

Covid Positive Case with Basicervical Intercapsular neck of Femur Fracture

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) was first detected in Wuhan, China in November, 2019 and has spread like wildfire all across the globe in no time. In India, the covid-19 pandemic has not only exposed the weak healthcare system but also has provided unprecedented challenges to the healthcare staff, particularly anesthesiologists, intensivists, and emergency medicine personnel, as they are the “frontline warriors.” with limitations of resources, be it safety kits like PPE’s, N95 masks, medicines, oxygen, hospital beds or ICU beds. The pandemic is sweeping through India at a pace that has staggered the entire Indian government and the health care system . Daily case numbers have exploded since March and is still counting and hence, dealing with other diseases and trauma is kept sideline as eyeing every single case of covid is a priority.

When we talk about trauma, not everyone is on the same page. esp. when it comes to the management of trauma victims during this pandemic. Here in this case report we present a review of trauma care and strategy to ensure optimal trauma management during and post COVID-19 pandemic.¹

Due to the pandemic, all the non-elective or non-emergency cases have been postponed

However, basic health care services cannot be discontinued during the crisis. Due to the preventive measures by the government like lockdown, travel restrictions and work from home, there is a drastic decline in trauma cases. We noticed about a 80% decline in the trauma and emergency department during this period (from 100-150 to 20-25 patients per day) in our hospital.

During this pandemic and risk of in-hospital COVID infection, trauma patients have to be operated on priority to limit the hospital stay, specially, the group with extremes of ages (pediatric and geriatric), who are vulnerable to COVID infection as well as prone to hip and head trauma).

Indications for emergency trauma surgery during the pandemic include:²

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.

During any trauma surgery, short surgical procedure with minimum manipulation should be followed as and when indicated. 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.³

Regional anesthesia (neuraxial or peripheral nerve blocks) is a preferred technique unless contraindicated, as it preserves the respiratory function, and therefore aerosol transmission of viral transmission can be prevented.

In cases where general anesthesia is indicated, the anesthesiologist should protect himself/herself using a proper PPE donning and doffing technique, using a barrier glass protective boxes(as per institutional protocol), 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.² To avoid viral

contamination of the anesthesia machine, appropriate air filters should be installed between the mask and breathing circuit and at the expiratory end of the breathing circuit.

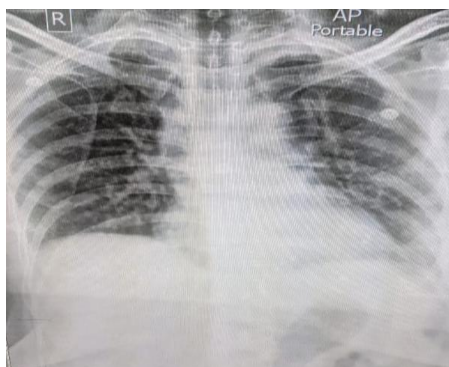
In patients with life threatening injuries, when there is no time for an extensive preoperative evaluation and RT-PCR testing, patient is managed as a COVID suspect. In stable trauma patients, thorough preoperative evaluation and RT-PCR testing should be obtained prior to surgery. In our institute, all patients posted for emergency surgery undergo Rapid antigen testing and RT-PCR is for all 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. In predicted difficult airway as per the guidelines by difficult airway society, tracheal intubation using supraglottic airway or video laryngoscope 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. We routinely perform video laryngoscope 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.

Our Surgical Experience

A 82 year elderly female, without any comorbid condition with history of fall in bathroom, presented with left basicervical neck of femur fracture and nonocclusive deep vein thrombosis of the left popliteal veins. On presentation, she was vitally stable and had no respiratory symptoms. Her preoperative oxygen saturation was between 96%- 98% on room air. Physical examination revealed that the patient not to be in respiratory distress with clear lung sounds. Admission chest radiograph is shown demonstrating no major consolidation or infiltrates. Laboratory evaluation showed no leukocytosis, anemia, or thrombocytosis.



Given that she was a housewife with known exposure to multiple COVID-19, positive residents, she was tested for the disease and found to be positive. A multidisciplinary approach was taken for the care of this patient, including orthopedics, internal medicine, infectious disease, anesthesia, and vascular surgery. She was deemed an asymptomatic COVID+ patient with no concern for her respiratory function.

A shared decision was made to proceed with surgical fixation to allow for improved mobility, healing, and pain control. Within 12 hours of initial presentation, the patient underwent reamed, locked proximal femur nailing, to keep the procedure minimally invasive. Preoperative templating estimated an isthmus of 14 to 15mm. Plan was for placement of a 11-mm diameter nail.



The patient tolerated the early steps of the procedure well. During passage of the 12-mm diameter reamer and obtaining cortical chatter, the patient became acutely hypoxic and hypotensive requiring maximal FiO₂ and increasing vasopressor requirements. After reaming, the patient improved marginally to the point where she was amenable to proximal femoral nail placement. After placement of the nail, a heparin drip was immediately initiated for presumed intraoperative pulmonary embolism. She remained intubated at the completion of the procedure and was transferred to the ICU.

The patient's initial leukocytosis and elevated troponin, brain natriuretic peptide, fibrinogen, D dimer, ferritin, and C-reactive protein (CRP) are noted. The patient's P/F ratio at that time declined to 86 (PaO₂ 86 mm Hg, FiO₂ 100%), indicating severe respiratory failure.

Upon arrival to the ICU, a bedside echocardiogram was performed revealing the right ventricular dilation and septal flattening indicative of right heart strain. Computed tomography pulmonary angiogram demonstrated a nonocclusive right main pulmonary artery embolus with right heart strain, left upper lobe segmental pulmonary artery embolus, and mosaic, ground glass attenuation of the lung parenchyma concerning for viral pneumonia and fat embolism. Subsequent pulmonary angiography redemonstrated the right-sided lobar embolus and elevated mean pulmonary artery pressure. Right-sided percutaneous pulmonary suction thrombectomy was performed. Blood clot and fat emboli were removed with no significant residual lobar or segmental pulmonary emboli on follow-up angiogram. The patient's relatively small embolic burden did not correlate with her clinical presentation of respiratory failure with right heart strain. In addition, the patient's hemodynamic response and lack of improvement after embolectomy was not characteristic of other experiences with similar volumes of thrombus or fat extraction.

ORTHOPAEDIC TRAUMA AND COVID-19

Although the orthopedic surgeon's role in mitigating the COVID-19 crisis may appear disparate compared with our medical colleagues, the management of patients with COVID-19 undergoing nonelective orthopedic trauma surgery demands thoughtful consideration. Emerging evidence in the medical literature suggests that a cytokine storm, also known as CRS, plays an integral role in severe COVID-19. Severe blunt trauma and the resulting surgical intervention similarly initiate a sequence of inflammatory events resulting in clinical instability. In the case we have presented, an asymptomatic COVID-19 patient with a basicervical femur fracture urgently treated with CRIF with PFN, as is the standard of care for the treatment. Intraoperatively, she developed pulmonary and fat emboli resulting in a systemic hyperinflammatory response and acute cardiopulmonary collapse. Our hypothesis is that the patient's diagnosis of COVID-19 amplified the initial inflammatory response to the low-energy traumatic insult that was not clinically apparent preoperatively. In addition, the hypercoagulable state secondary to COVID-19 and the inflammatory load of intramedullary reaming, fat emboli, and pulmonary embolism resulted cumulatively and pushed our patient and into respiratory failure. We would not have expected this type of response during intramedullary fixation of a low-energy fracture in a COVID-negative patient without any preoperative respiratory symptoms or illness.

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