Trauma care in times of COVID-19: The importance of considering all trauma patients as potentially infected

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Abstract

Objective: The COVID-19 epidemic and the polytrauma patient care field appear to be dissipating at first sight. Although trauma care personnel are not considered the first line in the attack against the pandemic, their role in controlling this outbreak is fundamental. The aim of this study is to assess the risk of exposure to COVID-19 in trauma care personnel and issue recommendations established in the literature. **Methods:** A retrospective and cross-sectional study was carried out of patients' records with a diagnosis of admission of polytrauma, in which concurrent infection by SARS-COV2 was detected, collecting demographic and clinical variables. **Results:** There were 15 patients included; 33.3% were female and 66.7% were male. The average age was 32 years, 46.7% presented brain trauma, and 66.7% of all cases required surgical management. All the patients denied respiratory symptoms. However, all presented suggestive lesions by imaging, being confirmed by performing RT-PCR in each of them. **Conclusion:** This work shows that the personnel in charge of treating trauma are highly likely to be exposed. Therefore, we have to adjust to the established recommendations to protect both health personnel and the patient.

Key words: SARS-COV2. COVID-19. Risk. Protection. Trauma.

Introduction

The pandemic secondary to an infection by the new coronavirus SARS-COV2 has caused a significant increase in hospitalizations worldwide, causing over 34 million cases and over a million deaths around the world¹. The clinical spectrum of its presentation is wide, going from asymptomatic infection, mild symptoms such as fever, cough, myalgias, fatigue, and arthralgias, to patients with severe pneumonia with respiratory failure, and even death^{2,3}.

The environment in which medical personnel attends polytrauma patients and the COVID-19 pandemic does not seem to be linked; however, said personnel plays a substantial role⁴. The COVID-19 pandemic has reorganized global medical care, including basic and indispensable services such as the care of a polytrauma patient².

In this context, we conducted a review of patients with a polytrauma diagnosis as the cause of initial care attended at our institution. Concomitant infection by

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COVID-19 was detected to evaluate the risk of exposure to COVID-19 among the trauma care personnel. We also reviewed recommendations for the management of said patients during the pandemic.

Materials and methods

An observational, retrospective, and transversal study of the records of patients with an initial diagnosis of polytrauma and concomitant infection by SARS-COV2, treated at the trauma ward of the Regional General Hospital 220 of the IMSS between May 2020 and September 2020, was conducted. We cataloged as a polytrauma patient anyone who presented injuries as a result of trauma which affected two or more organs, or anyone who presented at least one life-endangering injury, in relation to the definition by the WHO.⁴ Inclusion criteria were those patients with a complete clinical file for the variables of interest, with consistent tomographic data with infection by SARS-COV2, that is, with opacities in the unpolished glass distributed bilaterally with peripheral or subpleural distribution,² as illustrated in figure 1 of a representative case. In addition, those confirmed through the PCR-RT test (Real-time reverse transcriptase-polymerase chain reaction testing) were considered for the definitive diagnosis of said entity². Those cases with incomplete or ambiguous information were excluded from the study.

The variables gathered from these patients were demographic (gender and age) and clinical (reason for attendance, oxygen saturation at time of admission, presence of respiratory symptoms, PCR results, need for surgical management, and mortality).

Statistical analysis

The statistical analysis was performed by two researchers independently. All the information was collected in a Microsoft Excel spreadsheet (Office 2016, Microsoft) and later analyzed with SPSS (Version 21, IBM).

Results

Demographic characteristics

A total of 216 cases with a polytrauma diagnosis were attended in the studied period, of which 15 met the inclusion criteria previously mentioned. From said cohort (Table 1), 33.3% were female, and 67.7% were male. Mean age for all patients was 32 years (ranging

Figure 1. Representative case of a 28-year-old man who had a car accident with secondary head trauma. In the skull tomography (left), we can observe a diffuse traumatic subarachnoid hemorrhage and effacement of furrows and fissures suggestive of edema. In the chest tomography, ground-glass infiltrates predominantly in the periphery.

between 13 and 72 years of age), corresponding to 13 adult patients and two pediatric.

Clinical characteristics

Concerning the etiology of the trauma of the 15 included cases, eight corresponded to motor vehicle accidents, four to aggressions by third parties, and three by falls from a height. As observed in Table 1B, 46% presented cranioencephalic trauma as an initial diagnosis (two were mild, four moderate, and one severe), 40% of these presented a long bone fracture (three with a femur fracture, two with a tibial fracture, and one case with a radius fracture), and two patients presented a hip fracture.

All patients denied any respiratory symptomatology during direct or indirect questionnaire in relation to COVID-19; despite that, all of them presented saturation under 90% at the time of admittance (range 76%-89%). By hospital protocol during the pandemic, all patients with polytrauma and hypoxemia under 90% received a thorax tomography to rule out thoracic trauma and injuries suggestive of COVID-19. However, said findings were found in them, confirming additionally concomitant infection by SARS-COV2 through PCR-RT.

Of these patients, 66.7% required surgical management by the Neurosurgery Service (two cases with epidural hematoma, an exposed cranial fracture, and an acute subdural hematoma) and trauma (three long bone fractures and three hip fractures). None of them died as a direct result of the trauma.

Table 1. Demographic (A) and Clinical (B) characteristics of patients included in the study

A) Demographic Characteristics		n = 15
Gender		n, (%)
Male		10, (66.7)
Female		5, (33.3)
Age group		n, (%)
Adults		13, (86.7)
Pediatrics		2, (13.3)
B) Clinical Characteristics		
Reason for admission		n, (%)
Head trauma		7, (46.7)
Long bone fracture		6, (40)
Hip fracture		2, (13.3)
Management		n, (%)
Surgical		10, (66.7)
Conservative		5, (33.3)
Respiratory symptomatology		n, (%)
Present		15, (100)
Absent		0
Oxygen saturation		n, (%)
Normal (Greater of equal to 95%)		0
Mild hypoxemia (91% to 94%)		0
Moderate hypoxemia (86% to 90%)		10, (66.7)
Severe hypoxemia ($\leq 85\%$)		5, (33.3)
PCR Results		n, (%)
Positive		15, (100)
Negative		0
Mortality		n, (%)
Linked to trauma		0
Linked to infection by SARS-COV2		2, (13.3)

A total of 13.3% of the cases died due to complications linked to infection by SARS-COV2, a male patient with systemic arterial hypertension (SAH) and obstructive pulmonary disease, and a female with SAH and diabetes mellitus.

Discussion

This paper shows that 15 patients who attended our institution for polytrauma presented concomitant infection by SARS-COV2, despite denying any respiratory symptomatology. Thus, the premise of considering every patient as potentially infected is crucial.

The COVID-19 pandemic has redefined global medical attention. Medical professionals have been forced to modify their daily practice in order to care for infected patients during this pandemic⁵. However, despite that, management for polytrauma patients is still

needed, where the work of the neurosurgeon, orthopedist, general surgeon, and other health personnel is indispensable.

Devarakonda et al.⁶ studied the effect of COVID-19 in a trauma center, concluding that the severity of the injuries did not change, nor the mechanism of trauma. Decrease, and alcohol seemed more involved in the cases.

To avoid exposure and contain the infection, some guidelines have been established for these cases. First, all involved personnel in the initial management of the polytrauma patient ought to receive training to reduce the risk of contagion, and familiarize themselves with and complete workshops to assess the correct placement of personal protection equipment (PPE), with a verification list before accessing the trauma unit⁷.

Triage function is fundamental in patients with major trauma; the Advanced Trauma Life Support (ATLS) protocol must be put in place with stabilization and reanimation.⁸ On the contrary, respiratory triage could be performed when there is a minor trauma, including the questionnaire about exposure to cases with a COVID-19 diagnosis, emphasizing the symptomatology linked to said disease¹.

Implementing a thoracic X-ray has been utilized in a complementary manner as a part of the ATLS protocol⁹. This conduct can be utilized advantageously during COVID-19 pandemic times. Even performing a thoracic X-ray in the context of a patient with thoracic trauma can be of use since it has a high sensitivity for the diagnosis of patients with pneumonia by SARS-COV2¹⁰.

In cases with suspicion by questionnaire related to contact with diagnosed patients or present respiratory symptomatology or imaging studies with compatible data¹⁰, a PCR or GeneXpert ought to be conducted as soon as possible¹¹.

In this study, we can observe that two thirds (66.7%) of the patients required surgical management. Emergency surgery poses a great risk of infection. Hence, the measures ought to be aimed at protecting health personnel and the patient. Therefore, conservative management must be instated to the extent possible.¹¹ Surgical indications during the pandemic can be observed in table 2¹², which are the recommendations established by the Chinese Society of Anesthesiology in 2020, having the premises that surgical manipulation must be minimized and surgical times must be reduced.

Table 2. Surgical indications during the COVID-19 pandemic. Content adapted from: Gong, et al.¹²

Indication	Example
1) Non-penetrating trauma, with a Prehospital index (PHI) of ≥ 4	Closed abdominal trauma.
2) Abdominal or thoracic penetrating trauma with hemodynamic instability.	Gunshot wound in the thoracic region.
3) Non-controlled external hemorrhage.	Thoracic organic injury, abdominal injury, etc.
4) Head trauma	Epidural, subdural hematoma, brain herniation, cranial fractures.
5) Orthopedic surgery	Long bone fracture fixation, vertebral decompression.
6) Any emergency surgery in hospitalized patients by COVID-19	Intestinal perforation or obstruction.

Conclusion

Trauma management requires a dynamic and multi-disciplinary approach; however, the COVID-19 pandemic has forced us to modify the established status. This paper highlights the fact that personnel in charge of caring for trauma cases are at a high risk of exposure. Thus, we must adjust to the established recommendations to protect both health personnel and the patient.

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Conflict of interest

The authors declare not to have any conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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