

**Original Article:**

**Emergency Surgery in A Tertiary Hospital: The Covid-19 Experience**

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**Abstract:**

**Objective:** Evaluate the impact of Covid-19 in a critical area and analyze the changes in the daily activities in an Emergency Department of a tertiary COVID-Hospital. **Methods:** We reported and compared the surgical procedures performed for acute appendicitis and acute cholecystitis between two periods (March and April 2019 and March and April 2020) at Emergency Surgery Department of Parma University Hospital, a tertiary COVID-Hospital. **Results:** A total of 72 patients underwent surgery between March and April 2019 and 36 between March and April 2020 for acute appendicitis and cholecystitis. The average length of stay was comparable in the two considered years for LA (4.23±1.69 days in 2019 versus 4.5±2.33 days in 2020). The average length of stay in patients with acute cholecystitis was 5.9±3.8 days in 2019 and 8.23±5.5 days in 2020 (P=0.038). The average hospitalization was comparable with 2019 data (5.62±3.77 days) in March 2020; whereas, April 2020 was statistically significantly longer 10.5±6 days (P=0.023). **Conclusions:** Half of the emergency centers reported a drop in the overall number of urgent cases as confirmed in our department, where the number of total appendectomy and cholecystectomy was halved comparing the two months in 2019 and 2020, 72 operations in 2019 versus 36 operations in 2020. During the pandemic, the confidence of the population to the healthcare systems was poor, and this can explain the delayed access to the emergency department of patients who suffered from an acute illness.

**Keywords:** Covid-19; pandemic; emergency surgery; acute cholecystectomy; acute appendicitis.

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## Background

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified on 12 January 2020. SARS-CoV-2 is caused by the virus Covid-19<sup>1,2,3</sup>. The pandemic Covid-19 has changed the world and global health was reorganized to fight against this terrible enemy and maintain essential health service delivery<sup>4</sup>. In Italy, since early March 2020 the hospital's organization was subverted to ensure greater access to care for every patient affected by Covid-19. In this new scenario, several non-urgent health activities were stopped, and the emergency department has experienced remarkable change in daily activities. Parma University Hospital is a tertiary hospital and a "HUB" for the emergencies; it has become a COVID-Hospital in March 2020 and non-urgent daily activities were canceled to guarantee the best treatment for every patient affected by Covid-19. Several departments were converted into Covid-19 departments.

## Materials and Methods

This single-center study describes the experience and the impact of pandemic Covid-19 on the daily activity at the Emergency Surgery Department of Parma University Hospital. We report and compare the surgical procedures performed for acute appendicitis and acute cholecystitis between two periods (March and April 2019 and March and April 2020) according to the WSES guidelines<sup>5,6,7</sup>. This paper aims to evaluate the impact of COVID-19 in a critical area and analyze the changes in the daily activities in a tertiary COVID-Hospital. We analyzed the following characteristics: numbers of procedures, days of hospitalization, surgical treatment. No data about patients were reported. Data analysis was performed using SPSS-21 [(Statistical Package for Social Sciences) IBM Corporation, Armonk NY., USA]. Statistical analysis was obtained for the main descriptive indexes. Quantitative data are expressed as mean or median  $\pm$  standard deviation (SD). The qualitative data were elaborated as absolute frequencies, relative frequencies, cumulative frequencies, and percentages. Cox regression and Kaplan-Meier methods were used.

## Results

In March 2019, 35 patients underwent surgery for acute appendicitis (19) and acute cholecystitis (16). In April 2019, 37 patients underwent surgery (19 laparoscopic appendectomy and 18 laparoscopic cholecystectomy). In March 2020, only 16 patients underwent surgery, and 4 of them were treated before Covid-19 Italian lockdown and hospital

reorganization (8 laparoscopic appendectomy and eight laparoscopic cholecystectomy). In April 2020, a total of 20 patients underwent surgery for acute appendicitis (11) or acute cholecystitis (19). In the two considered months in 2020, during pandemic Covid-19, we observed a difference in the theater of surgery. Patients with suspected or confirmed Covid-19 were treated in a specific and exclusive Covid-19 operating compartment.

In March 2020, the major part of emergency surgery (12) was performed in the COVID-theater, six laparoscopic appendectomy (LA), and six laparoscopic cholecystectomies (LC), in the same month only four patients were treated in a non-COVID theater (2 LA and 2 LC). In April 2020, the data were more homogenous among the two operating compartments, and nine patients were treated in the COVID-theater (8 LA and 1 LC) and 11 patients in the non-COVID theater (3 LA and 8 LC). The average length of stay was comparable in the two considered years for LA ( $4.23 \pm 1.69$  days in 2019 versus  $4.5 \pm 2.33$  days in 2020). Patients who underwent laparoscopic cholecystectomy had statistically significant differences in length of stay between 2019 and 2020 ( $P=0.038$ ). The average length of stay in patients with acute cholecystitis was  $5.9 \pm 3.8$  days in 2019 and  $8.23 \pm 5.5$  days in 2020. Between March and April 2020, the length of stay was moreover significantly different ( $P=0.023$ ). In March 2020, the average hospitalization was  $5.62 \pm 3.77$  days, comparable with 2019 data, and in April 2020 was  $10.5 \pm 6$  days. Intraoperative Cholangiogram was performed three times only in April 2020. Only one patient died in April 2020.

## Discussion

Our findings suggest the catastrophic impact of Covid-19 on daily healthcare system activity. As reported by Patrili, over 80% of surgical departments changed their practices, 70% shifted work plans<sup>4,8,9</sup>. Half of the emergency centers reported a drop in the overall number of urgent cases as confirmed in our department, where the number of total appendectomy and cholecystectomy was halved comparing the two months in 2019 and 2020, 72 operations in 2019 versus 36 operations in 2020. An interesting point is the significantly different length of stay in patients treated for acute cholecystitis between March and April 2020. In April 2020, the general consideration of pandemic COVID-19 was to the higher level with widespread fear and several doubts for the future. Our data can be explained with the distrust of the patients in the healthcare systems.

Probably, there was a delayed hospitalization of the patients, due to the fear of Covid-19, and they presumably entered the emergency department with an advanced stage of disease or in critical conditions underestimating the symptoms<sup>8,10,11</sup>

### Limitation of the Study

The present study has several limits due to the small sample and not reporting the outcomes and data of patients. We have described only the number of LC and LA, not considering other surgical procedures.

### Conclusions

Our brief report on COVID-19 experience in an emergency department in a tertiary hospital shows the impact of COVID-19 on numbers of emergency surgery. During the pandemic, the confidence of the population to the healthcare systems was poor, and this can explain the delayed access to the emergency department of patients who suffered from an acute illness.

### Recommendation

The Covid-19 experience has shown the limitation of healthcare systems. Health service delivery should be improved, and the health information to the population should be implemented.

### Key Messages

Covid-19 impact on the hospital's daily activity has been linked to:

- The hospital's organization was subverted to ensure greater access to care for every patient affected by Covid-19.
- The patient's fear of Covid-19 has delayed the hospitalization for non-COVID-19 acute disease.
- Patients without Covid-19 at hospital admission have a high severity of disease due to the lack of trust in the healthcare system.

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### Conflict of Interest

The author declares no competing interest.

### Authors Contribution

All authors participated equally in this research and preparation of the manuscript.

### List of Abbreviations

LC: Laparoscopic Cholecystectomy

LA: Laparoscopic Appendectomy

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