

Recommendations for Surgical Interventions during COVID-19 Pandemic

COVID-19 Pandemisi sürecinde uygulanacak cerrahi girişimlere yönelik öneriler

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ABSTRACT

Throughout human history, many pandemics have broken out and caused great numbers of deaths. As the technological development made quite a huge advancement by the twentieth century, the medical treatment armamentarium had widened its facilities and resources. This brought with sophisticated and competent health care services for people which provided the medical practitioners with higher success rates when fighting against diseases and improved recovery and survival rates. However, during the COVID-19 pandemic, the high transmission rate of the novel SARS-Cov-2 virus has led to the paralysis of the health system and running out of the resources and healthcare workers. Thus, local government healthcare service regulators have begun building up plans to create management algorithms to use the limited resources more efficiently. This paper presents preliminary practical instructions for healthcare providers as a basic foundation for COVID-19 and potential future pandemics.

Key Words: COVID-19, pandemic, general surgery, surgical considerations, orthopaedics and traumatology

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ÖZET

İnsanlık tarihi boyunca çok sayıda salgın ortaya çıkmış ve pek çok ölüme neden olmuştur. 20. Yüzyılda teknolojik gelişmelerde büyük ilerlemeler olmasıyla birlikte tıbbi tedavi usul ve araç kaynakları ve imkanları da genişledi. Bu durum insanlar için sofistike ve yetkin sağlık hizmetini getirdi ve sağlık çalışanlarının hastalıklarla mücadelede yüksek başarı oranları ve daha iyi sağaltma ve sağkalım oranları elde etmelerini sağladı. Fakat, COVID-19 salgını sırasında, yeni tip SARS-Cov-2 virüsünün yüksek bulaş hızı sağlık sistemini felç etti ve kaynakların ve sağlık çalışanlarının yetersiz kalmasına neden oldu. Bu yüzden yerel sağlık hizmeti düzenleyicileri sınırlı miktardaki kaynakları daha etkin bir şekilde kullanabilmek için yönetim algoritması oluşturma planları yapmaya başladılar. Bu makale de sağlık hizmeti sunanlar için COVID-19 ve ileride ortaya çıkabilecek diğer salgınlar için temel oluşturacak öncül pratik öneriler vermektedir.

Anahtar Sözcükler: COVID-19, pandemi, genel cerrahi, cerrahi değerlendirme, ortopedi ve travmatoloji

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INTRODUCTION

In China at December 2019, number of patients admitted to the hospital with viral pneumonia later revealed that caused by the novel coronavirus disease (COVID-19-19) (1). The COVID-19 epidemic has become a pandemic very fast. As 4th of May 2020 3.435.894 cases confirmed and 239 604 people died due to COVID-19 disease. First final reports of Wuhan shows surveillance as a very optimal working strategy on keeping down the spread (1-3). Healthcare workers have a very huge risk of contamination as working on the front line of patient care due to enhance exposure with virus. A very direct cause of this contamination mainly consists of personal protective equipments (PPE) (1,4). To this date thousands of healthcare professionals have been infected worldwide (1,5-7).

These data showed the importance of providing and appropriate using of PPE's on disease transmission control and infection control guides are highly important to restrain and bring under control the infection among healthcare professionals. Even though surgery is not a management method of the disease, several numbers of infections dispersed from operating theaters in China (1,5). The purpose of this review is to bring forward recommendations to surgeons and other healthcare professionals who participate the perioperative care. These recommendations are reviewed from some of the authors' practices and various national guidelines for health professionals as listed in the references section. Nowadays the urgent concern of all counties must be prevention of healthcare professionals from the disease to ensure continuous healthcare service (1).

Decision Making for Surgery

As a respond to this very difficult dilemma, American College of Surgeons (8,9) released a statement that indicates: *"Each hospital, health system, and surgeon should thoughtfully review all scheduled elective procedures with a plan to minimize, postpone, or cancel electively scheduled operations, endoscopies, or other invasive procedures until we have passed the predicted inflection point in the exposure graph and can be confident that our health care infrastructure can support a potentially rapid and overwhelming uptick in critical patient care needs."*(8,9).

Several countries have now suspended all elective procedures including diagnostic interventions (10). Especially ambulatory surgery trusts (AST) which perform outpatient surgical interventions have closed or appeased their services. Yet AST's not very essential or only could serve as front-line patient assessment hospitals in need of support, there is a huge need for urgent surgical procedures (8,10). Like many others, in our country health system managed this course with a minimum series of surgery patients consisted of emergency surgery or cancer surgery mostly. Surgical case types must be stratified by indication and urgency (8).

Patient Transport and Preoperative Features

Transport of patient to the theatre must be as fast as possible (11). A direct access of the operation rooms must be provided by the directory and must be controlled by local infection disease committee to reduce the spread risk of infection. If transport will occur inside the hospital or between different hospitals, a designated vehicle must be used for this purpose (9-11). The healthcare worker responsible for transportation must be appropriately educated and must be actively using PPEs which consists of hand gloves, cap, protective mask, apron, glasses and face protective barrier (8,9,11). A Biocontainment device must be provided may be utilized. All workers must wear PPEs at any stage of perioperative process (11,12).

The highest protection level should be applied when suspected patient or a COVID-19 confirmed patient is encountered. Additional precautions should be taken to enhance maximum security on protecting the staff from spread like N95/FFP2-3 mask, face protective barrier, hand gloves, apron and protective footwear (12-15). Healthcare workers must be careful about hand sanitation before and after surgical procedures (12,13,16). Because these workers are very tend to cross-infect their families, it is very important to screen healthcare professionals' health status regarding body temperature and any other possible symptoms to diagnose and isolate the person from social relations and patients (12-16).

Anesthesia

Even though the decision depends on the clinical scenario, an optimal anesthetic approach should have been applied to reduce aerosol-producing procedures during general anesthesia (GA), like ambulatory ventilation, airway

suctioning, and endotracheal intubation (17). On 2002 SARS outbreak, endotracheal intubation has found to be the strongest independent risk factor for super-spreading nosocomial infections which affect many healthcare workers in China (17-18).

In the light of this information, very strict considerations which has been taken for airway management of confirmed/suspected COVID-19 patients may help reducing operation theatre spread (17,19-21).

Preferring regional anesthesia (RA) techniques can be useful regarding reduced pain and opioid consumption, postoperative pulmonary complications, postoperative nausea and vomiting (17,22,23) and when avoidance of patient coughing and infecting the team by aerosol dissemination considered, RA seems to be preferred option depending on these various main advantages (17,26-28). Additionally, RA has fewer effects on pulmonary function in accordance with GA which is thought to extenuate postoperative pulmonary complications in COVID-19 patients who already have restricted respiratory function (17-29).

Intraoperative Considerations

A negative pressure operating theatre should be used in case of existence of a patient with COVID-19 (or highly suspected) in addition to all PPE which mentioned before (12). Surgeons and all related staff must be remonstrated to avoid blood and body secretions at the time of surgery, all PPEs must be kept clean of those particles (12,30-32). Aerosol producing procedures cannot be described as just intubation or extubation but all general surgery procedures, gastrointestinal endoscopy, laparoscopy, and the use of energy devices (e.g. electrocautery) included (12,30-32). If electrocautery or other energy devices use is essential, the device must be adjusted to the lowest effective power to minimize surgical smoke, and use a smoke suction (32,33).

Laparoscopic/Robotic Surgery

The overall risk is thought to be lower on open surgery as no artificial pneumoperitoneum is incurred though when laparoscopic procedures performing, the risk of aerosol production is greater during insertion, and removal of trocars from a pressurized peritoneal cavity (34,35). On the other hand, robotic surgery presents some highly protective advantages as Finley et.al described as:

"• Highest protection level III for bedside assistant, but level II for console surgeon

- Reduce the number of staffs in the operation room.
- Ensure safe and effective gas evacuation.
- Reduce the intra-abdominal pressure to 8 mmHg or below.
- Minimize electrocautery power and avoid the use of ultrasonic sealing devices.

• Surgeons should avoid contact outside the theater (both in and out of the hospital)" (34-36)

Lifesaving Cancer Surgery

Canadian Partnership Against Cancer (36) recently released a statement that "Lifesaving cancer surgeries need to be managed appropriately during the COVID-19 pandemic". They summarized their collective advice starting with the cancer surgeries must be put at last to delay or cancel, and the optimal choice would be transferring the patient any other hospital where the required procedure can be done. When delay cannot be avoided it must have been stratified by the clinical prioritization criterias and when the pandemic is over these patients would be the first to take care of (36).

Orthopaedic and Traumatology Interventions

The regulation of the orthopaedic consultation during the COVID-19 pandemic should be handled in four basic subjects; clinical consultation, surgical intervention, follow-up, and postoperative rehabilitation. Since there is no active referral system currently in Turkey, any curtailing in the number of presented patients for clinical consultation is not available. However, patients seeking medical care has been extremely decreased already as the patients themselves decided not to refer hospitals as far as possible. Moreover, by planning the rotation of the consultants every 2 weeks (since the incubation period lasts up to 14 days), exposure to COVID-19 and viral load can be kept under critical levels, thus back up healthcare providers protected from the virus at their homes can be kept ready to substitute the ones with confirmed/suspected COVID-19 infection.

In the clinical setting, consultants can make several regulations such as using splints or soft casts rather than circular plaster casts to allow for removal by the patient without hospital readmission, postponing the follow-up time as much as possible, recommendation of tele-video consultation for follow-ups, and limited hours and days for consultation. Several online instruction videos can be used for dressing change, cast removal, wound care, and range of motion exercises.

Non-steroidal anti-inflammatory drugs are frequently used by orthopaedic surgeons in the daily practice. However, WHO advises against the usage of these drugs as the current speculation is that they cause cytokine storm which may induce prolonged illness or more severe respiratory and cardiac complications when taken in the early stages of the disease (37). Another frequently used drug is the local steroid injection. A previous study made with over 15000 cases reported that administration of the steroid reduces the efficacy of the influenza vaccine and suggest susceptibility to viral load. Although there is no paper specifically investigating the outcomes of intra-articular steroid injection in COVID-19 infected patients, WHO advises to avoid steroids unless the patient is in ARDS (38-39).

The surgical management is the most complicated part of the orthopaedic regulations for COVID-19 pandemic. It has three concerns to be considered by the consultants when deciding which patients require surgical intervention as following; protecting the patient from the Coronavirus infection, protecting the healthcare providers and other inpatients from the Coronavirus infection, and protecting the resources. Thus, maximum effort must be exerted to keep the number of surgical interventions. Decreasing the number of procedures not only address the above-mentioned issues, but also limits the number of anaesthetic staff working in theatres instead of working in intensive care units (ICU), postoperative physiotherapy staff workload, and mobilization of the medical goods supply chain. Several healthcare systems have constituted algorithms for decision-making to help consultants in practice (40-42). The surgical procedures that must be performed during the pandemic are comprised of emergent and urgent ones which are predominantly trauma-related fractures and dislocations followed by recently developed or progressive neurologic deficits, tumors, infections. The timing of the surgery and discharge should be as soon as possible to keep the beds available for new patients. Confused or unconscious patients must be managed as they are positive COVID-19 patients since detailed history and examination cannot be done in this group, and their tests should be conducted immediately to decrease the time before surgery.

Although the setting of taken precautions can be structured by phases according to the severity of the current pandemic spreading speed, the recommendations described here should be considered as they are of highest level.

Patients with no suspected contact, history of COVID-19 infection, and clinical symptoms can be operated on by taking basic precautions including masks, gloves, and utmost care during the intubation. Most of the hospitals prefer reverse-transcriptase polymerase chain reaction (rRT-PCR) of nasal swab and sputum testing before all procedures which results in 2-4 hours usually and is the gold standard currently (43-44). In the absence of rRT-PCR test, contact history, clinical symptoms, and characteristic thorax CT findings can be used for diagnosis (45). In suspected cases, the test can be reiterated if the first rRT-PCR test is negative. If the rRT-PCR tests are negative and suspicious contact, clinical symptoms, and chest X-ray or CT findings are remarkable for COVID-19, the patient should be managed as infected by SARS-CoV-2 (46). However, the precautions taken for COVID-19 positive and suspected patients are given in Table 1.

Table 1: Theatre setting for the COVID-19 positive or suspected patients

A specific theatre at a rather different floor reserved for these patients
The material used in the theatre should rather be of disposable material, such as disposable mask, caps, scrubs, footwear coverings.
Minimization of the personnel entering the room
Negative pressure operating room rather than positive pressure operating room
Using a different pathway for the patient from the healthcare providers
Buffer and clean zones protecting the surgical armamentarium and keeping away the surgical team from the clean zone
Another buffer zone for surgical team to remove the disposable material and to sanitize
Taking shower before leaving the theatres.

As far as the resources are available, some urgent elective cases can be performed during the pandemic. These cases should rather be primarily the time-dependent ones like developmental hip dysplasia, progressing congenital foot deformities (such as club foot and rocker bottom foot), progressing varus or valgus knee deformities, congenital rapidly progressing or other early-onset spinal deformities, etc. The common feature of these disorders is that if the surgical intervention is postponed, the surgical indication may potentially and frequently change or even be no longer feasible. Similarly, impending fractures secondary to tumor metastasis of long bones or loose implants of prosthetic replacement of joints may be the secondary level elective cases to be performed during the pandemic. However, these secondary level patients can also be postponed with strict protective measures. As the pandemic measures are gradually repealed, yielded elective caseload should be structured as is the above-mentioned manner which can be followed by severely debilitating disorders and those with best outcomes to use the limited time and resources during the normalizing period. However, despite satisfactory outcomes, chronic degenerative disorders, nonunion/malunion/delayed union, adult deformities, aseptic implant loosening, etc., must follow the semi-urgent cases like avascular necrosis/osteochondral defects, debilitating joint ligamentous injuries, spinal stenosis, etc.

CONCLUSION

The COVID-19 pandemic has caught most of the countries off-guard. Several countries exposed either SARS-CoV or MERS-CoV outbreak previously were somewhat better prepared and aware of what was coming. The current paper and the subsequent works will hopefully enlighten the healthcare providers on how to manage the disaster if any pandemic breaks out in the future. In that regard, we strongly recommend collaborative decision-making, planning, and management by multidisciplinary regularities.

Conflict of interest

No conflict of interest was declared by the authors.

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