

Review Article

Trauma care and COVID-19 pandemic

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Abstract

The Coronavirus SARS- CoV-2 (COVID-19) pandemic has overwhelmed the ability of health care systems all over the world. With the spread of the disease, countries have adopted different models to reorganize infrastructure and reallocate the resources to deal with the pandemic. All the nonurgent hospital services have been postponed. But, trauma and emergency services continue to function according to the established protocols with few modifications. During the pandemic, trauma care is based on clinical urgency, safety of the patient as well as health care workers (HCWs) and conservation of resources. The strategies include non-operative management if possible, restricting the number of personnel and utilization of remote consultation or telemedicine. In the present article, we discuss the triage and management of trauma victim during the pandemic, indications for emergency surgery and psychological impact of the pandemic. We also discuss the future challenges during the post-COVID-19 phase.

Keywords: Covid, resources, trauma

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) or covid-19 virus was first detected in Wuhan, China in November, 2019. The covid-19 pandemic has provided unprecedented challenges to the healthcare staff, particularly anesthesiologists, intensivists, and emergency medicine personnel, as they are the “frontline warriors.” This has led to constraints on resources like health infrastructure and health care workers (HCWs) all over the world. There is a lack of consensus regarding the management of trauma victims during the pandemic. We present a review of trauma care and strategies to ensure optimal trauma management during and post COVID-19 pandemic.

Trauma during the COVID-19 Pandemic

In order to deal with the pandemic, all nonurgent hospital services like outpatient visits, nonessential footfalls in the emergency department (ED) and elective interventions have been postponed. However, basic health care services like trauma care and oncology cannot be discontinued during the crisis.^[1] Due to the preventive measures adopted by the government like lockdown, travel restrictions and reduced industrial work, there is a drastic decline in the number of acute injuries. We have noticed a 75% decrease in the trauma ED footfall (from 150–200 to 40–50 patients per day) during the pandemic in our setup. Other injuries like falls, penetrating injuries, firearm injuries and domestic violence continue unabated. In fact, an increase in the number of firearm injuries was reported during the initial stages of pandemic in US.^[2]

Approach to Trauma Patient during Covid-19 Pandemic

Triage

A dedicated triage area is essential for the care of trauma

victims during the pandemic. There should be ready availability of supplies, easy accessibility of personal protective equipment (PPE) and limited number of personnel in this area. Triage area can be divided into hot, warm and cold zones in accordance with the Environmental Protection Agency Hazmat practices.^[3] “Hot zone” is approximately three feet area around a “high risk” patient and should be clearly demarcated. Everything in this area is considered potentially contaminated. Whereas, “warm zone” is the area used for placing and transferring supplies from “cold” to “hot” zone. It can also be used for donning and doffing of the hot zone staff. The area outside the warm zone is the “cold zone” where staff and supplies not involved in resuscitation are available.

ED management

On arrival in the ED, all trauma victims should be considered covid positive and necessary precautions should be implemented. Initial assessment and management is done as per the Advanced Trauma Life Support (ATLS) protocol with few modifications.^[4,5] Minor trauma patients should undergo covid screening before initial assessment and management, whereas major trauma victims are admitted and stabilized before testing for covid-19 infection.^[6] Covid screening includes epidemiological history like exposure and contact history but the emphasis should be on the symptoms related to covid-19 (fever, malaise, cough, shortness of breath), and laboratory investigations. However, physical examination may be limited or incomplete due to the PPE worn by the medical personnel hence, radiological examination can assist in injury assessment.^[4] As soon as possible, samples (nasopharyngeal swab or lower respiratory tract secretions) should be sent for laboratory investigation of SARS-CoV-2 (reverse transcription- polymerase chain reaction (RT-PCR) or geneXpert (CB-NAAT) or TrueNAT (micro RT-PCR) testing. This ensures the availability of test report either during or by the end of the procedure in case emergency surgery is planned. Only essential consultations should be sought and emergency procedures should be performed in the ED.

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During the pandemic, a pragmatic approach should be adopted for treatment decision and proper documentation should be maintained for future assessment and quality control.^[7]

Radiological evaluation

As per the ATLS protocol, radiological investigations like chest X-ray and focused assessment with sonography for trauma (FAST) are used as adjuncts to primary survey of trauma patients.^[5] Radiological investigations like chest ultrasound or computed tomography (CT) scan have an added advantage during the pandemic. Although these are not recommended as initial screening tests but can aid clinicians in rapid identification of covid-19 infection during trauma management.^[8] Since, RT-PCR test takes several hours so chest ultrasound or CT scan can be used for diagnosing patients with covid-19 pneumonia. Recently, studies have compared chest CT scan and RT-PCR for covid-19 diagnosis. They have reported a higher sensitivity of chest CT scan when compared with initial RT-PCR (60% to 93% initial positive CT scan before positive RT-PCR results).^[9]

Chest trauma patients with pulmonary contusions require special attention to distinguish between CT manifestations of Covid-19 infection and trauma. On chest CT scan, pulmonary contusions are seen as focal, non-segmental areas of parenchymal opacification in the peripheral lung field. Whereas, in the early phase of covid infection, bilateral ground glass opacities, in the subpleural areas and later consolidation suggestive of organizing pneumonia can be seen.^[8]

A dedicated CT room in close proximity to the triage area is the need of the hour for critical trauma patients. While performing the investigations, HCWs should don PPE consistent with the potential exposure. A lead/plexiglass barrier can also be used in the ED to protect against radiation exposure.^[10]

Airway management and resuscitation

One of the most challenging tasks is the airway management of a covid patient owing to close proximity to the patient's airway. Procedures like airway suctioning, endotracheal intubation, noninvasive ventilation, bronchoscopy, chest tube insertion, and tracheostomy are aerosol-generating medical procedures (AGMPs). These are associated with the generation of tiny droplets which remain suspended in the atmosphere for long and travel further. An unstable trauma patient might require urgent airway management in the ED where preparedness and teamwork are of utmost importance. Strategies to reduce infection risk include intubation by an experienced person, rapid sequence induction, videolaryngoscope - facilitated intubation using level 3 precautions.^[11] Intubating team should include an experienced person for intubation, one skilled

assistant (ICU nurse or OR technician) and one team leader to act as a backup for intubation or administer drugs. In case surgical airway is required, it should be performed by the most experienced surgeon.^[12]

Cardiopulmonary resuscitation (CPR) should be avoided in acute major trauma (blunt or penetrating trauma), unless it was preceded by medical events such as dysrhythmia, pulmonary embolism or myocardial infarction.^[13] Level 3 precautions should be implemented before initiating manual ventilation or chest compressions. Early tracheal intubation using a cuffed endotracheal tube to secure the airway and reduce aerosol generation is recommended. The use of external chest compression mechanical device and bag valve mask with high-efficiency particulate air filter reduce the risk of infection to the HCW.

Trauma surgery and anesthesia

During the pandemic, any patient undergoing surgery is at a high risk of exposure in the hospital and is susceptible to postoperative pulmonary complications.^[14] Hence, threshold for surgery should be higher than during normal practice. As far as possible, nonoperative or conservative management should be followed. Otherwise, a minimally invasive technique to reduce the intraoperative surgical time and postoperative hospital stay would be preferable.

However, trauma patients have to be operated on priority to limit the hospital stay, thereby, reducing the risk of in-hospital infection (specially, geriatric patients who are vulnerable to covid infection as well as prone to hip and head injury).^[15] There should be a dedicated trauma OR, staffed with senior surgeons to minimize the operative time and reduce postoperative complications.^[16]

Indications for emergency trauma surgery during the pandemic include:^[17]

- (1) Blunt injury with prehospital index (PHI) ≥ 4
- (2) Penetrating injury with hemodynamic instability
- (3) Uncontrolled external hemorrhage
- (4) Traumatic brain injury
- (5) Orthopedic surgeries like fracture fixation, spinal trauma, or decompression
- (6) Any acute care surgery in an admitted COVID-19 patient.

The principles of damage control surgery with minimum manipulation and short surgical duration should be followed during emergency trauma surgery. Any complex, planned procedure should be performed by two senior surgeons to reduce the operative time after discussing with all the team members including the infectious disease (ID) physician.^[18]

Anesthesia technique for a suspected or confirmed covid trauma patient depends upon the extent of injury, patient's condition and the procedure planned. Regional anesthesia (neuraxial or peripheral nerve blocks) is the preferred technique unless contraindicated, as the respiratory functions are preserved, hence aerosolization and viral transmission can be avoided. In cases where general anesthesia is indicated, the anesthesiologist should be cautious to protect himself, other HCWs and minimize the chances of infection transmission to the patient and environment. Avoiding bag mask ventilation, intubation by an experienced anesthesiologist after adequate neuromuscular relaxation to increase first pass success rates are some of the techniques to reduce aerosol generation.^[17] In suspected or confirmed covid-19 patients, proper positioning of the endotracheal tube should be confirmed by chest movement or end-tidal carbon dioxide (EtCO₂) rather than chest auscultation.^[11] To avoid viral contamination of the anesthesia machine, high efficiency air filters should be installed between the mask and breathing circuit and at the expiratory end of the breathing circuit.

In patients with life threatening injuries, there is a limited time available for preoperative evaluation of patients so these patients should be managed as suspected COVID-19 patients using level 3 precautions in a negative pressure OR, if available. In stable trauma patients, thorough preoperative evaluation and RT-PCR testing should be obtained prior to surgery. In our institute, all patients posted for emergency surgery undergo geneXpert (CB - NAAT) and RT-PCR is performed before elective procedures.

Covid-19 patients with difficult airway due to maxillofacial or cervical spine injury pose a special challenge for the anesthesiologist. Owing to decreased respiratory reserve, multiple attempts or delay in tracheal intubation can lead to hypoxemia and can even be fatal.^[17] In predicted difficult airway as per the guidelines by difficult airway society, tracheal intubation using supraglottic airway or videolaryngoscope should be preferred rather than flexible bronchoscopy techniques. If awake tracheal intubation is considered, airway topicalization needs to be carefully planned to reduce coughing and aerosol generation.^[19] We routinely perform videolaryngoscope guided intubation after anesthesia induction for patients with maxillofacial trauma. Hence, the choice of anesthesia technique would be specific to the patient's needs and anesthesiologist's expertise.

Another subset of trauma patients who require special care are covid patients with chest trauma and pulmonary contusion. These patients are at a high risk of respiratory complications which are exacerbated due to covid-19 infection. To avoid ventilator associated lung injury, lung protective ventilation

strategy, frequent endotracheal suctioning using closed system endotracheal suction and recruitment maneuvers are recommended. Restrictive fluid management and judicious use of blood and blood products would be beneficial for pulmonary protection and also promote blood conservation during the pandemic.

Postoperative care and rehabilitative services

Aggressive postoperative surveillance for covid-19 infection is required for all the patients as there is a possibility of perioperative infection. Trauma and surgery impair the patient's immune system. Hence, for postoperative complications like fever, traumatic and operative causes should also be considered to differentiate them from covid-19 infection. Similarly, thrombosis leading to pulmonary embolism is one of the leading causes of postoperative mortality in polytrauma patients. Postoperative dyspnea and hypoxia in trauma patients can be due to exacerbation of pre-existing lung injury or pulmonary embolism following trauma induced coagulopathy or a manifestation of covid-19 infection. Hence, aggressive infection monitoring along with usual postoperative workup is recommended during the pandemic. Repeat RT-PCR and CT scan should be done, if indicated.^[4] Initiation of thromboprophylaxis as soon as possible, measures to prevent postoperative nausea and vomiting (PONV) and multimodal analgesic techniques are recommended in the postoperative period.^[17]

Current experience can serve as an opportunity to plan and prepare for reestablishing trauma services in the post-covid phase. Utilization of remote consultation like telemedicine for scheduling postoperative follow up, managing recovery issues and even, wound care should be encouraged. It will work as "virtual PPE" and help in saving travel time, cost and conserving resources. Teleconsultation can also be used for new outpatient appointments, reviewing history and imaging.^[20] Telerehabilitation for trauma patients which includes home-based rehabilitation programs and video based rather than direct physical training will also decrease in-hospital stay and expedite safe home discharge.^[21]

Challenges for trauma team

A trauma patient needs to be managed in the ED, OR and even, ICU. Due to increasing number of asymptomatic patients, infection control protocols for the staff, environment and devices is a priority. Wang *et al.* observed clinical characteristics of 138 hospitalized covid patients in Wuhan. The authors reported that 57 (41.3%) patients acquired infection in the hospital and these included 40 (29%) HCWs. Among the affected personnel, 31 (77.5%) worked in general wards, seven (17.5%) in ED and two (5%) in the ICU.^[22] Protection of HCWs is crucial not only for the continuation of healthcare services but also to prevent further spread of

the disease.^[11,12] Infection control policies should be strictly adhered and all HCWs should be trained to perform correct donning and doffing.

Shortage of critical resources like blood and blood products are other concerns during trauma management in the pandemic. Scarcity of blood and blood products is due to the lock down measures, social distancing practices and fear of disease transmission. Blood conservation strategies and restrictive transfusion should be practiced in trauma patients. Blood donation should be encouraged as it is safe to donate and till date no data suggesting transmission through the blood transfusion.^[23]

Psychological impact of pandemic

An increase in domestic violence and firearm injuries during the pandemic can be attributed to exacerbated abusive situations due to quarantine, economic crisis and non availability of any help to validate the experience. This situation further deteriorates in homes where weapons are available and can lead to homicidal or suicidal attempts. Fortunately, most of the domestic violence, firearm injuries are preventable so efforts are required to minimize economic and emotional stresses and strengthen our social network.^[24]

Trauma models

Different countries have responded to the pandemic in different ways to develop covid-19 protocols for optimal management of trauma victims. One of the models adopted in Italy in the late epidemic phase is known as “hub and spoke” model. The goal is to ensure timely and efficient treatment for the patients and the least probability of hospital-acquired infections. Covid hubs are identified and, in these centers, there are separate access routes to emergency to avoid transmission of infection. Specific hospitals are designated as hubs for major trauma, neurosurgical and cardiovascular emergencies. In these centers, the wards and ORs are reorganized into covid and covid-free areas. Every HCW working in OR or in the covid area is supposed to implement level 3 precautions. This model is still playing a central role in the pandemic management in northern Italy.^[25] British Columbia Children’s hospital, Vancouver, implemented a “rotating team” approach. The department has been split into self-reliant cells. There is a lead surgeon for the day who manages trauma and delegates tasks. There is a “surge” or “back-up” team which helps in case there is a surge of cases or if the lead surgeon is unwell. This provides for self-quarantine and also avoids cross contamination.^[7] In Singapore, the pandemic threat has been classified into “waves” which started as the first wave in January 2020 with the detection of first covid-19 patient in Singapore. In the initial phase, the hospital staff was divided into “clean” and “dirty” teams. This segregation allowed the work to continue

unhindered even if one of the members of a team (dirty team) got infected. The “second wave” in February–March was traced to previous travel to European countries. During this period, they maintained a policy of testing, isolation of infected individuals and quarantine of close contacts. Policy of social distancing was also promoted. This strategy allowed them to continue work with limited restrictions hence, only daycare procedures were conducted and priority was given to trauma cases. By the end of March, significant local transmission was seen. All the nonessential services were stopped. Only life and limb salvaging surgeries were conducted.^[26]

Based on the available disease knowledge, we have reorganized our hospital infrastructure and have setup a separate covid center. Ours is a 2300-bedded tertiary care teaching hospital with a standalone 240-bedded trauma center. To manage the inflow of covid patients, trauma center has been converted into covid center. Trauma services have been relocated to the main hospital, where trauma patients are triaged at a separate ED. A CT scan room and an OR adjacent to ED has been marked for hemodynamically unstable patients. There is a dedicated trauma OR in orthopedics, surgery and neurosurgery complex where stable trauma patients are operated. All covid patients (trauma and nontrauma) who require surgery or intensive care support are shifted and operated in the covid center and are managed there till discharge or tested negative. This ensures that trauma care is not compromised during covid pandemic.

Post covid-19 phase

We need to anticipate the challenges that we may encounter during the post covid-19 phase. Post lockdown, there has been a surge of covid cases.^[27] The number of ER admissions for nontrauma as well as trauma patients coming for secondary corrective surgeries has increased. We need a capacity increase in infrastructure and resources the world over. Rapid, economical and robust preoperative screening for SARS-CoV-2 infection to prevent further transmission of infection is required. This is the ideal time to update the existing guidelines and draft national guidelines on best practices for trauma care systems during and after the pandemic.^[28]

Conclusion

Basic health services like trauma care cannot be compromised during the covid-19 pandemic. There should be a dedicated triage area for the trauma patients so that timely care can be provided to the trauma patients during the pandemic. All trauma patients should be considered as covid positive on admission. Hence, precautions should be implemented

to minimize the transmission of infection and RT-PCR or rRT-PCR testing should be done at the earliest. Management of trauma patients follows ATLS guidelines. Radiological investigations like chest CT scan aid in rapid identification of covid infection during trauma management. If possible, conservative management should be followed otherwise, damage control surgery should be performed. Standard protocols should be established to ensure minimum contact and smooth postoperative recovery for all trauma victims during as well as post covid-19 pandemic.

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Conflicts of interest

There are no conflicts of interest.

References

- De Simone B, Chouillard E, Di Saverio S, Pagani L, Sartelli M, Biffl WL, et al. Emergency surgery during the COVID-19 pandemic: What you need to know for practice. *Ann R Coll Surg Engl* 2020;102:323-32.
- Hatchimonji JS, Swendiman RA, Seamon MJ, Nance ML. Trauma does not quarantine: Violence during the COVID-19 pandemic. *Ann Surg* 2020. doi: 10.1097/SLA.0000000000003996.
- Livingston DH, Bonne S, Morello C, Fox A. Optimizing the trauma resuscitation bay during the covid-19 pandemic. *Trauma Surg Acute Care Open* 2020;5: e000488.
- Li Y, Zeng L, Li Z, Mao Q, Liu D, Zhang L, et al. Emergency trauma care during the outbreak of corona virus disease 2019 (COVID-19) in China. *World J Emerg Surg.* 2020 Dec;15(1):33.
- ATLS Subcommittee, American College of Surgeons' Committee on Trauma & International ATLS working group. Advanced trauma life support (ATLS®): The ninth edition. *J. Trauma Acute Care Surg* 2013;74:1363-6.
- Gok AFK, Eryilmaz M, Ozmen MM, Alimoglu O, Ertekin C, Kurtoglu MH. Recommendations for trauma and emergency general surgery practice during COVID-19 pandemic. *Ulus Travma Acil Cerrahi Derg* 2020;26:335-42.
- Farrell S, Schaeffer EK, Mulpuri K. Recommendations for the care of pediatric orthopedic patients during the COVID pandemic. *J Am Acad Orthop Surg* 2020;28:e477-86.
- Revel M, Parkar A, Prosch H, Silva M, Sverzellati N, Gleeson F, et al. COVID-19 patients and the radiology department-advice from the European Society of Radiology (ESR) and the European Society of Thoracic Imaging (ESTI). *Eur Radiol* 2020;1-7. doi: 10.1007/s00330-020-06865-y.
- Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, et al. Sensitivity of chest CT for COVID-19: Comparison to RT-PCR. *Radiology* 2020;200432. doi: 10.1148/radiol.2020200432.
- Zanardo M, Martini C, Monti CB, Cattaneo F, Ciaralli C, Cornacchione P, et al. Management of patients with suspected or confirmed COVID-19, in the radiology department. *Radiography* 2020. doi: 10.1016/j.radi.2020.04.010.
- Yao W, Wang T, Jiang B, Gao F, Wang L, Zheng H, et al. Emergency tracheal intubation in 202 patients with COVID-19 in Wuhan, China: Lessons learnt and international expert recommendations. *Br J Anaesth* 2020. doi: 10.1016/j.bja.2020.03.026.
- Odor PM, Neun M, Bampoe S, Clark S, Heaton D, Hoogenboom EM, et al. Anaesthesia and COVID-19: Infection control. *Br J Anaesth* 2020. doi: 10.1016/j.bja.2020.03.025.
- DeFilippis EM, Ranard LS, Berg DD. Cardiopulmonary resuscitation during the COVID-19 pandemic. *Circulation* 2020;141:1833-1835.
- Archer JE, Odeh A, Ereidige S, Hosni Khairy S, Gareth PJ, Anne G, et al. Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study. *The Lancet* 2020. doi: 10.1016/S0140-6736(20)31182-X.
- Coimbra R, Edwards S, Kurihara H, Bass GA, Balogh ZJ, Tilsed J, et al. European Society of Trauma and Emergency Surgery (ESTES) recommendations for trauma and emergency surgery preparation during times of COVID-19 infection. *Eur J Trauma Emerg Surg* 2020;46:505-10.
- Meyer M, Prost S, Farah K, Denis JB, Dufour H, Blondel B, et al. Spine surgical procedures during coronavirus disease 2019 pandemic: Is it still possible to take care of patients? Results of an observational study in the first month of confinement. *Asian Spine J* 2020;14:336-40.
- Gong Y, Cao X, Mei W, Wang J, Shen L, Wang S, et al. Anesthesia considerations and infection precautions for trauma and acute care cases during the COVID-19 pandemic. *Anesth Analg* 2020. doi: 10.1213/ANE.0000000000004913.
- Awad ME, Rumley JCL, Vazquez JA, Devine JG. Perioperative considerations in urgent surgical care of suspected and confirmed COVID-19 orthopaedic patients: Operating room protocols and recommendations in the current COVID-19 pandemic. *J Am Acad Orthop Surg* 2020;28: 451-63
- Cook TM, El-Boghdady K, McGuire B, McNarry AF, Patel A, Higgs A. Consensus guidelines for managing the airway in patients with Covid-19. *Anaesthesia* 2020;75:785-799.
- Bini SA, Schilling PL, Patel SP, Kalore NV, Ast M, Maratt JD, et al. Digital orthopaedics: A glimpse into the future in the midst of a pandemic. *J Arthroplasty* 2020. doi: 10.1016/j.arth.2020.04.048.
- Turolla A, Rossettini G, Viceconti A, Palese A, Geri T. Musculoskeletal physical therapy during the COVID-19 pandemic: Is telerehabilitation the answer? *Phys Ther* 2020. doi: 10.1093/ptj/pzaa093.
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 2020;323:1061-9.
- Dutton RP, Grissom TE, Herbstreit F. COVID-19 and trauma care: Improve, adapt and overcome! *Anesth Analg* 2020. doi: 10.1213/ANE.0000000000004944.
- Mazza M, Marano G, Lai C, Janiri L, Sani G. Danger in danger: Interpersonal violence during COVID-19 quarantine. *Psychiatry Res* 2020;289:113046.
- Placella G, Salvato D, Delmastro E, Bettinelli G, Salini V. CoViD-19 and ortho and trauma surgery: The Italian experience. *Injury* 2020. doi: 10.1016/j.injury.2020.04.012.
- Tay K, Lee Y. Trauma and orthopaedics in the COVID-19 pandemic: Breaking every wave. *Singapore Med J* 2020. doi: 10.11622/smedj.2020063.
- Cyranoski D. 'We need to be alert': Scientists fear second coronavirus wave as China's lockdowns ease. *Nature* 2020. doi: 10.1038/d41586-020-00938-0.
- Iyengar KP, Jain VK, Vaish A, Vaishya R, Maini L, Lal H. Post COVID-19: Planning strategies to resume orthopaedic surgery -challenges and considerations. Version 2. *J Clin Orthop Trauma* 2020;11(Suppl 3):S291-5.