Sick from what? Trauma during the SARS-CoV-2 pandemic

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ABSTRACT

Background: We present the case of two brothers with identical mechanisms of injury presenting simultaneously, one with SARS-CoV-2 respiratory failure and the other in hemorrhagic shock.

Summary: Healthcare globally and in the United States met novel challenges during the unprecedented severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) health crisis. The effect of SARS-CoV-2 on hospital and healthcare delivery systems has been widely reported. Elective surgical procedures were suspended; however, trauma and acute care services remained active and faced unique challenges during this pandemic. Trauma patients by their nature of injury require rapid assessment and treatment to include invasive emergency operations. Not only do trauma centers have to adapt to limited resources and new procedures limiting exposure, they are also met with the confounding issue of trauma patients concomitantly presenting with SARS-CoV-2 respiratory illness.

Conclusion: Trauma care providers must now contend with SARS-CoV-2 on the differential for patients presenting with trauma. This is demonstrated by our case of two brothers with identical mechanisms of injury presenting simultaneously, one in shock from respiratory failure and the other hemorrhagic.

Case report

A 40-year old male, trauma patient 1 (TP1) and a 38-year old male, trauma patient 2 (TP2) presented simultaneously by private vehicle after sustaining gunshot wounds to the abdomen. They were together in the same car and had a short transport to the trauma center. Both patients had penetrating injuries to the lower abdomen and appeared to be in shock. TP1 appeared diaphoretic and clammy while TP2 appeared gray and panicked.

Vitals were obtained on both patients and TP1 was noted to be hypotensive. Central venous and arterial access were obtained with intubation and initiation of massive transfusion protocol. The patient was taken emergently to the operating room for exploration. Operative findings included massive zone 1 hemorrhage and small bowel and mesenteric injuries. The patient underwent damage control surgery with extensive injury to the distal inferior vena cava (IVC) involving the bifurcation. Attempts at repair were made, however the injury was too destructive with ongoing hemorrhage necessitating ligation of the distal IVC. He was transfused...
approximately 100 units of blood products in a balanced fashion at the index operation. Small bowel injuries were stapled off, the mesenteric injury repaired, temporary abdominal closure applied, and the patient transported to the ICU for resuscitation. Rapid SARS-Cov-2 test returned negative. TP1 required a prolonged ICU stay due to his massive hemorrhagic shock and large volume resuscitation. Second look laparotomy confirmed hemostasis, intestinal continuity restored, and his abdomen closed. He required temporary dialysis. He remained intubated but demonstrated good lung function and never converted to SARS-Cov-2 positive. He made a gradual recovery, had return of renal function, and was ultimately discharged to inpatient rehab. He only had mild lower extremity edema as a consequence of his IVC ligation.

TP2 was found to be hypertensive and tachycardic. Central access was obtained, and the patient taken to CT scan. Radiological findings included bilateral ground glass opacities in the lung fields (Fig. 1) as well as a likely sigmoid colon injury with free air in the space of Retzius. Rapid SARS-Cov-2 test returned positive. He was taken to the operating room for exploratory laparotomy. During intubation frothy secretion were noted and he had profound desaturations. Intraoperative findings only demonstrated a contused sigmoid colon with associated mesenteric defect without hemorrhage or contamination. Segmental colon resection was performed with primary anastomosis and the abdomen closed primarily. During the end of the case the patient became progressively hypoxic. He was transported directly to the SARS-Cov-2 isolated ICU for ongoing care. The patient became hypotensive and oliguric with evidence of multi-organ failure. This represented severe SARS-Cov-2 viral sepsis and was not related to his traumatic injuries. Multidisciplinary care was involved, and the patient received all available adjunctive treatments for SARS-Cov-2 including steroids, Remdesivir, and convalescent plasma. He progressed to severe ARDS requiring maximum ventilatory support, paralytics, and pronation. He had a prolonged ICU stay requiring proning for 30 days and eventual tracheostomy with prolonged ventilatory weaning. In all patient was able to be weaned from ventilatory support, had gradual return of renal function, improvement in neurological status, and was also discharged to rehabilitation unit.

Discussion

The SARS-Cov-2 pandemic has stressed the medical field and challenged the delivery of trauma care. Trauma patients require rapid assessment and management. The SARS-Cov-2 status of patients cannot be known on arrival and thus universal enhanced personal protective equipment (PPE) precautions are paramount. These necessary changes and protocols have ramifications on PPE allocation, staffing, and trauma patient dispositions and treatment [1]. These challenges and responses have been reported in the literature helping to share coping mechanisms and SARS-Cov-2 protocols [2,3]. However, there has not been a discussion on facing the diagnostic dilemma represented by patients presenting with both traumatic injury and concomitant SARS-Cov-2 induced respiratory failure and shock.

![Fig. 1. CT chest demonstrating bilateral patchy groundglass opacities in the lower lung fields present on admission.](image-url)
During the preceding months of the SARS-CoV-2 pandemic there has been an appropriate discussion on treating these patients afflicted by the respiratory illness as well as the impact on the health care system in the United States and globally. These changes present unique challenges and stressors on the delivery of trauma and acute care surgery. A recent analysis by a US trauma center highlighted the continuation and possible increase in penetrating gun violence during the pandemic despite quarantine measures [4]. Rapid point of care testing is important but as in this case was not initially helpful due to the acuity of injury. Consideration of SARS-CoV-2 infection and illness is important part of a modern differential to transition care to supporting the patient’s respiratory status, activating adjunctive treatments, and placing the patient in the correct unit. This is underscored by the prevalence of SARS-CoV-2 in the underserved populations that are served by major trauma centers [1].

Conclusion

Trauma care providers must now contend with SARS-CoV-2 on the differential for patients presenting with trauma. This is demonstrated by our case of two brothers with identical mechanisms of injury presenting simultaneously, one in shock from respiratory failure and the other hemorrhagic.

References

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