

Research Article

Impact of SARS CoV-2 Pandemic on Surgical Volume & Outcomes – Experience from a Tertiary Care Hospital Teaching Hospital in India

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Abstract

Background: COVID-19 pandemic has had a huge impact on healthcare system. The impact has been more catastrophic for low and middle-income countries because of very poor health care system. The pandemic and the lockdown not only drastically reduced the number of surgeries performed but also impacted the outcome in both COVID and non-COVID surgeries. The present study analyses the impact of COVID on surgical volume and outcomes in a surgical unit at a tertiary care teaching hospital from India.

Methods: A retrospective analysis of a prospectively maintained database of patients from single surgical unit in a tertiary care teaching hospital was done. The number of patients who underwent surgery between Jan 2020 to Dec 2020 were included and compared to number of patients operated between Jan 2019 to Dec 2019. The patients operated in 2020 were further categorized into those operated during the period of national lockdown and those operated before and after the lockdown were lifted. SARS COV-2 diagnosis was made using RTPCR/CBNAAT testing on oral and nasopharyngeal swabs. The outcomes of COVID positive patients were compared with non-COVID patients operated during the study period.

Results: A total of 629 cases were operated between Jan 2020 to Dec 2020. There was significant reduction in number of cases per-

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formed compared to same time period in previous year (Jan 2019 to Dec 2019) in which 2023 cases were operated. There was also a significant reduction in number of both elective and emergency cases (502 vs 1811- 79.8% vs 89.5% and 127 vs 212- 20.2% vs 10.5%, $p < 0.05$). Overall perioperative morbidity during the COVID period (2020) was 23.9% which was more than that of previous year (2019) (17.6%) ($p = 0.001$). There was also evident significant increase in 30-day mortality during COVID year (3.1% vs 1.3%, $p = 0.002$). The total number of operated cases were 276 and 353 respectively during the lock-down and non-lockdown period. There was significant decrease in the number of elective (84% vs 77%, $p = 0.032$) as well as emergency cases (16% vs 23% $p = 0.032$) operated during lockdown period. There was also significant increase in the perioperative morbidity during lockdown period (31.52% vs 17.84%, $p < 0.05$).

Conclusion: COVID-19 pandemic and nationwide lockdown drastically decreased the volume of surgery and significantly increased the perioperative morbidity and mortality.

Keywords: COVID; Lockdown; Pandemic; SARS CoV2; Surgical Volume

Introduction

A new type of coronavirus that began in Wuhan, China in late 2019 has spread across the world since then. The virus has caused an outbreak of viral pneumonia, which has been named Coronavirus disease (COVID-19) [1]. On January 30th, 2020, the WHO declared COVID-19 (severe acute respiratory syndrome coronavirus 2; SARS-CoV-2), a Public Health Emergency of International Concern. The first SARS-CoV-2 positive case in India was reported in the state of Kerala on January 30th, 2020. Subsequently, the number of cases have risen drastically [2]. Countrywide lockdown was enforced in March 2020 to curb the rising number of cases. The COVID-19 pandemic and the accompanied lockdown drastically impacted all routine healthcares including the surgery.

Globally, the impact of COVID-19 has been disastrous due to a lack of proven treatment. However, the impact has been more catastrophic for low and middle-income countries because of very poor health care system, shortage of skilled health care personnel, scarce Intensive Care Units, a limited number of mechanical ventilators, high prevalence of malnutrition along with other co-morbidities, high illiteracy and low awareness of the disease and its prevention. The surgical impact of the disease has included the reduced number of surgeries performed, increase in perioperative mortality and morbidity, prolonged mechanical ventilation & ICU care. Performing surgery in COVID-19 patients is a challenge & new experience in itself, requiring donning of Personal Protective Gear (PPE), designated separate operation theatres and more trained staff assisting the surgeons.

Ours is tertiary care teaching hospital catering to more than 50,000 surgical patients annually. In this study we have evaluated and reported the impact of COVID-19 and nation-wide lockdown on the volume of surgeries being performed in a single surgical unit as well the surgical outcomes in both COVID and non-COVID patients

Materials and Methods

This was a retrospective analysis of a prospectively maintained database of patients from single surgical unit in a tertiary care teaching hospital. This study was conducted after approval from Institute Ethics Committee (IECPG-657/25.11.2020). All patients who underwent surgery under general and local anesthesia between Jan 2020 to Dec 2020 were included. The patients operated were further categorized into those operated during the period of national lockdown and those operated before and after the lockdown were lifted. All patients were subjected to SARS COV-2 testing. SARS COV-2 diagnosis was made using RTPCR/CBNAAT testing on oral and nasopharyngeal swabs.

Prospective data including demographic profile, clinical profile, indication for surgery, type of surgery (elective, semi-urgent or urgent), preoperative morbidity and mortality were recorded and analyzed. Data of patients included in this study was compared with the patients operated during the same time period in the year prior i.e., Jan 2019 to Dec 2019. The demographic data and outcome of COVID positive patients were compared with non-COVID patients operated during the study period.

Statistical analysis was done using Fischer exact test for continuous variables and Pearson's chi-square test for categorical variables and p-value were calculated. P-value <0.05 was considered significant.

Results

A total of 629 cases were operated between Jan 2020 to Dec 2020. Demographic profile, type of surgery (emergency or elective), technique (open or laparoscopic) and other data is presented in table 1. There was significant reduction in number of cases performed compared to same time period in previous year (Jan 2019 to Dec 2019) in which 2023 cases were operated. There was also a significant reduction in number of both elective and emergency cases (502 vs 1811- 79.8% vs 89.5% and 127 vs 212- 20.2% vs 10.5%, p<0.05). Though the number of emergency surgeries were less as compared to non-COVID times, the percentage of emergency cases operated in 2020 increased significantly (212/629 -20.2% vs 127/2023-10.5%). There was also a significant decrease in the number of laparoscopic procedures performed in 2020 (27% vs 41%, p<0.05).

	2020	2019	p Value
Total No Of Procedures	629	2023	
Elective	502 (79.8%)	1811 (89.5%)	<0.05
Emergency	127 (20.2%)	212 (10.5%)	<0.05
LAP/ENDOSCOPIC	171 (27.2%)	850 (42%)	<0.05
Open	458 (72.8%)	1173 (58%)	<0.05
GA	440 (70%)	1390 (68.7%)	0.59
SA/RA	13 (2%)	10 (0.005%)	0.001
LA	176 (28%)	623 (30.8%)	0.196
Morbidity	150 (23.8%)	356 (17.6%)	0.001
Mortality	20(3.1%)	27 (0.013%)	0.002
Readmission	12 (1.9%)	56 (0.027%)	0.311
Male: Female	326:287	1066:957	

Table 1: Comparison of volume of surgery.

Overall perioperative morbidity during the COVID period was 23.9% which was significantly more than that of previous year (17.6%) (p=0.001). There was also evident significant increase in 30-day mortality during COVID year (3.1% vs 1.3%, p=0.002) and majority of deaths were in the emergency cases (20/629) the cause of mortality was directly COVID related in one case. However, there was no significant difference in the readmission rates (p=0.31).

We also compared results of patients operated during the lockdown period (March 1st 2020 – August 31st 2020) and the non-lockdown period (January 1st 2020 – February 29th 2020 & September 1st 2020 – December 31st 2020). The total number of operated cases were 276 and 353 respectively during the lock-down and non-lock-down period (Table 2). There was significant decrease in the number of elective (84% vs 77%, p=0.032) as well as emergency cases (16% vs 23% p=0.032) operated during lockdown period including both laparoscopic and open approach. There was also significant increase in the perioperative morbidity during lockdown period (31.52% vs 17.84%, p<0.05). However, the mortality (p=0.08) and readmission rates (p=0.18) were similar (table 2).

	Lockdown	Lockdown (Jan-Feb + Sep-Dec)	P Value
Total No Of Procedures	276	353	
COVID Negative	259	349	
COVID Positive	7	5	
Elective	231 (83.7%)	272 (77%)	0.032
Emergency	45 (16.3%)	81 (23%)	0.032
LAP/ENDOSCOPIC	64 (23.1%)	107 (30.3%)	0.816
Open	212 (76.8%)	246 (69.7%)	0.046
GA	191 (69.2%)	249 (70.5%)	0.71
SA/RA	10 (3.6%)	3 (0.9%)	0.015
LA	75 (27.2%)	101 (28.6%)	0.69
Morbidity	87 (31.5%)	63 (17.8%)	<0.05
Mortality	5 (1.8%)	15 (4.2%)	0.084
Readmission	3(1%)	9 (2.5%)	0.183
Male: Female	125:137	201:150	

Table 2: Comparison of volume of surgery between lockdown and non-lockdown period.

Twelve COVID positive patients were operated in 2020. All were emergency cases and included cases of enteric perforation, splenic abscess, bowel gangrene, necrotizing fasciitis. Compared to other non-COVID emergencies operated during the same time period, there was a significantly higher mortality among patients operated with COVID (17% vs 14%) (Table 3).

Emergency cases	COVID Negative	COVID Positive	P value
Morbidity	23.5%	41%	0.002
Mortality	14%	17%	0.032

Table 3: Comparison of morbidity and mortality between COVID positive and non-COVID surgical patients.

Discussion

COVID-19 pandemic and lockdown caused an unprecedented disruption in healthcare system particularly elective surgical procedures. As the coronavirus outbreak was evolving during March 2020, delay

of non-urgent medical services was called upon to conserve resources and PPE. This was further compounded by the nationwide lockdown in India under the directives of Health Ministry of India. Many guidelines were formulated on considering non operative management wherever clinically appropriate³. To estimate the impact of COVID pandemic, Negopdiev et al., [4] estimated that, 28,404,603 operations would have been cancelled or postponed during the peak 12 weeks of disruption due to COVID-19 globally (2,367,050 operations per week). If countries increased their normal surgical volume by 20 per cent after the pandemic, it would take a median of 45 weeks to clear the backlog of operations resulting from COVID-19 disruption [4].

There was substantial decrease in the overall number of surgeries performed at our center, a tertiary care apex hospital catering to patients from all over the country, especially the northern states. Number of factors contributed to this including lack of transportation due to national lockdown, social stigma associated with the disease and major portion of hospital services catering only to COVID 19 patients ($p = 0.032$).

There is limited number of studies which studied the outcomes in surgical patient with COVID. Lei et al., [5] examined the postoperative outcome of patients following elective procedures performed during this pandemic. They retrospectively reviewed 34 patients with COVID-19 infection who underwent elective surgical procedures at a hospital centre in Wuhan, China demonstrated 44.1% of their patients required ICU admission and 20.5% died [5]. A study by COVID surg Collaborative [6], analysed 1128 patients operated with perioperative COVID infection between Jan 1 and Mar 31, 2020. Patients who developed pulmonary complications had a higher 30-day mortality than those who did not (38.0% [219 of 577] versus 8.7% [46 of 526], $p < 0.0001$). Pulmonary complications had occurred in 219 (81.7%) of 268 patients who died⁶. At our tertiary teaching hospital, we noticed the high perioperative morbidity (41%) and mortality (17%) in COVID tested positive patients undergoing surgery. All our cases were emergency cases that had increased morbidity and mortality, either due to COVID related respiratory symptoms, or due increased postoperative complications.

We also observed an increased morbidity and mortality among patient operated during the lockdown period irrespective of their COVID status. The inability to access emergency transport services and possible denial by local hospitals contributed to the delay in the presentation of these patients. Majority of the patients went from hospital to hospital without definitive surgical management. Thus, most of the patients operated during this period had prolonged hospital stay and thus affected the outcomes of the patients.

Conclusion

COVID-19 pandemic and nationwide lockdown drastically decreased the volume of surgery and significantly increased the perioperative morbidity and mortality.

Disclosure

All authors have no financial disclosure and no conflict of interest.

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