

IMPACT OF COVID-19 PANDEMIC ON GENERAL SURGICAL PRACTICE AT TERTIARY CARE HOSPITAL IN PAKISTAN-A SINGLE CENTER ANALYSIS

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ABSTRACT

The Coronavirus Disease 2019 (COVID-19) has adversely affected the global healthcare system, especially the management of surgical diseases. Most guidelines issued during pandemic recommended deferral of elective surgeries to decrease transmission and conserve resources for COVID-19 management, which raised the risk of complications. This study was conducted to evaluate the impact of the COVID-19 pandemic on the general surgical practice of a tertiary healthcare facility in Sindh, Pakistan. The data were retrospectively retrieved from the operation room records for most common general surgical procedures performed between January 2019 to December 2020 (i.e. peak COVID-19 restriction period). Monthly frequencies of the enrolled procedures were compared to COVID-19-associated incidence, recoveries, and mortality in Sindh. The six enrolled procedures suffered a reduction of 23.9% from 2019 to 2020. However, the difference was not significant ($p > 0.05$) for the procedures collectively or individually, except for trucut biopsy ($p = 0.042$).

COVID-19-associated mortality significantly influences the frequency of the surgical procedures, compared to the pre-COVID era ($p = 0.042$). However, the association was significant for the procedures collectively only, but in the individual procedure, only open inguinal hernia repair ($p = 0.011$) showed a significant difference. In conclusion, there was a significant reduction in surgical cases with the potential risk of complications. Therefore in such situations, there must be a developed system to that the cases may be decided on an individual basis.

Key Words: General Surgery, Elective Surgery, Coronavirus, COVID, Pandemic

INTRODUCTION

On 31 December 2019, the World Health Organization (WHO) China Country Office reported cases of pneumonia of unknown etiology in Wuhan City, Hubei Province of China. The Chinese authorities isolated and identified a novel type of coronavirus on 7 January 2020 (1). This novel virus has outreached worldwide and claimed millions of lives, including in Pakistan. According to the Government of Pakistan in May 2021 there were 850,131 confirmed cases were reported since January 2020, out of which 18,149(2.2%) deaths occurred and 728,044 (87.3%) were recovered from this disease(2).

The COVID-19 pandemic has changed human lives to the greatest degree all around the globe. Every field of life has been greatly affected, but the healthcare system was the worst hit. Tremendous burden has been placed by this viral outbreak on healthcare facilities across the globe(3). Low to Middle-Income Countries (LMICs), including Pakistan, have severely suffered consequences on the already strained healthcare resources due to the disease burden (4, 5, 6). Given the nature of the symptoms and contiguous capacity the hospitals were restricted to a certain number of cases. Since the COVID-19 positive patients needed oxygen, thus large quantity of oxygen was required in all hospital and treatment facilities. Thus, In order to adjust

the rising number of emergency admissions for respiratory syndrome, the majority of which required critical care, every healthcare center experienced considerable changes in their practices. In order to dispense this unprecedented disaster, many guidelines and procedures were proposed. Shortage of healthcare workers, personal protective instruments, increased oxygen demand and fear of excessive exposure of surgical and anesthesia staff to the virus, all the necessary measures were recommended at global and national levels (4). Postponement of elective surgical cases whenever possible was one of the crucial responses to the outbreak (7, 8, 9, 10). In addition to the reduced viral transmission, its advantages included decreased oxygen consumption, ICU admissions and ventilator usage. The conserved resources were then dedicated to deal with the high burden of COVID-19 associated respiratory diseases.

Healthcare institutions across Pakistan were recommended to hold their elective surgical cases, especially during the high positivity rates of their provinces. Despite widespread effects of the pandemic, relatively limited literature exists from the developing world for its impact on the surgical practices. Keeping in view this study was conducted to evaluate the impact of the COVID-19 pandemic on the performance of general surgical cases during peak COVID-19 restriction time (i.e. 2020) and compare it with the pre-COVID period (i.e. 2019).

METHODOLOGY

This study was a retrospective review of the surgical cases operated during two time periods:

1. Pre-COVID-19 (January 2019- December 2019)
2. COVID-19 restriction period (January 2020 – December 2020)

The data was retrospectively collected from operation room records at General Surgery Department, Dow University Hospital- Ojha Campus, Dow University of Health Sciences, Karachi, Pakistan. Only the most common procedures performed under care of general surgical service in 2019 were enrolled for analysis and the data of those procedures were retrieved for the period of 2020.

The data for COVID-19 incidence, recovery and mortality was collected from the official website by the Government of Pakistan (5). The data of all the common procedures performed were collected and compared. In addition, data of recoveries and deaths was also collected. The data of the most common general surgical procedures was divided as per each month of the years 2019 and 2020.

Statistical Methods

The data was collected and analyzed by using Statistical Package for Social Sciences (SPSS, IBM, version 26.0). Continuous data was evaluated as mean and standard deviation, whereas categorical data was evaluated as frequency distribution and percentages. The comparison was done by using regression analysis. A p-value <0.05 was considered significant.

RESULTS

A total of 1753 procedures were performed in 2019 while 1345 general surgical procedures were performed in the years 2020. The 23.9% reduction in the number of procedures for the year 2020 was observed.

Table 1 shows the most common operations performed under general surgical service at our hospital in years 2019 and compared with those performed in 2020. As observed for both years, laparoscopic cholecystectomy remained the most common procedure, followed by breast mass surgery and open inguinal hernia repair. The collective frequencies of enrolled procedures were 808 and 615 in 2019 and 2020 respectively, observing a 23.9% decrease. All surgical operations observed lower frequency in the year 2020, when compared to 2019. Five of the included six procedures were not performed at all for at least a month in 2020. However the significant decline was seen in tru-cut biopsies of breast lumps (Table 1).

Table 1: The most common procedures performed under general surgical service at our hospital in years 2019-20.

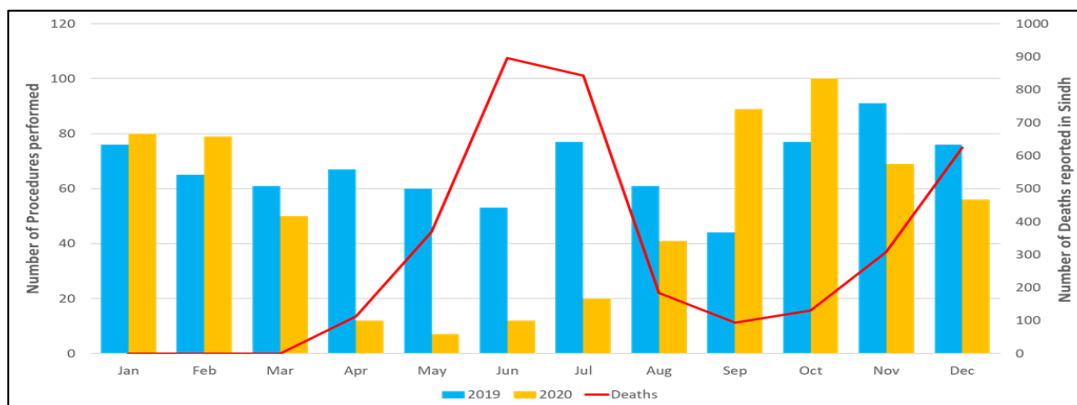
S. No.	Procedures	Year	Month wise number of procedures												Total	*P-values
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Breast Cancer Surgery	2019	17	9	10	9	13	10	10	11	11	22	21	14	157	0.278
		2020	16	10	12	8	6	10	8	7	17	18	16	9	137	
2	Laparoscopic Cholecystectomy	2019	34	22	29	28	22	15	34	20	12	30	40	31	317	0.374
		2020	33	29	17	2	0	0	2	21	49	43	30	29	255	
3	Open Inguinal Hernia Repair	2019	12	11	8	7	9	14	15	10	6	8	11	10	121	0.117
		2020	13	10	6	1	0	1	7	7	12	14	11	6	88	
4	Trucut Biopsy	2019	3	7	3	8	5	5	11	4	7	6	8	3	70	0.042
		2020	3	6	5	1	0	0	0	0	2	5	3	4	29	
5	Fistulectomy	2019	3	3	5	5	4	4	1	8	3	4	4	7	51	0.115
		2020	6	8	4	0	1	1	0	3	4	8	0	5	40	
6	Sebaceous Cyst Excision	2019	7	13	6	10	7	5	6	8	5	7	7	11	92	0.065
		2020	9	16	6	0	0	0	3	3	5	12	9	3	66	
7	Total Procedures**	2019	76	65	61	67	60	53	77	61	44	77	91	76	808	0.992
		2020	80	79	50	12	7	12	20	41	89	100	69	56	615	

*Significance for differences in number of general surgical procedures conducted between April to December in 2019 and 2020.

** Sum of all the six procedures enrolled in the study.

The periods of January to March for both years were excluded from the annual comparative analysis as Sindh observed its first case of COVID-19 infection in April 2020. A compensatory rise in number of procedures during the periods of low disease prevalence was observed. As for example, the cases of May 2020 were only 11.7% of those in same month in 2019, whereas the cases of September 2020 were 20.3% of those in same month of 2019. Graphical image (Figure 1) shows monthly COVID-19 mortality and frequencies of the common general surgical procedures in 2019 and 2020. COVID-19 associated mortality was observed to primarily influence the monthly frequencies of procedures collectively, although only open inguinal hernia repair observed significant association separately. The COVID-19 incidence only influenced the monthly cases of open inguinal hernia repair, whereas the recoveries played no role in affecting the operation room routine at our facility.

Figure 1. Summary of the monthly frequency of surgical procedures in the year 2019 and 2020 and COVID-19 mortality in Sindh



DISCUSSION

The study has shown considerable decline in the elective surgical procedures during COVID-19 peak period. Among them tru-cut biopsies of breast lumps were significantly reduced or deferred. Developing countries, like Pakistan, remain highly vulnerable to its devastating economic as well as healthcare burdens. It has led to upgrading the local healthcare practices to deal with the pandemic (3,4,7). In this study we evaluated the impact of COVID-19 pandemic and its factors on the general surgical practices at our institution. The pandemic restricted the surgical procedures to mainly emergency cases only, which led to decrease in surgeries conducted at our tertiary healthcare facility in 2020 (3,7). All major guidelines, including American College of Surgeons (ACS), British National Health Service (NHS), and European Society for Medical Oncology (ESMO), recommended prioritization of elective surgeries to defer cases which were not urgent (4, 9, 12, 13). As a result, the number of elective surgeries performed by our department decreased in 2020, especially during the high provincial positivity rates. Similar observations were made in other surgical departments and institutions as well (14, 15). These guidelines also assisted surgeons with amending the local protocols for surgical decision making. Such improvised protocols usually allow the patients to undergo procedures depending on their risk of developing complications (4). Oncological cases are usually considered semi-emergency due to the risk of lowering overall survival with delaying surgery (9). Perez Lara et al. discussed the modified protocols used in a Spanish district hospital to prioritize surgeries on case-to-case basis to determine the appropriate time for operation (13). Similarly, Nagarkar et al. also reviewed the modified protocols for surgical teams in an Indian hospital which can allow safe surgical management (14). Since breast cancer is already reported to be aggressive type in Pakistan and time lapsed between the appearance of first symptom and the start of the treatment adversely influence survival outcome. Thus reduction in tru-cut biopsies probably has multifaceted causes and long term sequelae in terms of rising breast cancer mortality in these patients.

We observed that following alleviation of the COVID-19 cases, the surgical procedures performed increased higher than expected to compensate for the postponed cases during the wave. As a result, the annual analysis revealed no significant difference in total number of common procedures performed by the general surgical unit in 2019 and 2020. Though, the significant difference was not observed for five of the enrolled six procedures for the two years but this could be due to a small sample size. The study also allowed us to determine the COVID-19 associated primary factors influencing the general surgical practices at our institution. Monthly mortality due to COVID-19 was found to be the influential factor for change in frequency of the general surgical procedures collectively. The post-COVID year observed more procedures compared to pre-COVID year during the periods of lower pandemic mortality. Minimizing the decrease in surgical frequencies from pre-COVID times is commendable during the COVID-19 crisis. This may still not compensate for simultaneous increasing incidence of surgical diseases but may allow preparation of additional facilities around the country. The authors believe the lack of significant difference for total procedures between the two years, along with COVID-19 mortality influencing frequency of surgical procedures highlights a narrow window of opportunity for the surgical units during these pandemic times. During the lower mortality periods, the surgical departments should be encouraged to perform higher frequency of procedures to compensate for delayed elective cases during the pandemic waves. The strategy would allow us to adjust our operational performance with COVID-19 mortality to conserve resources during the periods of high demand, as well as avoiding the cost of significant reduction in annual surgical frequencies, which can lead to disease

complications. There is another important aspect of looking at the long term sequelae of the delayed procedures such as advanced stages of breast cancers and number of strangulated and obstructed inguinal hernias need to be explored.

CONCLUSION

The study showed a considerable reduction in the surgical procedures performed before and during COVID-19. The deferral policies of elective general surgical cases can be strategically used to reduce transmission and conserve resources during the pandemic waves, and then be compensated during periods of low COVID-19 prevalence. In this way health care providers would be able to continue treatment for surgical diseases along with managing COVID-19 pandemic.

Ethical Consideration: The study was retrospective review of the hospital record, no patient's identity displayed at any time.

Conflict of Interest: There is no conflict of interest.

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