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The Effect of COVID-19 Pandemic Thoracic Trauma Patients with on Transferred to the Emergency Service

COVID-19 Pandemisinin Acil Servise Taşınan Toraks Travmalı Hastalar Üzerine Olan Etkisi

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Abstract

Objective: On March 11 2020, World Health Organization declared Coronavirus disease-2019 (COVID-19) a pandemic. Trauma, and particularly thoracic trauma, may not be prominent with the coronavirus, but there is a serious risk to the patient's life and needs to be planned. Our study aims to reveal the effects of the current pandemic on the distribution of patients with thoracic trauma transferred to the emergency service.

Methods: In this study, patients with thoracic trauma who were transferred to the emergency services by ambulance between March 2019 and March 2021 were examined. The study group was divided into two as pre-pandemic and post-pandemic periods. Data such as trauma type, gender, age, type of thoracic injury area were included in the study.

Results: The total number of patients referred to the emergency department in the pre-pandemic period was 267,897. During the pandemic period, there were 167,729 patients. In the pre-pandemic period, traffic accidents were in the first place, with 72,293 patients. In the pandemic period, falls were in the first place with 37,256 patients. When the study data were examined, there was a significant difference in terms of the total number of patients in the pre-pandemic and post-pandemic periods ($p=0.021$). Both groups were evaluated in terms of the type of trauma, there was a significant difference ($p=0.017$).

Conclusion: The implementation of various preventions in the COVID-19 pandemic and the reduction of human movements decreased the number of patients with thoracic trauma. Along with the decrease in the number of patients, the COVID-19 pandemic has also created differences in the etiology of trauma.

Keywords: COVID-19, pandemic, thoracic trauma, emergency service

Öz

Amaç: 11 Mart 2020'de Dünya Sağlık Örgütü, Koronavirüs hastalığı-2019'u (COVID-19) bir pandemi ilan etti. Travma ve özellikle toraks travması koronavirüs ile öne çıkmayabilir ancak hastanın hayatı için ciddi bir risk vardır ve planlanması gerekir. Çalışmamızın amacı, acil servise sevk edilen göğüs travmalı hastaların dağılımında mevcut pandeminin etkilerini ortaya koymaktır.

Yöntem: Bu çalışmada Mart 2019-Mart 2021 tarihleri arasında ambulansla acil servise sevk edilen göğüs travmalı hastalar incelendi. Çalışma grubu pandemi öncesi ve pandemi sonrası dönemler olarak ikiye ayrıldı. Travma tipi, cinsiyet, yaş, göğüs yaralanma bölgesi gibi veriler çalışmaya dahil edildi.



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Öz

Bulgular: Pandemi öncesi dönemde acil servise başvuran toplam hasta sayısı 267.897 idi. Pandemi döneminde 167.729 hasta vardı. Pandemi öncesi dönemde ise 72.293 hasta ile trafik kazaları ilk sırada yer aldı. Pandemi döneminde 37.256 hasta ile düşmeler ilk sırada yer aldı. Çalışma verileri incelendiğinde, pandemi öncesi ve pandemi sonrası dönemde toplam hasta sayısı açısından anlamlı farklılık vardı ($p=0,021$). Her iki grup da travma tipi açısından değerlendirildiğinde anlamlı fark vardı ($p=0,017$).

Sonuç: COVID-19 pandemisinde çeşitli önlemlerin uygulanması ve insan hareketlerinin azaltılması göğüs travmalı hasta sayısında azalmaya neden olmuştur. COVID-19 pandemisi hasta sayısındaki azalma ile birlikte travma etiolojisinde de farklılıklar yaratmıştır.

Anahtar Kelimeler: COVID-19, pandemi, toraks travması, acil servis

Introduction

Coronavirus disease-2019 (COVID-19), which started as an epidemic that emerged in Wuhan, China, was declared a public health emergency by the World Health Organization (WHO) on January 20, 2020. On March 11 2020, WHO declared COVID-19 a pandemic. COVID-19 is a viral infection with a mortality rate between 0.4% and 4.3%, with a lower mortality rate than Severe acute respiratory syndrome and Middle East respiratory syndrome, but with higher contagiousness^(1,2). There has been a reduction in elective clinics and surgeries to use labor in acute specialties combating COVID-19, including trauma units in the Emergency Departments, and to maximize hospital beds and resources available⁽³⁾. This rapid change in clinics and reprogramming of patients cause significant inconvenience to patients and has a potential risk due to delayed evaluation and treatment, however is imperative given the seriousness of the current situation⁽⁴⁾. The healthcare burden is increasing, as many patients may not receive treatment until their illness is more advanced, potentially requiring hospitalization⁽⁵⁾. Trauma, and especially thoracic trauma, may not be prominent with the coronavirus, but there is a serious risk to the patient's life and needs to be planned.

Our study aims to reveal the effects of the current pandemic on the distribution of patients with thoracic trauma transferred to the emergency service. Considering the information obtained, it is to ensure that patients with thoracic trauma can receive effective and safe treatment. This is important to prepare for the ongoing process of the COVID-19 pandemic and to prepare for future pandemics that may be even more deadly and more difficult to control. Additionally, since there is no study on the current subject, we contribute to the literature.

Materials and Methods

The study were approved by the Dr. Abdurrahman Yurtaslan Ankara Oncology Education and Research Hospital of Local Ethics Committee (protocol number: 2022-02/1682, date: 23.02.2022). In this study, patients with thoracic trauma who were transferred to the emergency services by ambulance between March 2019 and March 2021 were examined. The study group was divided into two as pre-pandemic and post-pandemic periods. Data such as trauma type, gender, age, type of thoracic injury area were included in the study. Patients who were brought to the emergency department because of sharp and blunt trauma, whose exact cause of trauma was known, were included in the study. Patients whose trauma cause and severity could not be determined clearly were excluded from the study. Patients with trauma due to internal causes such as syncope and cardiac causes were not included in the study.

The patient data in the 1-year period before the pandemic and the 1-year period during the pandemic period were compared and the effect of pandemic period epidemiology of thoracic traumas was analyzed. Data such as the number of thoracic trauma patients transferred by ambulance and patient distribution were analyzed comparatively.

Statistical Analysis

Data were evaluated using the Statistical Package for the Social Sciences 23.0, IBM, USA. Data are presented in mean±standard deviation or n (%), where appropriate. Comparison of the categorical data between groups was used chi-square test. Analysis of variance (ANOVA) was used for comparing normally distributed continuous data of more than two groups. Correlations between continuous variables were tested using Spearman's rho. $P<0.05$ was considered as statistically significant.

Results

In our study, a retrospective review was conducted using the data collected for trauma cases transported to the emergency room by ambulance organized by the Ministry of Health between March 2019 and March 2021. Patients with thoracic trauma who were transferred to the emergency department were included in the study. The period between March 2019 and March 2020 was accepted as the pre-pandemic period. It was considered the pandemic period in the 1-year period between March 2020 and March 2021. In the pre-pandemic period, the total number of patients transferred to the emergency department was 267,897. Of these patients, 146,294 had thoracic trauma. 103,147 of the patients were male and 43,147 were female. Their mean age was 46.5 years. During the pandemic period, a total of 167,729 patients were transferred to the emergency department due to trauma. Of these patients, 82,456 had thoracic trauma. 52,658 of the patients were male and 29,798 were female. Their mean age was 51.7 years (Table 1).

When the patients with thoracic trauma transferred to the emergency department were evaluated; in the pre-pandemic period, traffic accidents occurred in the first place with 72,293 patients. Fall was in the second place with 43,654 patients. In the third place, there were occupational accidents with 16,349 patients. In the pandemic period, falls were in the first place with 37,256 patients. Traffic accidents were in the second place with 24,659 patients. In the third place, there were occupational accidents with 11,528 patients (Table 2).

When the two groups were compared in terms of the type of thoracic trauma, there was no significant difference ($p=0.125$) (Table 2). In both groups, rib fractures were in the first place. Pneumothorax was in the second place and hemothorax was in the third place.

When the study data were examined, there was a significant difference in terms of the total number of patients in the pre-pandemic and pandemic periods ($p=0.021$) (Table 2). In the pre-pandemic period, the total number of patients and the number of patients with thoracic trauma was significantly higher. We considered that the curfews, transportation restrictions, changes in the working order and the closure of schools during the pandemic period were the reasons. Again, when both groups were evaluated in terms of the type of trauma, there was a significant difference ($p=0.017$) (Table 2). Although traffic accidents were in the first place in the pre-pandemic period, falls were in the first place during the pandemic period. Again, we considered that the curfews, transportation restrictions, changes in the working order and closed schools during the pandemic period are the reasons.

Discussion

In this study, which included chest trauma, the most common reason for admission to the hospital was falls and motor vehicle accidents, consistent with the literature. Blunt chest traumas usually occurs due to motor vehicle accidents, falls, bumps, and accidents caused by animals⁽⁶⁾. Both blunt and penetrating chest traumas are seen more frequently in the male gender in the literature, because of the number of men

Table 1. Epidemiological characteristics of our study group

| Number of totally patients | N | | |
|----------------------------|---------------------|-----------------|----------------|
| | Pre-pandemic period | 267.897 | |
| | Pandemic period | 167.729 | |
| Thoracic trauma patients | Pre-pandemic period | Pandemic period | |
| | 146.294 | 82.456 | |
| Distribution by gender | Male | 103.147 (70.5%) | 43.147 (52.3%) |
| | Female | 52.658 (29.5%) | 29.798 (47.7%) |

Table 2. Statistical analysis of study data

| | Pre-pandemic period | Pandemic period |
|--|---|---|
| The type of thoracic trauma (in order) | 1. Traffic accidents (49.4%) 2. Falls (29.8%) 3. Occupational accidents (11.1%) | 1. Falls (45.1%) 2. Traffic accidents (29.9%) 3. Occupational accidents (13.9%) |

The two groups were compared in terms of the type of thoracic trauma, there was no significant difference ($p=0.125$).

Two groups were evaluated in terms of the type of trauma, there was a significant difference ($p=0.017$).

There was a significant difference in terms of the total number of patients in the pre-pandemic and post-pandemic periods ($p=0.021$).

working in dangerous jobs and the excess of the male gender in traffic. Consistent with the literature, in this study 63.9% of the patients were male.

Rib fractures are seen in 35-50% of patients exposed to chest trauma⁽⁷⁾. Isolated rib fractures should be followed conservatively⁽⁸⁾. If the patient deteriorates during monitoring, it should be kept in mind that additional complications such as contusion, pneumothorax, or hemothorax may develop, and the patient should be re-evaluated⁽⁹⁾. In this study, the rate of rib fracture was higher (69.9%) compared to the literature. In the study of Segers et al.⁽¹⁰⁾, rib fracture was reported as 71%, which was consistent with the results of our study. The fact that not only the patients with rib fractures but also the additional complications of rib fractures, such as hemothorax and pneumothorax, may explain this difference.

With the first COVID-19 case seen in Turkey as of March 2020, various national and international measures have been taken within the scope of the pandemic. With the measures implemented in April 2020, the number of trauma admissions to the emergency department decreased by 47%. Although there are not many studies in the literature, the study by Thornton, it was reported that 25% reduction in accident and emergency cases in the UK in the week following the implementation of the national quarantine⁽¹¹⁾. In the study of Jenkins⁽¹²⁾, it was stated a 23% reduction in the number of surgeries performed for trauma in the week following the implementation of the measures. In our study, the 1-year period before the pandemic was compared with the pandemic period, there was a significant difference in the number of patients with thoracic trauma ($p < 0.05$). There was a significant decrease in the number of thoracic trauma patients during the pandemic period. We considered that curfews, transportation restrictions, closed schools and a limited number of business centers were effective in the reduction of thoracic trauma cases.

When the pre-pandemic and pandemic period trauma etiologies were compared, traffic accidents were at the forefront in the pre-pandemic period. However, during the pandemic period, traffic accidents have been replaced by falls and work accidents. We considered that the applied restrictions created periodic differences in the etiology of trauma. Due to the lack of similar publications in the literature, a comparison could not be made in terms of literature.

Study Limitations

Considering the limitations of our study, the lack of patient treatment information and the inclusion of only patients brought by ambulance are the limitations of the study.

Conclusion

The implementation of various preventions in the COVID-19 pandemic and the reduction of human movements decreased the number of patients with thoracic trauma. Along with the decrease in the number of patients, the COVID-19 pandemic has also created differences in the etiology of trauma. Although there was a decrease in the number of thoracic traumas, it should be paid attention in terms of high rate among all traumas and effect on mortality.

Ethics

Ethics Committee Approval: The study were approved by the Dr. Abdurrahman Yurtaslan Ankara Oncology Education and Research Hospital of Local Ethics Committee (protocol number: 2022-02/1682, date: 23.02.2022).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ş.Y., A.G., Concept: Ş.Y., Design: Ş.Y., Data Collection or Processing: Ş.Y., Analysis or Interpretation: A.G., Literature Search: A.G., Writing: Ş.Y., A.G.

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