The Impact of COVID-19 on Geriatric Traumatic Injury: A Quantitative Approach

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Abstract

The COVID-19 pandemic has resulted in a significant number of deaths across the world, particularly in the geriatric age group. This group is also prone to suffer an increased level of mortality from traumatic injury. As exposure to COVID-19 could serve as a potential deterrent to geriatric patients seeking medical attention, these patients may present to the hospital less frequently and at a higher acuity when compared to time periods before COVID-19

We conducted a retrospective analysis of data from a level one trauma center comparing geriatric trauma from March 1st and June 15th between 2015 and 2019 to the same time period in 2020. We analyzed the differences before and after the pandemic in Glasgow Coma Scale (GCS), injury severity score (ISS), the number of ICU days, the hospital length as well as frequency of geriatric trauma cases, ground level falls (GLF), CT head scans, CT neck scans, total MRI scans, and head, neck, spinal canal MRI and intubation.

We saw a significant increase in the proportion of geriatric patients who presented to the hospital during the pandemic time when compared to the time period prior to the pandemic. We also observed an increase in CT neck scans but a decrease in CT head scans and overall MRI scans.

Introduction

As of December 1st, 2020, 13.5 million cases and 267,302 deaths have been reported in the United States with 80.1% of the mortalities occurring in those 65 years old or older.[1] Health effects extend beyond infection with COVID-19. The pandemic has created new norms in terms societal function, from social distancing to limitations on visits within geriatric health care facilities and has disproportionally affected those aged 65 or greater.

Our tertiary care institution, and busy level one trauma center, is in eastern Georgia and serves both urban and rural populations. In Georgia, an initial state-wide shelter-in-place executive order was issued on March 23, 2020 for at risk populations, including those with chronic respiratory conditions and those residing in care homes.[2] Subsequently a non-specific shelter-in-place executive order was initiated on April 2, 2020, closing non-essential businesses and limiting travel to obtaining or providing essential services for all citizens.[2] The long-term effects on the COVID-19 pandemic and trauma volume are still being defined, although data is starting to emerge. [3]

Trauma is a significant source of morbidity and mortality in the geriatric population and the seventh leading cause of death among those aged >65.[4] We examined data from our institutional database to determine if any significant change had occurred in both the occurrence and character of geriatric trauma evaluated by our institution during the Georgia state-wide lockdown.

Methods and Materials

We conducted a retrospective analysis of data from a level one trauma center. Our inclusion criteria for the pre-COVID time frame were patients who were 65 or older upon initial presentation in the time period between March 1st and June 15th between 2015 and 2019. Our inclusion criteria for the COVID-19 time frame were patients who were 65 or older upon initial presentation in the time period between March 1st and June 15th in the year 2020.

We assessed the differences before and after the pandemic of Glasgow Coma Scale (GCS), injury severity score (ISS), the number of ICU days, and the hospital length of stay via Mann Whitney U test as they were continuous non-parametric variables.

The frequency of geriatric trauma cases, the frequency of ground level falls (GLF), the frequency of CT head scans, the frequency of CT neck scans, the frequency of total MRI scans, and the frequency of head, neck, and spinal canal MRI scans were compared via a Chi-squared tests as they are categorical variables. Due to a low number of cases in the COVID-19 period who were intubated, the difference in the distributions of intubation were compared using the Fisher's Exact test.

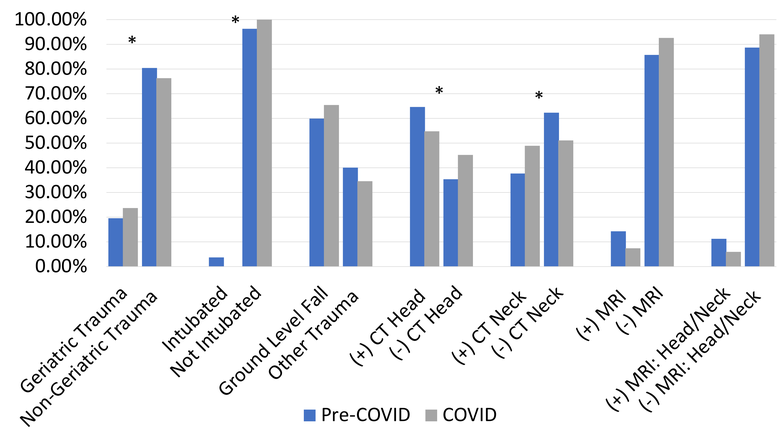
Results

There were a total of 594 geriatric traumas out of 3030 total traumas before the pandemic and 135 geriatric traumas out of 434 total after the pandemic. We saw a significant increase in the proportion of geriatric patients who presented to the hospital during the pandemic time when compared to the time period prior to the pandemic. We also observed an increase in CT neck scans but a decrease in CT head scans and overall MRI scans. We saw no difference in the number of ICU days or the overall hospital length of stay for patients before and after the pandemic as well as no difference in GCS, ISS, frequency of GLF, frequency of intubation, and frequency of MRI head, neck, and spinal column.

Table 1. The table below contains descriptive measures of the quantitative analysis of multiple traumatic injury associated variables as well as the p-values of the comparison between groups before and during the Pandemic.

	N	Mean	Median	Standard Deviation	P-value
Length of Stay (days) Pre-COVID	551	6.50	5	6.70	P = 0.7741
Length of Stay (days) Post-COVID	105	6.97	5	8.31	
ICU Days Pre-COVID	266	5.24	3	6.09	P = 0.3760
ICU Days Post-COVID	35	7.25	3	11.44	
GCS Pre-COVID	575	14.13	15	2.60	P = 0.6789
GCS Post-COVID	107	14.33	15	2.16	
ISS Pre-COVID	594	11.05	9	8.08	P = 0.5664
ISS Post-COVID	104	10.77	9	6.26	

Changes in the Distribution of Trauma Associated Variables before and during COVID-19



*Note: * Delineates a statistically significant difference between the distribution of the groups before and during the pandemic.*

Discussion

We were initially surprised that the proportion of ground level falls did not demonstrate a significant difference. We suspected that reduced staff and visiting hours at care homes may influence the total number of falls evaluated. The proportion, however, remained constant. Ground level falls remain a significant cause of morbidity and mortality among geriatric populations, and our limited study indicates that this is increased during periods of government mandated lockdown.

Our study was limited because it relied on retrospective data obtained from our institutional trauma database. ISS or defined mechanism beyond blunt or penetrating, were not included with every patients. As such, we cannot ascertain the reason for the increased number of geriatric trauma during the mandated shelter in place order.

Conclusions

While there were more geriatric traumas, there seems to be no difference in the overall severity upon presentation across multiple indicators. There has been a decrease in intubations and imaging, which may be indicative of different types of injuries occurring, although we see no difference in the major cause of morbidity and mortality in elderly patients: ground level falls.

Further studies examining total levels of ground level falls during the pandemic will be extremely helpful in defining the exact exacerbating factors and causative effects responsible.

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