to be in order as a recent study showed that delaying surgery in women with early stage disease due to COVID-19 did not adversely affect outcomes and was not life-threatening.<sup>[29]</sup>

### Operating on a COVID-19-Positive Patient

The operating theater conditions favor the spread of COVID-19. There is a large number of personnel working in a confined space where perhaps aerosol-generating procedures like endotracheal intubation are routinely performed, sometimes in emergency situations. A full complement of PPE for staff would be ideal for every surgery but practically this is not feasible for everybody, every time. Surgery on COVID-19-positive patients should be deferred, if not absolutely necessary, until they have been asymptomatic for 72 h and have at least two negative tests separated by at least 24 h.<sup>[30]</sup> In an emergency, surgery has to be performed expeditiously, the COVID-positive status of the patient notwithstanding. There should be a theater designated specifically for COVID-19 patients with a negative pressure system.<sup>[31]</sup> This theater should have an anteroom for donning and doffing of PPE.<sup>[27]</sup> The full complement of PPE should be worn by all personnel in the theater. This includes N95 masks or powered air purifying respirator (PAPR), head cover, goggles or face shield, waterproof gowns, double gloves, and boots. The N95 fit test should be done properly, especially for personnel with beards. The importance of proper donning and doffing of PPE in this situation cannot be overemphasized. The theater should be free of unnecessary items and materials, and staff not actively involved in the care of the patient should stay home.<sup>[30,32]</sup> A meticulous record of personnel involved in the surgery should be kept so contact tracing is easier if the need arises.<sup>[27]</sup> The traffic in and out of the theater should be reduced.<sup>[30,32]</sup> No personal items like phones and pagers should be allowed into the theater.<sup>[30]</sup> Alternatives to GA should be considered. If GA is to be used, the anesthetist should don a full complement of PPE as it is an aerosol-generating procedure.<sup>[33]</sup> A PAPR system is recommended.<sup>[34]</sup> This respirator is also recommended for surgeons in surgeries

lasting longer than 3 h as it is more comfortable than an N95 mask.<sup>[35]</sup> Personnel not involved in the intubation like the surgeons and nurses should leave the room and return when the procedure is completed.<sup>[31,35]</sup> The minimum time personnel should stay out during intubation is 3 min based on an air recycle rate of 25–30/min.<sup>[35]</sup> A video laryngoscope will ease the process. Other aerosol-generating procedures include oropharyngeal suction, tracheostomy, nasogastric tube insertion, manipulation of oxygen masks, nebulizer use,<sup>[7,33]</sup> and endoscopy.<sup>[36]</sup> Similar safety measures should be employed when performing these procedures. If other forms of anesthesia are used, the patient should wear a mask throughout the length of the procedure.<sup>[32]</sup> The surgery should be performed by the most experienced, available surgeon in the team<sup>[7,35]</sup> and where available disposable instruments should be used.<sup>[32]</sup> A runner (circulator) should be available to provide materials throughout the surgery using a material exchange cart, and there should be no exchange of theater staff in the course of the operation, a common practice among nurses. As much as possible, intraoperatively, document consultation should be avoided to prevent contamination.<sup>[32]</sup> At the end of surgery, the patient should be recovered in the theater and transferred directly to isolation ward or ICU. The route from the theater to the ward or ICU should be clear. This is ensured by personnel moving in advance and clearing the way ahead of the patient.<sup>[30]</sup> Operative room cleaning and disinfection should follow recommended guidelines.<sup>[37]</sup> Coronaviruses have been shown to be inactivated and killed by most common disinfectants,<sup>[38]</sup> and decontamination of surfaces and instruments with 0.1% chloro-derivative solutions should be carried out thoroughly after and in between cases.<sup>[32]</sup> Instruments and materials used on COVID-positive patients should be sterilized separate from others and labeled accordingly.

## Surgical Smoke

The use of energy devices in surgery for cutting, dissection, and coagulation gives rise to a plume of “surgical smoke” or aerosol due to vaporization and explosion of cells. These devices include diathermy, harmonic scalpel, radio-frequency ablation, and laser devices. This smoke contains mainly water, blood fragments, viable cellular material, viruses, bacteria, and toxic vapors and is produced in both open and laparoscopic procedures.<sup>[39]</sup> This smoke has been found to contain hepatitis B virus (HBV),<sup>[40]</sup> human immunodeficiency virus (HIV),<sup>[41]</sup> and human papilloma virus (HPV),<sup>[42]</sup> but it is uncertain whether COVID-19 is carried in such smoke and can be transmitted by inhalation.<sup>[43]</sup> Guidelines released by surgical societies released early in the pandemic recommended open surgery over laparoscopic surgery as a way of reducing transmission of COVID-19 via surgical smoke.<sup>[44,45]</sup> Fingerhut *et al.* in their systematic review on the topic concluded that there was no difference in the creation of surgical smoke between open and laparoscopic surgeries.<sup>[46]</sup> Any differences depend on the energy source and tissue involved. COVID-19 has not been reported in surgical smoke.<sup>[46,47]</sup> It was also suggested that laparoscopy

may be the safer alternative with regard to dispersion of smoke and possible transmission of infection.<sup>[46,47]</sup> This is because the smoke in laparoscopic procedures is contained within a confined space and thus can be evacuated in a controlled manner unlike in open surgery in which the abdominal cavity and the smoke are in direct communication with the atmosphere of the theater.<sup>[46]</sup> Chadi *et al.*<sup>[48]</sup> also made the same assertion. The advantages of smaller incisions, less post-op pain, and a shorter hospital stay favor the use of laparoscopy over a laparotomy, if there are no contraindications to the former.<sup>[46,48]</sup> Some ways to mitigate this potential threat of COVID-19 in surgical smoke include:

- Using airtight incisions;
- Ensuring all valves are working correctly;
- Care with instrument exchanges;
- Cleaning blood on instruments;
- Eliminating smoke with suction. This also applies to open surgery;
- Completely removing all pneumoperitoneum before specimen retrieval, before closing incisions, and on conversion to open surgery;
- Use of filters in the system for pneumoperitoneum evacuation. A number of filters are available<sup>[47]</sup>;
- Use of electrostatic precipitation devices to precipitate the particulate matter on the peritoneal surface<sup>[47,49]</sup>;
- Use of the least possible insufflation pressures;
- If energy devices must be used, they should be at the lowest possible functional settings<sup>[49]</sup>;
- The use of closed systems as used in pressurized intraperitoneal aerosol chemotherapy is advocated.<sup>[27,31]</sup>

Some other surgeons have advocated the use of laparotomy over laparoscopy.<sup>[21]</sup> The reasons put forward are the time and financial implications of procuring and setting up the system of self-sealing trocars, filters, and smoke evacuation systems.<sup>[21]</sup> Setting up a minimally invasive surgical service by hospitals is not advisable at this time.<sup>[48]</sup> Ultimately, the decision on what approach to use should be done on a case-by-case basis. The advantages of a particular approach should be balanced against the potential risk for viral transmission. For instance, in a patient with uncomplicated appendicitis in whom conservative treatment fails, GA with endotracheal intubation will be required for a laparoscopic appendectomy. Endotracheal intubation is an aerosol-generating procedure and puts the anesthetic team at risk. Pneumoperitoneum will need to be achieved and energy devices will likely be used. It will not be out of place to perform an open appendectomy in this case in which regional anesthesia can be employed and the use of energy devices avoided, using a cold scalpel and sutures instead.

## Management of Scarce Resources

PPEs are an invaluable yet limited resource in this context. N95 masks are designed to filter and capture at least 95% of particles measuring a median of 0.3  $\mu\text{m}$ .<sup>[50]</sup> There are various ways to use a mask beyond single use.<sup>[50]</sup> These include:

*Extended use:* N95 masks can be used for prolonged periods of up to 8 h including in between patients. A face shield on top of the mask is encouraged to avoid soiling and thus enhance reusage.<sup>[50]</sup>

*Re-use:* masks that are not soiled can be used for up to five times using strategies like meticulous donning and doffing, mask rotation, and reprocessing. Masks can be processed and decontaminated with the use of vaporized hydrogen peroxide, ultraviolet light treatment, moist heat and dry heat.<sup>[50]</sup> Vaporized hydrogen peroxide is approved by the FDA for emergency mask decontamination in this pandemic.<sup>[50]</sup> Mask rotation also helps in the preservation of this resource. The healthcare provider is given at least three N95 masks which he/she places in containers at the end of the working day consecutively. On filling all the containers, he/she then starts from the first container. This ensures that by the time a particular mask is used again (72 h later), the virus would be non-viable.<sup>[50]</sup> The caveats are that the masks should not be soiled and must not be shared with others.<sup>[50]</sup> The use of mask containers has been advocated to facilitate extended use of masks by health workers.<sup>[51]</sup> These containers can also be used for mask rotation.

## Resuming Elective Surgery

It is wise to acknowledge that this scourge will be with us for some time to come. While efforts are ongoing to reduce transmission and flatten the curve with various public health measures, health services not directly related to COVID-19 have to commence at some level and then stepped up gradually in stages.<sup>[52]</sup> This is particularly important as several governments are beginning to “ease the lockdown.” Synonyms like “resuming,” “restarting,” “recovery of,” “recommencing,” and “ramping up” have been used with respect to elective surgery in this regard. Factors to be taken into consideration include the trend of COVID-19 infection in the locality, the capacity of the healthcare facility as well as the available resources especially PPE.<sup>[53,54]</sup> Before commencing electives, there should be a decreasing trend in the incidence of the disease over 14 days as well as a decrease in hospital COVID-19 admissions.<sup>[52,55]</sup> The hospital bed occupancy rate is also critical. A hospital with less than 50% bed occupancy can commence elective surgery, whereas those with rates greater than 75% should suspend elective surgery.<sup>[55]</sup>

“Ramping up” involves reversal of the initial guidelines, for example, the elective surgery acuity scale. The MeNTS scoring system is a useful tool for case priority allocation when recommencing elective surgery.<sup>[26]</sup> Patients with lower scores should be given precedence and as the pandemic subsides and more resources become available, MeNTS score thresholds can be increased till all patients are eventually accommodated.<sup>[26]</sup> It is advisable to start with day-case or short admission surgeries with local or regional anesthesia.<sup>[55]</sup> Preference should also be given to those in whom non-operative treatment has failed. Consent should include the risks of surgery in the COVID era, especially the possibility of the patient contracting COVID-19.<sup>[52]</sup> Patients should be assured of their safety when

in hospital, and information on steps being taken to make surgery safe should be readily available to patients. Virtual tours may be helpful.<sup>[52,54]</sup>

The American College of Surgeons checklist items include screening and testing for patients, wearing of masks, and provision of information on hospital COVID-19 policies as patient-related policies. Other items include policies on healthcare workers and PPE, facility infection control as well as publicly available hospital information and data.<sup>[54]</sup>

As the outcomes of surgery are worse in COVID-positive patients, including asymptomatic patients,<sup>[56-58]</sup> pre-operative testing should be done within 3 days of the operation.<sup>[43,52]</sup> If positive, surgery should be postponed. If testing was done outside 72 h and was negative, a rapid test should be done on the morning of surgery.<sup>[52]</sup> Where testing is not readily available, screening with temperature checks and questionnaires can be used. Post-operative care for admitted patients should follow the Enhanced Recovery After Surgery (ERAS) protocol.<sup>[59]</sup> Adoption of ERAS guidelines has been shown to improve patient outcomes and reduce cost, both being critical factors in these dire times.

Clinics cannot continue to run the way they used to a few months ago. New designs should include provisions for social distancing and hand washing. Appointment times for patients can be staggered. There is great promise in telehealth, especially for post-op follow-up.<sup>[60]</sup> Regular visits can be interspersed with telehealth consultations.<sup>[61]</sup> The legal, technical, and privacy issues with telehealth remain to be resolved. Telemedicine also requires significant resources (personnel and technology) to set up.

The cancellation of elective surgeries at the early phases of the pandemic created a backlog of 28,000,000 surgeries worldwide in the first 12 weeks, and it is estimated that it will take 45 weeks, working at 20% above baseline, to clear this pile-up.<sup>[8]</sup> Suggested ways of clearing this backlog include longer working days and working weekends.<sup>[52,53]</sup>

The limitation of this manuscript is that it is a narrative review which can only identify but not test the gaps in knowledge. Randomized controlled trials and subsequently meta-analyses will be needed to increase the level of evidence on the themes discussed.

## Conclusion

COVID-19 has had a significant impact on the surgical community and the delivery of surgical care. It is wise to acknowledge that this disease will lurk in the background for some time to come. During the present and future pandemics, it is important to maintain a robust emergency surgery capacity including urgent surgery for cancer. Safety precautions should be followed to the letter when operating on a suspected or confirmed COVID-19 patient. The possibility of transmission of COVID-19 in surgical smoke exists. Until this is proven or disproven, surgeons should continue to adhere to the well

laid out guidelines. Strategies for extended use and re-use of N95 masks should be adopted, especially in low- and middle-income countries where resources are scarce. Resumption of elective surgeries which were suspended at the beginning of this crisis should be balanced with local epidemiology of COVID-19 and available human and material resources. Available guidelines and recommendations are “guides” and should be adopted after taking local peculiarities into consideration. This review is an attempt to reflect the state of affairs as at August 2020. As this is a rapidly evolving disease, new insights to these themes are likely to emerge with time. Though this pandemic appears to be subsiding, a sound knowledge of best practices as regards the themes highlighted will allow us to provide quality, safe care for our patients with minimal interruption of services, during this and future epidemics. This we must continue to do until the widespread use of a safe and efficacious vaccine.

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