




Effect of Lockdown on Neurosurgery Trauma Patients in a Tertiary Care Hospital in India

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Indian J Neurosurg 2022;11:260–264.

Abstract

Background With an increasing number of cases of COVID-19 disease, the Indian government announced a complete lockdown on March 24, 2020, and the country remained under complete lockdown in April 2020. After ramping up health infrastructure and although cases were on the rise, the lockdown was ordered to gradually lift in May 2020.

Methodology It was a retrospective cross-sectional study of all patients admitted to our medical college trauma center in April 2020 and who were compared with April 2019. We studied the prevalence and outcome of road traffic accidents (RTA), assault, and fall from height (FFH) victims admitted to our trauma center. Data were collected using an Excel sheet, and statistical analysis was done using the latest available SPSS software.

Results Our study groups included 124 trauma patients from April 2020 as compared with 322 trauma patients from April 2019. The intense lockdown resulted in a decrease in the number of RTA (–72%), FFH (–29%), and assault patients (–7%). There was no statistically significant change in patients' care and management at our center in terms of mortality and morbidity. No Covid-19-positive neurosurgery trauma patients were admitted in April 2020 to our center.

Conclusion During the stringent lockdown period of April 2020, there was a significant decrease in the number of trauma victims, especially RTAs. The intense lockdown resulted in a significant decrease in the proportion of trauma victims under the influence of alcohol, head injuries, fractures, and dislocations along with a decrease in the number of cases of assaults and FFH as compared with the unlock period.

Keywords

- ▶ lockdown
- ▶ road traffic accidents
- ▶ assault

Introduction

COVID-19 was first reported in India in the last week of January in 2020 when the western world and many cities of China were already under the menace of this deadly pandemic.¹ This was first reported from Wuhan of China

and soon millions of cases flooded the hospitals of the west especially Italy/France/Sweden and part of the UK. To fight this pandemic and ramp up the medical health infrastructure, the Indian government ordered an unprecedented nationwide lockdown for 21 days on

DOI <https://doi.org/10.1055/s-0042-1744243>.
ISSN 2277-954X.

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March 24, 2020, and subsequently extended it until May 2020.² This absolutely indispensable and globally appreciated rigorous lockdown froze the world's largest democracy. This lockdown made everything standstill in a country of 136 crore population and halted the wheels of motor vehicles.³ This resulted in the hypothesis that motor vehicular accidents and subsequently the cases of trauma patients may also have decreased. Although India has only 1% of the motor vehicles of the world, yet nearly 37,000 persons died in 2019.⁴ This lockdown however gave reasonably good time to ramp up the medical infrastructure to fight COVID-19 disease but at the same time impacted severely the delivery of healthcare to other diseases. The impact of lockdown on cases of roadside accidents and assault cases, their prevalence, and the effective healthcare provided to the victims are not assessed properly in the world medical literature. We tried to study the impact of lockdown on the number of cases and the efficacy of treatment provided to the patients admitted in our trauma center.

Aims and Objectives

To study the impact of lockdown on trauma cases in a tertiary care center.

To study the quality of health care in terms of operations and survival of the trauma patients during the COVID-19 pandemic and the difference in the level of care during and without lockdown.

Materials and Methods

This was a retrospective cross-sectional study done in our hospital, which is the biggest tertiary referral center in north India. All trauma patients who presented with trauma during the lockdown month of April 2020 and a comparative period of April 2019 were screened.

We included all the patients who presented to our trauma center. Our study was aimed to study the patients with a history of road traffic accidents (RTA), fall from height (FFH), domestic accidental injuries, injuries, sports-related injuries, assault injuries, or injuries caused by animals. Patients who were brought dead to the trauma center following trauma and charts with missing data were excluded. We collected data on trauma patients from our hospital's electronic database. The following data were collected on a standard data abstraction sheet: baseline characteristics, mode of injury, type of RTA, treatment given, and hospital outcome. The outcome measures were the severity of the trauma, the number of surgeries

performed, and mortality rate comparing April 2020 and April 2019.

Statistical Analysis

We analyzed the data using a statistical package for social sciences for Windows (SPSS Inc. released 2007, version 23.0. Armonk, NY, USA). Continuous variables are expressed as mean with standard deviation and nominal variables as numbers and percentages. Dichotomous variables were compared using the chi-square test. Factors associated with the profile of trauma patients during these two study periods were determined by bivariate logistic regression analysis and their 95% confidence intervals (CI) calculated. A two-sided *p*-value of less than 0.05 was considered statistically significant.

Observations and Results

In this study, 446 patients were enrolled based on inclusion and exclusion criteria. We found that 322 patients were admitted in April 2019 and 124 in April 2020. These patients were classified into patients of RTA, assault, FFH, and others. The total number of patients admitted during the lockdown was less as compared with the unlock period in our trauma center. We found the mean age group of admission in April 2020 to be 30.8 years, which was younger than the mean age group admitted in April 2019 (33.75 years). However, the difference was not statistically significant ($p = 0.165$) (► **Table 1**).

In this study, almost equal number of patients of trauma in extremes of age group (age > 60 years) were admitted during the lockdown ($n = 47$, 14.6% in April 2020 vs. $n = 17$, 13.7% in April 2019). However, in April 2019 during the unlock period, the admission of younger and adult age groups was more ($n = 206$, 64%) as compared with that during April 2020 ($n = 70$, 56.5%) and the result was statistically significant ► **Table 2**. These data suggested that more young patients were reported in our casualty trauma center, indicating a more burden of accidental injuries during the unlock period as compared with the lockdown period.

In our study, the admission of male patients was more during the unlock period ($n = 240$, 74.5% in 2019 vs. $n = 81$, 65.3% in 2020) as compared with lockdown, which indirectly suggested that RFA trauma was more during the unlock period. However, the admission of female patients was more in April 2020 during the lockdown period ($n = 43$, 34.7%) as compared with April 2019 ($n = 82$, 25%) with a difference of 47.56% in the total number of admissions

Table 1 Mean age group of patients in lockdown (April 2020) and unlock period (April 2019)

	Months frequency	Mean	SD	Median	Minimum	Maximum	Valid N
Age (y)	April 2020	30.80	21.85	27.50	.03	85.00	124
	April 2019	33.75	19.32	30.00	.02	77.00	322
	Total	32.93	20.07	30.00	.02	85.00	446

Table 2 Age-wise distribution of patients in lockdown and unlock period

		Months frequency		Total
		April 2020	April 2019	
Age intervals	Up to 1 year	8	3	11
		6.5%	.9%	2.5%
	1 to 5 years	14	18	32
		11.3%	5.6%	7.2%
	>5 to <18 years	15	48	63
		12.1%	14.9%	14.1%
18 to <60 years	70	206	276	
	56.5%	64.0%	61.9%	
≥60 years	17	47	64	
	13.7%	14.6%	14.3%	
Total		124	322	446
		100.0%	100.0%	100.0%

amongst females. These data suggested a rising trend of injuries amongst females during the lockdown, which we further investigated. We found that more females were subjected to assault ($n=13$, 11% in April 2020 vs. $n=14$, 4.3% of total neurosurgery trauma patients in 2019) during the lockdown period and most cases were of domestic violence in our patients. Similarly, cases of FFH were more in April 2020 ($n=17$, 13.7%) than in April 2019 ($n=24$, 7.5%). Due to decreased cases of trauma in the lockdown period of April 2020, we had more admissions of patients with brain tumors, TBM with HCP, and non-traumatic injuries categorized as others ($n=45$, 36% in 2020 as compared with $n=110$, 34% in 2019 for April). We found no major changes in the quality of health care provided to the patients in our hospitals in terms of operations done over these patients as the number of surgeries performed during lockdown ($n=65$, 52% during April 2020) was almost similar to surgeries performed in unlock period of April 2019 ($n=163$, 51%). There was only a slight change in the outcome in terms of mortality, as the number of live discharges was more in April 2020 ($n=119$, 96% in April 2020) than in April 2019 ($n=301$, 94%). No COVID-19-positive patients were admitted to the neurosurgery trauma center in April 2020 at our institute and hence the outcome of such patients was not assessed in our study (► **Table 3**).

On statistical analysis, we found that the total number of RFA admissions was more during the unlock period ($n=167$, 51.9%) than during the lockdown period ($n=46$, 37.1%). During the lockdown period, more cases of overall head injury were added ($n=234$, 72.7% in April 2019 vs. $n=83$, 66.9% in April 2020). More patients of RTA were admitted in April 2019 ($n=167$, 51.95%) than in April 2020 ($n=46$, 37.1%), and the result was statistically significant ($p=0.005$, unadjusted odds ratio [OR]: 0.761), total number of assault patients were more during the lockdown period ($n=13$, 10.5%) than during the unlock period ($n=14$, 4.3%), and

the difference was significant statistically ($p=0.004$; unadjusted OR: 0.272). Similarly, as compared with RTA, the number of patients with a history of FFH was more during the lockdown period ($n=17$, 13.7%) than during the unlock period ($n=24$, 7.5%) but the difference was statistically significant ($p=0.008$; unadjusted OR: 0.364). However, the difference of outcome in terms of deaths and live discharge suggesting differences in the quality of care was not statistically significant, indicating no difference in the quality of care given to the patients in our hospital (► **Table 4**).

Discussion

We worked on a hypothesis that lockdown will halt all motor vehicular activities in the country and will cause a significant decrease in the number of cases of RFAs and associated injuries.⁵ This was also projected in IJCMR by Harne et al in 2020.⁶ As according to our hypothesis, we showed that the number of patients admitted due to RFAs decreased by 72% during April 2020 as compared with that during April 2019. This fall in the number of road traffic cases was due to reduced vehicle activities and reduced demand and supply ratio of essential commodities during the lockdown period. Reduced economic activities and fall in motor vehicle accidents were also observed in other countries such as the UK.⁷ During the testing times of COVID-19 disease, this fall in the number of cases of accidents was a breather in terms of the burden on the already stretched healthcare system.

We found a slight increase in the proportion of the extreme of age (pediatric and >60 years) group populations admitted with a history of trauma in our hospital between the two periods, 43.5% in 2020 compared with 36% in 2019; however, it was not statistically significant. The more likely cause of this finding was children being more at home and hence more prone to

Table 3 Percentage difference in patients admitted in April 2020 and April 2019

		Months frequency				Difference	Difference %
		April 2020		April 2019			
		N	%	N	%		
Total no. of patients		124	27.8	322	72.2	-198	-61.491
Age intervals	Pediatric (<18 years) and geriatric (≥60 years) trauma	54	43.5%	116	36.0%	-62	-53.448
	Others	70	56.5%	206	64.0%	-136	-66.019
Gender	Male	81	65.3%	240	74.5%	-159	-66.25
	Female	43	34.7%	82	25.5%	-39	-47.561
Injury	Cervical trauma/injury	2	1.6%	16	5.0%	-14	-87.5
	Head injury	83	66.9%	234	72.7%	-151	-64.53
	Others	39	31.5%	72	22.4%	-33	-45.833
Mode of injury	RTA	46	37.1%	167	51.9%	-121	-72.455
	Assault	13	10.5%	14	4.3%	-1	-7.1429
	Fall from height	17	13.7%	24	7.5%	-7	-29.167
	Mechanical injury	1	.8%	7	2.2%	-6	-85.714
	Head injury	2	1.6%	0	.0%	2	100
	Others	45	36.3%	110	34.2%	-65	-59.091
Procedure	Operated	65	52.4%	163	50.6%	-98	-60.123
	Conservative	59	47.6%	159	49.4%	-100	-62.893
Outcome	Live	119	96.0%	301	93.5%	-182	-60.465
	Expired	5	4.0%	21	6.5%	-16	-76.19

Table 4 Statistical analysis of patients admitted in neurosurgery trauma in April 2019 and 2020

		Months frequency				p-Value	Unadjusted OR (95% CI)
		April 2020		April 2019			
		N	%	N	%		
Injury	Head injury	83	66.9%	234	72.7%	0.232	0.761 (0.487–1.19)
Mode of injury	RTA vs. all	46	37.1%	167	51.9%	0.005	0.547 (0.358–0.837)
	Assault vs. RTA	13	10.5%	14	4.3%	0.004	0.297 (0.130–0.675)
	Fall from height vs. RTA	17	13.7%	24	7.5%	0.008	0.389 (0.193–0.785)
	Mechanical injury vs. RTA	1	0.8%	7	2.2%	0.544	1.928 (0.231–16.07)
	Others vs. RTA	45	36.3%	110	34.2%	0.104	0.673 (0.418–1.084)
Procedure	Operated	65	52.4%	163	50.6%	0.734	1.075 (0.710–1.627)
Outcome	Live	119	96.0%	301	93.5%	0.319	1.66 (0.612–4.51)

injuries and domestic violence during the lockdown period.^{8,9} We found an increased incidence of assault and accidental injuries amongst females during the lockdown period in our study, suggesting increased cases of domestic violence and related assault in this section of society.¹⁰ Similar data were reported in the studies published in The Lancet journal, suggesting an increased incidence of rage and anger during the period of lockdown, mainly due to economic constraints and psychological breakdowns. An

increased incidence of assault was reported in other parts of the world too during the lockdown.¹¹ The global lockdown has aptly been described as “the world’s largest psychological experiment.”¹² A review of multiple studies done on the effect of quarantine published by The Lancet shows that quarantine in the past has been associated with increased fear and anger among other emotions that may have perpetrated assaults.¹³ However, we found no statistically significant difference in the quality of health

care given to patients in terms of the number of operations done and the number of live discharges done.

Conclusion

This study concluded that during the lockdown, the number of trauma cases decreased than during the unlock period. The number of cases of RFAs decreased in our hospital but the incidence of assault and FFH increased during the lockdown period. The incidence of assault in females and with an increase in the number of injuries to extremes of age group (pediatrics and >60 years) was reported during the lockdown period.

Limitations of our Study

The country-wide lockdown was implemented in full scale in April 2020 and hence only 1-month data were available for comparison with the data of April 2019. No COVID-19-positive cases were admitted to our hospital during this period and hence the outcome was not assessed for COVID-19-positive neurosurgery trauma patients in our study.

Conflicts of Interest

None declared.

References

- 1 CNN HR Esha Mitra and Swati Gupta. India places millions under lockdown to fight coronavirus. CNN. Accessed May 22, 2021. <https://www.cnn.com/2020/03/23/asia/coronavirus-covid-19-update-india-intl-hnk/index.html>
- 2 Hebbbar N. PM Modi announces 21-day lockdown as COVID-19 toll touches 12. The Hindu <https://www.thehindu.com/news/national/pm-announces-21-day-lockdown-as-covid-19-toll-touches-10/article31156691.ece>. Published March 24, 2020. Accessed May 22, 2021
- 3 Gettleman J, Schultz K. Modi Orders 3-Week Total Lockdown for All 1.3 Billion Indians. The New York Times <https://www.nytimes.com/2020/03/24/world/asia/india-coronavirus-lockdown.html>. Published March 24, 2020. Accessed May 22, 2021
- 4 Road accidents in India: This is what makes Indian roads deadliest - Times of India. The Times of India . Accessed May 22, 2021. <https://timesofindia.indiatimes.com/india/this-is-what-makes-indian-roads-deadliest/articleshow/78870630.cms>
- 5 Lockdown in India. Lockdown cuts road deaths by 62% | India News - Times of India . Accessed May 24, 2021. <https://timesofindia.indiatimes.com/india/covid-lockdown-saved-nearly-9000-lives-26000-injuries-on-roads/articleshow/76637367.cms>
- 6 Harne NM, Maraskolhe DS, Pandhare ML, Rathod BT. Lockdown versus epidemiology of orthopedic injuries: our experience at tertiary care center in Central India. *International Journal of Contemporary Medical Research* 2020;7(11):K1-K3
- 7 UK road travel falls to 1955 levels as Covid-19 lockdown takes hold | Transport | The Guardian. Accessed May 24, 2021. <https://www.theguardian.com/uk-news/2020/apr/03/uk-road-travel-falls-to-1955-levels-as-covid-19-lockdown-takes-hold-coronavirus-traffic>
- 8 Christey G, Amey J, Campbell A, Smith A. Variation in volumes and characteristics of trauma patients admitted to a level one trauma centre during national level 4 lockdown for COVID-19 in New Zealand. *N Z Med J* 2020;133(1513):81-88
- 9 Hernigou J, Morel X, Callewier A, Bath O, Hernigou P. Staying home during "COVID-19" decreased fractures, but trauma did not quarantine in one hundred and twelve adults and twenty eight children and the "tsunami of recommendations" could not lockdown twelve elective operations. *Int Orthop* 2020;44(08):1473-1480
- 10 Jacob S, Mwangiru D, Thakur I, Moghadam A, Oh T, Hsu J. Impact of societal restrictions and lockdown on trauma admissions during the COVID-19 pandemic: a single-centre cross-sectional observational study. *ANZ J Surg* 2020;90(11):2227-2231. Doi: 10.1111/ans.16307
- 11 Hatchimonji JS, Swendiman RA, Seamon MJ, Nance ML. Trauma does not quarantine: violence during the COVID-19 pandemic. *Ann Surg* 2020;272(02):e53-e54
- 12 Lockdown is the world's biggest psychological experiment - and we will pay the price. World Economic Forum . Accessed May 24, 2021. <https://www.weforum.org/agenda/2020/04/this-is-the-psychological-side-of-the-covid-19-pandemic-that-were-ignoring/>
- 13 Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020;395(10227):912-920