

Original Research Article

Pattern of surgical emergencies during COVID-19 lockdown in a tertiary care centre

Surender Verma^{1*}, Anjali Verma², Pradeep Garg¹, Rajesh Godara¹,
Vivek Sirohi¹, Neha Garg¹, Vijay Pal¹

¹Department of General Surgery, PGIMS, Rohtak, Haryana, India

²Department of Pediatrics, PGIMS, Rohtak, Haryana, India

Received: 07 October 2020

Accepted: 18 November 2020

***Correspondence:**

Dr. Surender Verma,

E-mail: drsurn@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: COVID-19 is a novel pandemic affecting almost all countries of the world. The containment measures in form of lockdown taken to prevent its spread has impacted pattern and volume of surgical emergencies. As emergency admissions form a major bulk of total surgical admissions hence this study was planned to look for the impact of lockdown on the spectrum of surgical emergencies in a tertiary care hospital.

Methods: A descriptive register based study was done by collecting data of surgical emergencies in three phases – pre lockdown, lockdown and lockdown with relaxations. Data regarding surgical admissions which includes trauma as well as non-trauma emergencies during various phases was collected and analysed.

Results: Total number of surgical emergencies decreased by 55.6% during lockdown when compared with pre-lockdown phase. In lockdown phase with relaxations, total admissions increased by 35.2% over lockdown phase however they was overall decrease by 19.4% than pre-lockdown phase. Physical assault was most common cause of trauma admissions in both lockdown (48.2%) as well as relaxation phases (57.1%) whereas RSA was the most common cause in pre-lockdown phase (50.5%).

Conclusions: As there was significant decrease in surgical emergencies particularly road side accidents during both lockdown and relaxation phases, hence we conclude that maximum emergencies can be avoided which ultimately decrease the burden on existing health care system. However lockdown has adversely affected economy of country and public comfort i.e. travel restrictions, jobs, recreation etc. Moreover, rise in cases of physical assaults also warrants urgent attention in the community.

Keywords: Lockdown, COVID-19, Surgical emergencies

INTRODUCTION

The world healthcare community is facing coronavirus disease (COVID-19) outbreak caused by SARS-CoV-2 that is progressively spreading globally. In the last few weeks, we have witnessed an unprecedented spread of the COVID-19 worldwide.¹ The past few months has seen a lot of findings and learnings regarding the novel coronavirus illness, but there are still many things which needs more research. Indian government has also ordered

a series of phased lockdowns to hinder and limit the possible spread of COVID-19. A lot has been studied about its pathogenesis and course of illness, however there is limited data on effect of lockdown on surgical emergencies.

Because of the newness of situation, there is paucity of literature on the patterns and volumes of injury that can impact on hospital resources during periods of community lockdowns. The Royal Australian college of surgeons

(RACS) and the American college of surgeons (ACS) have both warned possibility of the pandemic to impact care of critically injured patients, particularly for those patients who require time-sensitive life-saving interventions.^{2,3} Hence this study was planned to see the impact of lockdown on pattern and volume of surgical emergencies in tertiary care teaching hospital.

METHODS

An observational descriptive study was conducted by collecting data of patients admitted in the surgical emergency of a tertiary care teaching hospital in state of Haryana. The first case of COVID-19 pandemic in India was reported on 30th January 2020 possibly originating from China. On 22nd March 2020, India observed a 14-hour voluntary public curfew followed by complete lockdown from 25th March to 14th April later extended to 3rd May which was also followed by 2 phases of 2 weeks each starting from 3rd and 17th May 2020 respectively. Substantial relaxation were started from 20 April in form of local transport and inter district communication in our zone.⁴ However, primary care was available at a variety of community clinics with fragmented health care services during both lockdown and lockdown with relaxation phase.

Patients data was collected during three study periods of 26 days each, first was pre lockdown period of from 25th Feb 2020 to 21st March 2020, second of strict lockdown where all activities were restricted i.e. from 25th March to 19th April 2020 and third from 20th April 2020 to 15th May 2020 in which relaxations were given in our zone that was an orange zone i.e. areas with limited number of cases in past and no case detected in last 14 days.⁴ Time period from 22nd March to 24th March was excluded from the study as there was public curfew on 22nd March followed by decreased movement in our zone in the following two days. Demographic details of the patients according to age, gender, and background and referral status were noted. Data of both trauma and non-trauma surgical emergencies was recorded. Details of various surgical procedures done during various phases were also taken. Data of all the 3 phases was sourced from the registers and analysed using descriptive statistical methods.

RESULTS

A total of 1112 patients were admitted in pre lockdown phase; 505 in the lockdown and 896 in lockdown phase with relaxations. There was an overall decrease in admissions of 54.6% in lock down phase (Table 1). When

lockdown phase was compared with relaxation phase, admissions increased by 35.2% but admissions were still 19.4% less than pre lockdown phase. Among all emergencies during pre-lockdown, 70.3% were due to trauma compared to 66.2% and 75.1% in lockdown and lockdown with relaxations phase respectively.

During lockdown, marked reductions occurred in male gender admissions (20.9%) compared to pre lockdown. Also 7.8% reduction was seen in patients of age group 16-30 years. Patients coming from rural background also decreased by 9.2%. Referred patient increased by 9.6% and 3.2% in lockdown and lockdown with relaxation phase respectively when compared with pre lock down phase (Table 1).

Road side accidents (50.5%) which was the most common mode of emergency decreased to 28.7% in lockdown and further decreased to 26.3% in lockdown with relaxations. However, cases of physical assault increased by 11.6% in lockdown which further increased by 8.9% in lockdown with relaxations. Falls and burns also increased during lockdown (Table 2). Pediatric patients accounted for 50%, 65%, 63% of falls and 6%, 12%, 11.5% of burns in pre lockdown, lockdown and lockdown with relaxation phase respectively.

Among non-trauma surgical emergencies, not much change in pattern was noticed except cases of perforation peritonitis increased significantly in lockdown with relaxations (10.6%) and lockdown (8.8%) when compared with pre lockdown (5.2%) (Figure 1).

During lockdown phase, volume of emergency surgeries also dropped significantly (48.7% reduction). However when relaxations were being made it again increased by 37.5% as patients who were being managed at home or by local practitioners started reporting to the hospital. However, incidence of appendicectomy remained less in even lockdown with relaxations (Table 3).

Laparotomies done for intestinal obstruction were 14, 8 and 12 in pre lockdown, lockdown and lockdown with relaxation phase respectively. Perforation peritonitis as an indication of laparotomy was much higher in lockdown with relaxations (21 patients) as compared to pre lockdown (15 patients) as well as lockdown phase (14 patients) whereas not much difference was seen in intestinal obstruction. Laparotomies in relaxation phase for both blunt as well as penetrating trauma abdomen (11 patients) were also increased as compared to pre lockdown (4 patients) and lockdown phase (4 patients).

Table 1: Demographic parameters of patients.

Parameters	Pre lockdown n=1112 (%)	Lockdown n=505 (%)	Lockdown with relaxations n=896 (%)
Age (years)			
<15	46 (4.1)	35 (6.9)	57 (6.3)
16-30	346 (31.2)	118 (23.4)	235 (26.3)

Continued.

Parameters	Pre lockdown n=1112 (%)	Lockdown n=505 (%)	Lockdown with relaxations n=896 (%)
31-45	321 (28.9)	136 (26.9)	242 (27)
46-60	242 (21.8)	122 (24.2)	198 (22.1)
>60	155 (14)	94 (18.6)	164 (18.3)
Sex			
Male	907 (81.6)	352 (60.7)	759 (84.7)
Female	205 (18.4)	153 (30.3)	137 (15.3)
Background			
Rural	831 (74.8)	331 (65.6)	707 (78.9)
Urban	281 (25.2)	174 (34.4)	189 (21.1)
Referred	695 (62.5)	364 (72.1)	589 (65.7)
Non referred	417 (37.5)	141 (27.9)	307 (34.3)

Table 2: Mode of injury of trauma emergencies.

Mode of injury	Prelockdown N (%)	Lockdown N (%)	Lockdown with relaxations N (%)
Physical assault	286 (36.6)	161 (48.2)	384 (57.1)
Road side accident	395 (50.5)	96 (28.7)	177 (26.3)
Fall from height	61 (7.8)	35 (10.5)	66 (9.8)
Burns	22 (2.8)	33 (9.9)	31 (4.6)
Others	18 (2.3)	9 (2.7)	15 (2.2)
Total	782 (100)	334 (100)	673 (100)

Table 3: Major surgical procedures done during pre-lockdown, lockdown and post lockdown.

Procedures	Pre lockdown, N (%)	Lockdown, N (%)	Lockdown with relaxations, N (%)
Laparotomy	34 (43.6)	27 (67.5)	44 (68.8)
Appendicectomy	26 (33.3)	8 (20)	10 (15.6)
Feeding jejunostomy	5 (6.4)	1 (2.5)	5 (7.8)
Orchidectomy	9 (11.5)	3 (7.5)	3 (4.7)
Herniorrhaphy	4 (5.2)	1 (2.5)	2 (3.1)
Total	78 (100)	40 (100)	64 (100)

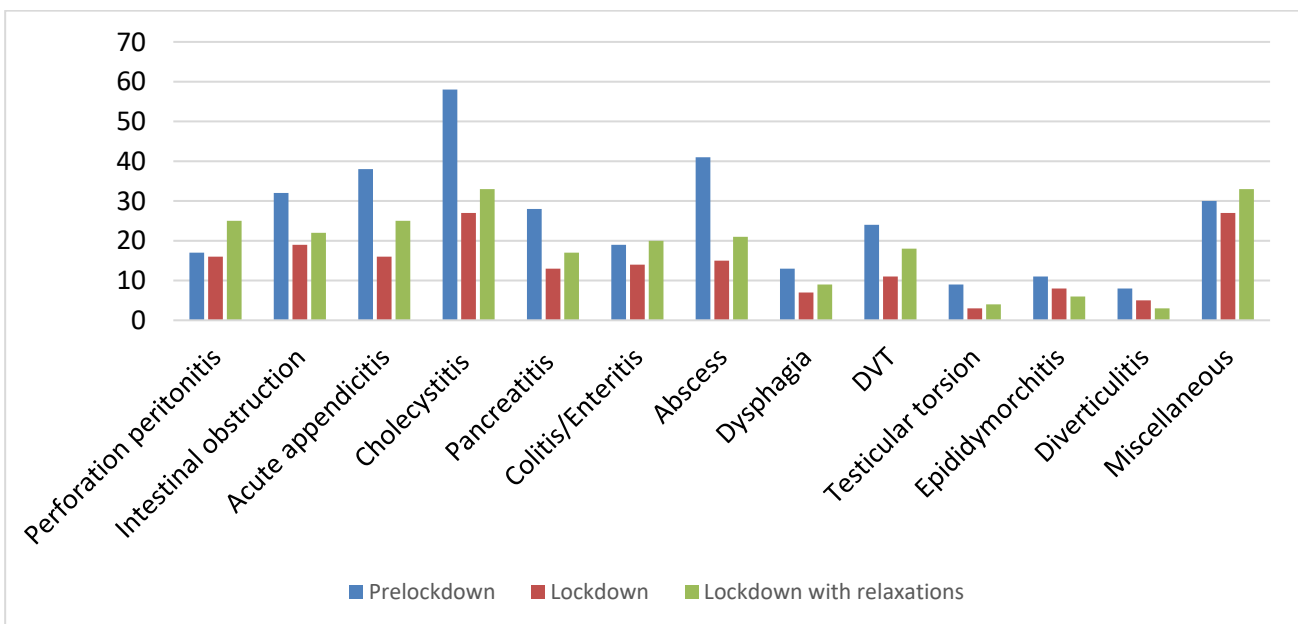


Figure 1: Pattern of non-trauma surgical emergencies.

DISCUSSION

This hospital is the only tertiary care teaching centre with a fully functional trauma block that attracts rural as well as urban patients across the state and also the neighbouring states. Various studies had been done earlier showing pattern of surgical emergencies in the same institute.⁵⁻⁸ As maximum trauma as well as non-trauma emergencies of the state are being referred here only which leads to huge patient load, hence we had planned this study to know the impact of COVID-19 on surgical emergencies in our institute.

This study revealed significant reductions in the overall volume of all surgical admissions during absolute lockdown period. The overall greatest reductions were seen in surgical emergencies in males (20.9%) and patients in age group of 16-45 years (9.8%). This suggests that during lockdown outdoor activities of young males were restricted which has led to reduced RSA and assault. As our centre being major referral centre of the state, percentage of referred cases were also increased during lockdown phase.

Similar results were seen in a study in New Zealand which showed reduction of 43% in all injury-related admissions with significant reductions seen in major injury (50% reduction), males (50% reduction) and children aged 0-14 years (48% reduction).⁹

Another study in Italy related to surgical emergencies in red zone area in lockdown also showed 86% decrease of cases of emergency surgery compared to the month before the lockdown.¹⁰

The rates of road trauma have fallen during lockdown as vehicle use declined, however we would expect further reduction if road users remained committed to safe driving. On the contrary cases of physical assault have increased significantly particularly during lockdown with relaxations owing to stress, financial crisis, scarcity of resources, alcohol use, excessive free time and domestic violence due to all persons being trapped together in close confinement.

Royal college of emergency medicine in United Kingdom had reported a 25% fall in visits to emergency departments in the first week following their lockdown which was attributed to fewer injury events due to lower vehicle use. However, the college was concerned about more domestic violence which was also seen in our study.¹¹ In Italy also, several doctors have reported lower volumes of injuries during lockdown period.¹² However, these data are new (and localised) trends with analysis are likely to be available in public domain in near future.

Incidence of burns have also increased possibly due to the same above mentioned reasons. Accidental burns and falls in children have also increased as a result of increased indoor stay. Injuries at home, particularly falls were more

commonly noticed in another study.⁹ Surgeons in New Zealand and Ireland have also heightened risk of domestic injuries during lockdown as evident in our study.^{13,14}

Contrary to our findings, trauma surgeons in Australia have expressed concerns that there may be an increase in trauma related hospitalisations during this pandemic because of alcohol related risk taking behaviour.¹⁵ In our area strict restriction to liquor might be a reason for this finding.

Most common indication for emergency surgery was acute appendicitis in pre lockdown phase as in earlier done studies too.^{5,16} However, during both lockdown and relaxation phases, perforation peritonitis was found to be main cause of emergency surgery and there was a tremendous fall in appendectomy. This was because many patients of appendicitis didn't report and sought treatment from local practitioners and were managed with medications at home. In view of high infectivity of COVID-19 many patients of appendicitis were managed conservatively in hospital also. Patients with mild forms of other abdominal emergencies such as diverticulitis, cholecystitis and mild pancreatitis also decreased as they were also managed conservatively at home by the general physician. As a matter of fact, we expect increasing unknown number of patients suffering of acute abdominal and thoracic disease at home in the near future.

Total number of laparotomies slightly decreased in absolute lockdown and later increased in lockdown with relaxations. The most common cause of peritonitis was peptic perforation in pre lockdown phase followed by enteric perforations and the same was noticed in previous studies too.¹⁷ However increase was noted in enteric perforations in lockdown and more in lockdown with relaxations as it has a seasonal variation with cases mainly reporting in May-September.^{18,19} Cases of intestinal obstruction decreased in lockdown period and later on increased in relaxation phase which might be because of delayed reporting of cases. Similar studies have also showed reduction in bowel obstruction and other diet-related pathologies during lockdown due to change in diet habits and social behaviour due to social isolation.¹⁰ In addition, increase in blunt and penetrating trauma abdomen was also a cause for increase in laparotomies during lockdown with relaxation phase.

As COVID-19 is still spreading in our country with more hospitals converting into COVID hospitals, in the near future this situation of increased cases in lockdown with relaxations could quickly saturate our health infrastructure and the already crowded intensive care units.

CONCLUSION

There is a significant reduction in volume of both trauma as well as non-trauma surgical emergencies during lockdown. Attention of road users to strictly follow traffic rules and maintaining social harmony is essential after

lockdown to reduce the incidence of preventable injuries. These immediate measures can potentially reduce unnecessary pressure on hospital beds and resources during the pandemic.

ACKNOWLEDGEMENTS

Authors would like to thank Mr. Subhash Sapra for his help in retrieving the data.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

- Lai C, Shih T, Ko W, Tang H, Hsueh P. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirusdisease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents.* 2020;105924.
- American College of Surgeons. Maintaining trauma center access and care during the COVID19 pandemic: Guidance document for Trauma Medical Directors. Available at: www.facs.org/quality-programs/trauma/maintaining-access. Accessed on: 20 June 2020.
- Royal Australasian College of Surgeons. Maintaining front-line trauma services during the COVID-19 response. Available at: http://umbraco.surgeons.org/media/5146/20200330_ltr_trauma-group_covid-statement_hospital-ceo.pdf. Accessed on: 20 June 2020.
- 2020 Coronavirus pandemic in India. Available at: https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_India. Accessed on: 25 May 2020.
- Verma A, Verma S, Garg P, Godara R, Karwasra RK, Verma N. Surgical emergencies in a tertiary care hospital: a brief overview. *Int J Contemp Med Res.* 2016;3:648-51.
- Verma S, Karwasra RK, Garg P, Verma A, Godara R, Singh J, et al. Pattern of Trauma at a Government Tertiary Care Teaching Hospital of Haryana. *J Evol Med Dent Sci.* 2014;3:7143-9.
- Verma S, Noori MT, Garg P, Yadav A, Sirohi V, Garg N. Study of pattern and management strategies of solid visceral injuries in blunt trauma abdomen in tertiary care centre. *Int Surg J.* 2020;7:1808-12.
- Anand A, Verma S, Garg P, Noori MT, Kajal A, Verma A. Evaluation of pattern and prognostic factors of head injury cases in a tertiary care centre. *Int Surg J.* 2020;7:1535-40.
- 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. *NZMJ.* 2020;4:1513.
- Patriti A, Eugeni E, Guerra F. What happened to surgical emergencies in the era of COVID 19 outbreak? Considerations of surgeons working in an Italian COVID 19 red zone. *Updates in Surgery.* Available at: <https://doi.org/10.1007/s13304-020-00779-6>. Accessed on: 20 April 2020.
- Thornton J. Covid-19: A&E visits in England fall by 25% in week after lockdown. *BMJ.* 2020;369:m1401.
- Foujat R. How coronavirus is affecting trauma systems in Italy. Available at: www.trauma-news.com/2020/03/how-coronavirus-is-affecting-trauma-systems-in-italy/. Accessed on: 27 June 2020.
- One News. Heightened risk of injury for Kiwis in lockdown warns plastic surgeon. Available at: www.tvnz.co.nz/one-news/new-zealand/heightened-risk-injury-kiwis-in-lockdown-warns-plastic-surgeon. Accessed on: 25 June 2020).
- Fahy S, Moore J, Kelly M, Flannery O, Kenny P. Analysing the variation in volume and nature of trauma presentations during COVID-19 lockdown in Ireland. *Bone Joint Open.* 2020;1:261-6.
- Royal Australasian College of Surgeons. Trauma surgeons fear increased caseload as a result of COVID-19. Available at: www.surgeons.org/news/media-releases/trauma-surgeons-fear-increased-caseload-as-a-result-of-covid-19. Accessed on: 27 June 2020.
- Drake TM, Camilleri-Brennan J, Tabiri S. Laparoscopy in management of appendicitis in high, middle-, and low-income countries: a multicenter, prospective, cohort study. *Surg Endosc.* 2018;32:3450-66.
- Singla S, Verma S, Garg P, Verma A, Noori MT, Yadav A. Pattern and etiology of patients with gastrointestinal perforations: an observational prospective study. *Int J Contemp Med Res.* 2019;6:6-9.
- Saad NJ, Lynch VD, Antillón M, Yang C, Crump JA, Pitzer VE. Seasonal dynamics of typhoid and paratyphoid fever. *Sci Rep.* 2018;8:6870.
- Dash D, Das P, Bhargava A, Gaikwad UN, Negi SS, Wankhede A. Estimating the burden of enteric fever in Chhattisgarh: A single-center study on culture-positive cases from a newly built tertiary care hospital. *JLP.* 2019;11:3.

Cite this article as: Verma S, Verma A, Garg P, Godara R, Sirohi V, Garg N, Pal V. Pattern of surgical emergencies during COVID-19 lockdown in a tertiary care centre. *Int Surg J* 2020;7:4127-31.