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Child Abuse and the COVID-19 Pandemic

Christina M. Theodorou, MD, Erin G. Brown, MD, Jordan E. Jackson, MD, and Alana L. Beres, MD*

Division of Pediatric General, Thoracic, and Fetal Surgery, University of California Davis Medical Center, Sacramento, California

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ABSTRACT

Introduction: The COVID-19 pandemic has widespread effects, including enhanced psychosocial stressors and stay-at-home orders which may be associated with higher rates of child abuse. We aimed to evaluate rates of child abuse, neglect, and inadequate supervision during the COVID-19 pandemic.

Methods: Patients ≤5 y old admitted to a level one pediatric trauma center between 3/19/20-9/19/20 (COVID-era) were compared to a pre-COVID cohort (3/19/19-9/19/19). The primary outcome was the rate of child abuse, neglect, or inadequate supervision, determined by Child Protection Team and Social Work consultations. Secondary outcomes included injury severity score (ISS), mortality, and discharge disposition.

Results: Of 163 total COVID-era pediatric trauma patients, 22 (13.5%) sustained child abuse/neglect, compared to 17 of 206 (8.3%) pre-COVID era patients ($P = 0.13$). The ISS was similar between cohorts (median 9 pre-COVID *versus* 5 COVID-era, $P = 0.23$). There was one mortality in the pre-COVID era and none during COVID ($P = 0.45$). The rate of discharge with someone other than the primary caregiver at time of injury was significantly higher pre-COVID (94.1% *versus* 59.1%, $P = 0.02$). In addition, foster family placement rate was twice as high pre-COVID (50.0% *versus* 22.7%, $P = 0.10$).

Conclusions: The rate of abuse/neglect among young pediatric trauma patients during COVID did not differ compared to pre-pandemic, but discharge to a new caregiver was significantly lower. While likely multifactorial, this data suggests that resources during COVID may have been limited and the clinical significance of this is concerning. Larger studies are warranted to further evaluate COVID-19's effect on this vulnerable population.

Introduction

The global pandemic resulting from the spread of SARS-CoV-2 (COVID-19) has left no area of healthcare unaffected. Concerns have been raised about delayed and suboptimal care of non-COVID-19 illnesses including cancer, as well as acute medical and surgical diseases. The effect is thought to be multifactorial: patients may delay seeking care out of a desire to avoid exposure to COVID-19 within the healthcare system, to avoid hospitalization at times when visitation is strictly limited, or may have their care delayed due to an overburdened healthcare system that is at capacity.[1,2] However, in some instances, the data has been variable. For example, in pediatric appendicitis, several studies have reported increased rates of perforation at presentation,[3-5] while a

* *Corresponding author*. Department of Pediatric General, Thoracic, and Fetal Surgery, University of California Davis Medical Center, 2335 Stockton Boulevard, Room 5107, Sacramento, CA 95817. Tel.: +1916 453 2080; fax: 1 916 453 2035.
E-mail address: ctheodorou@ucdavis.edu (C.M. Theodorou).
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Table 1 – Characteristics of child abuse cases before and during the COVID-19 pandemic.

Variable	Pre-COVID $n = 17$	COVID-era $n = 22$	P-value
Age, y: median (IQR)	0.6 (0.2-2)	1 (0.5-2)	0.25
Sex, male: *n* (%)	9 (52.9)	16 (72.7)	0.31
Transfer: *n* (%)	11 (64.7)	17 (77.3)	0.48
Race: *n* (%)			0.31
White	8 (47.1)	9 (40.9)	
Black	4 (23.5)	2 (9.1)	
Other	5 (29.4)	11 (50.0)	
Ethnicity: *n* (%)*			0.72
Hispanic or Latino	4 (23.5)	7 (33.3)	
Non-Hispanic or Latino	13 (76.5)	14 (66.7)	
Insurance: *n* (%)†			1.0
Private	15 (88.2)	18 (85.7)	
Public	2 (11.8)	3 (14.3)	
ED GCS: median (IQR)	15 (6.5-15)	15 (15-15)	0.003
Injury Severity Score: median (IQR)	9 (5.5-17)	7 (4-10.5)	0.21
Prior ED visit for injury: *n* (%)	3 (17.7)	2 (9.1)	0.64

IQR = interquartile range; ED = emergency department; GCS = Glasgow Coma Scale.
*Note 1 patient in the COVID-era cohort did not have ethnicity recorded.
†Note 1 patient in the COVID-era cohort was recorded as self-pay.

multicenter study found no changes in presentation during the COVID-19 pandemic.[6]

An alarming finding during the pandemic has been its effect on reported cases of child abuse. A nationwide study utilizing the Pediatric Health Information System (PHIS) found a lower volume of hospitalizations for child abuse, but with higher injury severity.[7] This raises a significant concern for unreported and unrecognized cases of abuse. In addition, domestic violence cases have risen.[8] The etiology behind these findings is unclear, and potentially exacerbated by increased time at home coupled with pandemic stressors such as financial insecurity and increased childcare responsibilities.

Our aim was to study the association between the shelter-in-place orders instituted during the early phases of the COVID-19 pandemic and presentations for child abuse at a large level one pediatric trauma center. In particular, post-hospitalization disposition was studied. We hypothesized that, in a similar manner to the excessive strain on the healthcare system, organizations such as Child Protective Services (CPS) and those involved in coordinating foster family placement for cases of abuse may also be affected, thus resulting in lower rates of foster placement during the pandemic.

Methods

Local institutional review board (IRB) approval (IRB# 1584205-1) was obtained with a waiver of informed consent due to the retrospective nature of the study. All pediatric trauma admissions for patients ≤5 y old years old between 3/19/20-9/19/20 (COVID-era) and 3/19/19-9/19/19 (pre-COVID era) were reviewed at a state-designated and American College of Surgeons (ACS)-verified level one pediatric trauma center. This age group was chosen as young children are at heightened risk for abuse.[9] Cases were included if they were confirmed child abuse, neglect, injuries sustained due to inadequate supervision, or cases highly suspicious for child abuse or neglect in line with the Centers for Disease Control (CDC) guidelines on child maltreatment.[10] Child abuse/neglect/inadequate supervision was determined by Social Work and/or Child Protection Teams (CPT). Child abuse was defined as intentional inflicted injury. Neglect was defined as failure to provide basic necessities of care to a child without alternative explanation. Inadequate supervision included cases in which injuries were sustained which could have been prevented by appropriate supervision. Cases were excluded if they were assessed by CPT and abuse/neglect was not suspected. Additionally, cases were excluded if CPT was unable to determine if abuse was the cause of the child's injuries. Cases in which there was some uncertainty as to the classification were reviewed by two authors and a consensus decision was made.

Data was collected on demographics, mechanism of injury, injury severity score (ISS) and injuries sustained. Healthcare utilization was assessed by disposition from the emergency department (ED) to home, ward, or intensive care unit (ICU), as well as hospital and ICU length of stay (LOS), if applicable. Need for mechanical ventilation was recorded. Surgical interventions performed were collected, as well as in-hospital mortality. Hospital discharge disposition was categorized as home with the primary caregiver at the time of injury or home with someone other than the primary caregiver at time of injury. Rate of foster family placement was noted.

Table 2 – Injuries sustained.

Injuries	Pre-COVID $n = 17$	COVID-era $n = 22$	P-value
Any head injury	7 (41.2)	11 (50.0)	0.75
Intracranial hemorrhage	7 (41.2)	6 (27.3)	0.50
Skull fracture	1 (5.9)	4 (18.2)	0.36
Facial injury	0 (0)	4 (18.2)	0.12
Thoracic injury	4 (23.5)	3 (13.6)	0.68
Intraabdominal injury	0 (0)	1 (4.6)	1.0
Vertebral injury	0 (0)	1 (4.6)	1.0
Extremity injury	6 (35.3)	9 (40.9)	0.75
Soft tissue bruising and/or lacerations	3 (17.7)	6 (27.3)	0.70
Genital injuries	2 (11.8)	1 (4.6)	0.57

The proportion of pediatric trauma patients presenting with confirmed or highly suspected child abuse/neglect/inadequate supervision was compared between the two cohorts: pre-COVID and during COVID. We hypothesized that rates of abuse/neglect/inadequate supervision would be higher during the pandemic, as has been noted in other studies.[11] We additionally hypothesized that injuries would be more severe during the pandemic. Categorical data are presented as number of patients and percentage and compared by χ^2 test or Fisher's exact test where appropriate. Continuous data are presented as median and interquartile range (IQR) and compared by Mann Whitney *U*-test. Significance was set at $P < 0.05$. All analyses were done in Prism version 9.1.2 (GraphPad Software, Inc, San Diego, CA).

Results

Overall results

Of 163 total COVID-era pediatric trauma patients, 22 (13.5%) sustained child abuse/neglect/inadequate supervision, compared to 17 of 206 (8.3%) pre-COVID era patients ($P = 0.13$). Of these patients, in the pre-COVID cohort, 15/17 patients sustained physical abuse (88.2%) compared to 14/22 patients in the COVID-era cohort (63.6%, $P = 0.14$). Neglect was determined to be the cause of the injuries sustained in 2/17 (11.8%) of pre-COVID patients compared to 5/22 (22.7%) of COVID-era patients ($P = 0.44$). Inadequate supervision occurred in no pre-COVID patients compared to 3/22 (13.6%) of COVID-era patients ($P = 0.24$). There were no differences in the race or ethnicity of the patients in both cohorts (Table 1). Most patients had private insurance (88.2% *versus* 85.7%, $P = 1.0$). The interquartile range of presenting GCS was wider in the pre-COVID era cohort (median 15, IQR 6.5-15 pre-COVID *versus* median 15, IQR 15-15 in the COVID-era cohort, $P = 0.003$). The ISS was similar between cohorts (median 9 pre-COVID *versus* 5 COVID-era, $P = 0.23$).

Injuries and interventions

All children sustained injuries (Table 2). The most common injuries were head injuries, including intracranial hemorrhage, skull fractures, and facial trauma, with 41.2% of pre-COVID patients and 50.0% of COVID-era patients sustaining abusive head trauma (AHT) ($P = 0.75$). In addition, extremity orthopedic injuries were prevalent, occurring in 35.3% of pre-COVID era patients and 40.9% of COVID-era patients ($P = 0.75$). Thoracic injuries were less common (23.5% pre-COVID and 13.6% COVID-era, $P = 0.68$). Rates of intraabdominal injury were low (none in the pre-COVID era cohort, one patient in the COVID cohort, $P = 1.0$).

Table 3 – Surgical interventions performed. ENT = ear, nose, and throat surgery.

Surgical interventions	Pre-COVID $n = 17$	COVID-era $n = 22$	P-value
Neurosurgery	2 (11.8)	1 (4.6)	0.57
ENT surgery	0 (0)	1 (4.6)	1.0
Orthopedic surgery	3 (17.7)	3 (13.6)	1.0
Plastic surgery	1 (5.9)	0 (0)	1.0
Wound exploration	0 (0)	1 (4.6)	1.0
Abdominal exploration	0 (0)	0 (0)	N/A

Table 4 – Outcomes of child abuse cases before and during the COVID-19 pandemic.

Variable	Pre-COVID $n = 17$	COVID-era $n = 22$	P-value
ICU admission: *n* (%)	10 (58.8)	3 (13.6)	0.006
ICU LOS, d: median (IQR)	1 (1-4)	1 (1-1)	0.51
Mechanical ventilation: *n* (%)	6 (35.3)	1 (4.6)	0.03
Surgical interventions: *n* (%)	6 (35.3)	6 (27.3)	0.73
Hospital LOS, d: median (IQR)	2 (1.5-5.5)	2 (1-2.3)	0.09
CPT consulted: *n* (%)	15 (88.2)	18 (81.8)	0.68
Ophthalmology consulted: *n* (%)	8 (47.1)	10 (45.5)	1.0
Retinal hemorrhage: *n* (%)	5/8 (62.5)	2/10 (20.0)	0.15
Skeletal survey done: *n* (%)	15 (88.2)	18 (81.8)	0.68
In-hospital mortality: *n* (%)	1 (5.9)	0 (0)	0.44
Discharge disposition to someone other than primary caregiver at time of injury: *n* (%)*	16 (94.1)	13 (59.1)	0.02
Discharge home with foster family: *n* (%)*	8 (50.0)	5 (22.7)	0.10

ICU = intensive care unit; LOS = length of stay; CPT = child protection team.
*Note, the denominator for these outcomes is $n = 16$ for pre-COVID cohort as one patient died before discharge.

Six children underwent surgical intervention in each cohort (35.3% pre-COVID *versus* 27.3% COVID-era, $P = 0.73$, Table 3). These were most commonly orthopedic surgeries (17.7% pre-COVID, 13.6% COVID-era, $P = 1.0$) and neurosurgical procedures (11.8% pre-COVID, 4.6% COVID-era, $P = 0.57$). Three patients went directly from the emergency department (ED) to the operating room (OR), all for orthopedic surgeries.

Outcomes

ICU admission was more common in the pre-COVID cohort (58.5% *versus* 13.6%, $P = 0.006$). When evaluated by age, 58.3% of children <1 y old required ICU admission pre-COVID compared to 9.1% of children <1 y old during COVID ($P = 0.03$). Among children aged 1-5 y old, 80.0% were admitted to the ICU pre-COVID compared to 18.2% during COVID ($P = 0.04$). Of the 11 children admitted to the ICU pre-COVID, indications for ICU admission included need for frequent neurologic monitoring in five patients, ventilator management in three patients, and both ventilator management and neurologic monitoring in three patients. In the COVID-era cohort, three patients were admitted to the ICU, two for frequent neurologic monitoring and one for neurologic monitoring and ventilator management. Rates of mechanical ventilation were additionally higher pre-COVID (35.3% pre-COVID *versus* 4.6% COVID-era, $P = 0.03$, Table 4). ICU LOS was overall short (median 1 d in both cohorts, $P = 0.51$). The hospital LOS was similar between cohorts, but with greater variability in the pre-COVID cohort (median 2 d, IQR 1.5-5.5 *versus* median 2 d, IQR 1-2.3, $P = 0.09$) as noted by the wider interquartile range.

All patients had a consultation performed by the inpatient social work team and all patients had a report filed with Child Protective Services (CPS). Most patients additionally were seen by the Child Protection Team (CPT; 15/17 or 88.2% pre-COVID *versus* 18/22 or 81.8% COVID-era, $P = 0.68$). Ophthalmology consultation was performed in about half of patients (47.1% pre-COVID, 45.5% COVID-era, $P = 1.0$) to evaluate for retinal hemorrhages, which were detected in 62.5% of patients pre-COVID and 20.0% of patients during COVID ($P = 0.15$). When evaluating children who sustained abusive head trauma, all children who suffered from AHT in the pre-COVID cohort were seen by ophthalmology (7/7, 100%) compared to 7/11 children who sustained AHT in the COVID-era cohort (63.6%, $P = 0.12$). Of the four children with AHT who were not seen by ophthalmology, two children were injured as a result of inadequate supervision rather than physical abuse.

There was one mortality in the pre-COVID era and none during COVID ($P = 0.45$). The rate of discharge with someone other than the primary caregiver at time of injury was significantly higher pre-COVID (94.1% *versus* 59.1%, $P = 0.02$). In addition, foster family placement rate was twice as high pre-COVID (50.0% *versus* 22.7%, $P = 0.10$).

Discussion

In this longitudinal cohort study of pediatric trauma patients admitted to a high-volume level one pediatric trauma center, we evaluated rates of child abuse, neglect, or inadequate supervision during the COVID-19 pandemic. These cases accounted for 13.5% of COVID-era pediatric trauma patients compared to 8.3% of pre-COVID trauma patients ($P = 0.13$). While most of these patients in the pre-COVID cohort sustained physical abuse (88.2%), in the COVID-era cohort, the causes of injuries were more variable, with higher rate of neglect (22.7% *versus* 11.8%) and inadequate supervision (13.6% *versus* 0%) during COVID-19. Despite similar injury severities between cohorts, ICU admissions were significantly more common pre-COVID (58.5% *versus* 13.6%, $P = 0.006$). Lastly, hospital disposition varied significantly between cohorts, with higher rates of discharge to someone other than the primary caregiver at the time of injury pre-COVID (94.1% *versus* 59.1%, $P = 0.02$) and lower rates of placement into a

foster home (50.0% pre-COVID *versus* 22.7% during COVID, $P = 0.10$). While the underlying reasons for these differences are likely multifactorial, the burden imposed by COVID-19 on the healthcare system and the required social work services in cases such as these cannot be understated.

The potential clinical significance of these findings cannot be neglected. The effect of the COVID-19 pandemic on rates of child abuse has been studied, with conflicting results. Several groups have found increased rates of child abuse during the early months of the pandemic.[11-13] One study out of Harbor-UCLA found shifting patterns of types of abuse during the pandemic, with higher rates of emotional/psychological abuse and neglect during the pandemic compared to prior years.[12] Another study out of Johns Hopkins University found a tripling of the proportion of physical child abuse cases during the pandemic compared to prior years (13% *versus* 3%-4%).[13] This effect has been found internationally, with a rise in abusive head trauma cases in the United Kingdom also reported.[11] However, some studies have found the opposite: lower rates of child abuse among children presenting to the hospital.[7,14,15] Two studies utilizing the PHIS found a significant decline in child abuse cases during the pandemic compared to years before.[7,14] However, one found higher odds of ICU admission (odds ratio 1.26) during the pandemic, contrary to our experience.[7] A third study analyzing the number of child abuse/neglect reports received by the New York City Administration for Children's Services found fewer reports than expected in March-May 2020, corresponding to the first threemonths of the COVID-19 pandemic.[15] Some studies have found no significant changes in abuse rates. A single-center study out of New York City found an overall decreased rate of pediatric trauma activations, and no difference in rates of child abuse (6% in 2020 compared to 9% in 2019 and 4% in 2018).[16] One multicenter study of five children's hospitals across the United States also found no difference in the proportion of trauma patients presenting for abusive injuries.[17] It is important to consider the potential effect of the pandemic and shelter-in-place orders on the frequency of contact children have with mandated reporters such as physicians, teachers, and school nurses, who may have had diminished interactions with at-risk children due to distance learning and avoidance of the healthcare system. Thus, lower rates of reported abuse may not reflect true rates of abuse and simply reflect a lower rate of detection.

Resource utilization has also shifted during the COVID-19 pandemic. Despite overall similar injury severities, we noted that ICU utilization for child abuse admissions sharply decreased during the pandemic. The reasons behind this are unclear, as children were relatively spared during the first wave of the pandemic, with low rates of infection and serious illness requiring ICU admission,[18] thus ICU availability may not have been a contributing factor. One study of the PHIS database looking at children <15 y old who sustained injuries from physical abuse found higher odds of ICU admission during the pandemic for the months of March through June after adjusting for co-variates including age, sex, race, insurance, and geographic region.[7] This finding was contrary to our results, in which ICU admission rates were significantly lower during the pandemic than the year before. Interestingly, another study of the PHIS database found age-based differences in ICU admission. For very young children (<1 y old), lower rates of ICU admission during the pandemic were noted (15.4% *versus* 21.3% in previous years, $P < 0.01$), but in children aged 1-5 y old, there was no difference in ICU admission rates (7.4% *versus* 7.9%, $P = 0.68$).[14] These findings are overall more in line with ours of lower ICU admission rates during the pandemic. In both age groups (<1 y old and 1-5 y old) among our cohort, ICU admissions were lower during the pandemic. This change in resource utilization did not reflect lower rates of injury (100% of patients in both cohorts sustained injuries) or operative interventions, occurring in approximately one-third of patients in both cohorts. In addition, rates of abusive head trauma were similar in the pre-COVID and COVID-era cohorts in our study. However, nearly all of the ICU admissions were done for frequent neurologic monitoring in the setting of abusive head trauma, thus indicating that one possible reason for the higher rates of ICU admission pre-COVID is more severe head injuries in that cohort.

Lastly, hospital disposition varied significantly between the cohorts. We found that before the COVID-19 pandemic, nearly all patients discharged to someone other than the primary caregiver at the time of injury (94.1%), and that this decreased to 59.1% of patients during the pandemic ($P = 0.02$). This may be due to slightly higher rates of neglect and inadequate supervision during the pandemic, rather than physical child abuse, which may be more amenable to caregiver educational interventions to prevent recurrence, rather than removing the child from the home. Placement of children into foster homes decreased by half during the pandemic. This again may represent a lower proportion of physical child abuse cases, but may also be due to resource constraints on the foster system during the pandemic. An analysis of the foster system in Florida found overall lower rates of foster family placement during the pandemic, but higher rates of foster placement specifically due to child maltreatment.[19] Race-based differences were also noted in the cited study, with white children more frequently being placed into foster homes during the pandemic compared to previous years, and Black children less frequently. Decreases in foster home utilization may have been due to fewer families willing to take in children during the pandemic, perceived difficulty receiving needed therapies for children and foster families, and potential impacts on program funding.[19]

Limitations

Our study is limited in that it is a single-center retrospective study, and our results may not be applicable to other hospital systems in different regions of the country. Additionally, although we utilized the trauma registry of a high-volume level one pediatric trauma center, overall numbers of child abuse cases are, fortunately, low, and we may be underpowered to detect statistical significance. Determining which cases represent child abuse requires consultation with experts including licensed clinical social workers and trained child abuse pediatricians, and we attempted to categorize cases as abuse, neglect, or inadequate supervision based upon the clinical impression of these professionals. In addition, less clear-cut cases were reviewed by two authors to come to a final decision on the classification of each case. However,

some bias may be present in these categorizations. 15% of included cases were not evaluated by the CPT team formally, and the classification of these cases as abuse/neglect/inadequate supervision was made by the social worker in conjunction with the medical teams. This finding additionally identifies an area for institutional improvement, as all patients with suspected or confirmed abuse or neglect should be evaluated by the CPT team. The trauma registry may not capture all cases of neglect, as these patients may not always present as trauma activations; the true incidence of child neglect is likely higher than that found in this study.

Conclusion

The rate of abuse, neglect, or inadequate supervision among young pediatric trauma patients during COVID did not differ compared to pre-pandemic, but discharge to a new caregiver was significantly lower. While likely multifactorial, this data suggests that resources during COVID may have been limited and the clinical significance of this is concerning. Larger studies are warranted to further evaluate COVID-19's effect on this vulnerable population.

Author Contributions

Drs Theodorou, Brown, Jackson, and Beres conceived of and designed the study. Dr Theodorou performed the data collection and data analysis. Drs Theodorou, Brown, Jackson, and Beres interpreted the data. Dr Theodorou drafted the manuscript. Drs Theodorou, Brown, Jackson, and Beres critically revised the manuscript.

Disclosure

None declared.

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Meeting Presentation

This study was presented as a poster presentation at the 2021 Pediatric Trauma Society Annual Meeting.

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