



The Effects on Surgical Gastrointestinal Diseases Urgent Due to the Covid-19 Pandemic

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Authors' contributions

This work was carried out in collaboration among all authors. Author DAMO designed the study and wrote the bibliographic review. Authors NSSC and JECG performed the spell review in the article. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Know the impact of COVID-19 on emergency gastrointestinal surgeries in Mexico and the world and the possible complications that the pandemic could cause in post-surgical results.

Results: From its beginnings in 2019 in China, until the start of the pandemic declared by the WHO in March 2020, it caused changes in health care. Following the COVID-19 outbreak, COVID restrictions were implemented in Mexico on March 24, 2020, 26 days after the outbreak. The operation of the emergency surgery service had to continue to avoid an increase in morbidity and mortality in the population, but this was not the case for the elective surgery service, which canceled its activities to focus on the care of the COVID patient. For this reason, knowing the impact that the pandemic has generated in emergency services on perioperative results has been a

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priority. Systematic reviews have found that around 50% of articles recommend postponing elective surgeries, but 13% do not offer recommendations regarding this, with the conclusion that surgery is postponed as long as possible. There is no discussion of the benefit generated by emergency laparoscopic surgery versus open surgery in gastrointestinal diseases. It is important to note that there is no evidence of aerosolization risk of the virus during pneumoperitoneum and surgery.

Conclusion: During the pandemic there were changes in the health environment, complications were found in patients due to the delay in attending, diagnosing and treating these pathologies, it being of vital importance to initiate in each country a medical-surgical protocol on how to act in the event of a pandemic.

Keywords: COVID-19; emergency surgery; pandemic.

ABBREVIATIONS

COVID-19 : *Coronavirus Disease*
ASA SCALE : *Escala American Society of Anesthesiologist*
EES : *Emergency Surgery Scale*
ARDS : *Acute Respiratory Distress Syndrome*
WHO : *World Health Organization*

1. COVID BACKGROUD

From its beginnings in China in 2019, until the start of the pandemic declared by the WHO in March 2020, it caused changes in health care [1].

In Spain, the government implemented the state of alarm forcing all its inhabitants into confinement in March 2020 [1].

Following the COVID-19 outbreak, COVID restrictions were implemented in Mexico on March 24, 2020, 26 days after that [2].

The first detected case of COVID-19 in Mexico occurred on February 27, 2020, increasing exponentially since then, reaching more than 19 thousand cases, with almost 10% mortality on April 30, 2020, compared to the rate in China that was 3.66%, being higher than worldwide that was 7%; the age range was 30-59 years, being the productive age group the most affected. It is mentioned that, among those who died from COVID, they had one or more comorbidities, mainly arterial hypertension, and diabetes [2].

In the demographic characteristics, it is said that 68% were men, with the highest mortality range between 50 to 54 years and 65 to 69 years, mortality was 9%, unlike women, which was 4.67% with range from 65 to 69 years [3].

The symptoms of COVID-10 are fatigue, cough, myalgia, fever, headache, sore throat, dyspnea, sputum production, inter alia, which may occur 5

days after infection [incubation period]. Mortality usually occurs on average 14 days after infection [3].

2. EMERGENCY SURGERY

However, the operation of the emergency surgery service had to continue to avoid an increase in morbidity and mortality in the population, but this was not the case for the elective surgery service, which canceled its activities to focus on the care of the COVID patient [4].

In the emergency room, the acute abdominal pain is one of the most frequently seen causes of consultation for general surgery and requires an adequate clinical and image approach for an adequate diagnosis, however, only 30 to 40% require an emergency procedure, with a wide margin of error of up to 40% according to data in Mexico if the emergency services were working at 100% [5].

In this case, during pain assessment, it is important to know which ones can put life at risk and keep in mind that older and immunosuppressed adults may have atypical symptoms, causing difficult diagnosis of acute abdomen, may be, even of extra-abdominal origin [6].

For this reason, knowing the impact that the pandemic has generated in emergency services on perioperative results has been a priority [7].

Such is the case of Madrazo Z., et al, who comments that there are publications that suggest that surgeries can increase and accelerate the clinical progression of COVID-19; It has even been commented that the clinic is usually atypical in some diseases and its post-surgical evolution is usually more complicated, this, is inherent to the worse prognostic factors that emergency surgery has compared to elective surgery per se, but, there are others that seem to negatively influence the prognosis, such as those commented: [8].

- Fear of going to the hospital, arriving until it has advanced
- Collapse in hospitals and a misidentification of symptoms
- The use of conservative treatment in the surgical diseases

On this, in Spain, a multicenter study was carried out to assess the outcome of COVID-19 with post-surgical mortality in patients with emergency surgery during the highest peak of the pandemic and the relationship with complications, however the results have not yet been obtained, but they will be very useful in the future [8].

3. THE IMPACT OF COVID ON EMERGENCY SURGERY

A retrospective study was carried out in Spain in 2021 for now the most prevalent pathologies in our environment during the COVID-19, not finding any change in the most prevalent pathologies, however, it was an initial study and more reviews like this one are needed [1].

But, in the case of the emergency department, there was a sudden change in the diagnosis of admissions during the pandemic, in addition to having a decrease in the number of these, taking in the trauma admissions a significant decrease [4].

here was another retrospective study where the management of emergency surgery patients was assessed, being a retrospective, in Spain, single-center in 2020, to describe surgeries, procedures, the evolution, and 30-day morbidity and mortality. During the article, 153 patients were analyzed, of which greater imaging and laboratory severity was observed in 50% in patients without COVID, being 4 times more than the previous year, requiring some procedure. The 33% was started conservative treatment, in 4% percutaneous treatment and the rest with

surgical management, of which 76% were performed laparoscopically, noting a decline compared to the previous year that was 82%. In addition, it was observed that during the pandemic, morbidity was 33% against the 15% of the previous year, being three times higher in patients with COVID and increased need for stay in the care intensive unit in the group with COVID-19. They found a 30-day mortality of 7%, with no difference from the previous year, finding as mortality factors such as age over 70 years, ASA classification 3 and 4, an high emergency surgery scale [ESS] and having COVID-19. Concluding that patients with COVID had higher morbidity and mortality, although 50% they were asymptomatic and the most frequent complications were septic shock, pneumonia, and ARDS, perhaps due to late medical attention. In this study, no cases of trauma were found, believing that it was due to the stoppage of activities during the pandemic [9].

After the start of the pandemic and the “stay at home” campaigns, in multiple countries around the world, there was a decrease in emergency room admissions for non-COVID patients [10].

Systematic reviews have found that around 50% of articles recommend postponing elective surgeries, but 13% do not offer recommendations regarding this, with the conclusion that surgery is postponed as long as possible [11].

In the case of major hospitals in various parts of the world, there has been a decrease in emergency department admissions in the pandemic, with fewer evaluations, even in trauma cases, perhaps due to confinement [12].

In addition, the effects of perioperative physiological stress caused by COVID-19 are not fully known, and it is believed that it has a deleterious effect on prognosis [13].

This was observed in the Middle East and in some parts of Europe, the decrease of around 50% of surgical procedures, which, in some parts of Italy, reached up to 86%; although demographic data such as age, sex, hospital stay, and laparoscopy performance were not statistically affected. Patients with hernias, which pre-pandemic, made up a fifth of the procedures, reduced their number during the pandemic, if patients delayed their care for fear of COVID infection, increasing the severity of the cases intervened upon arrival at the hospital. In Spain,

a delay in the time from the onset of symptoms until the arrival of the patient to the emergency room was even observed, reaching almost 24 hours, however, the SOFA score did not change [14].

Along with these probable causes, it is noted that the capacity of beds for surgical patients decreased by more than 50% [15].

In the case of acute cholecystitis, which was one of the most frequently found diagnoses in the pandemic in patients requiring emergency surgical attention, some guidelines recommended non-surgical management in the case of non-severe acute cholecystitis [16].

A multicenter study of sixteen hospitals in Madrid in 2020 was conducted to assess the risk of hospital infection, hospital stay, and morbidity and mortality in non-COVID patients who were managed non-surgically for acute cholecystitis. The number of patients evaluated was 257, of which 43.2% were women, forty-two patients also had COVID and of these, 30 had COVID since admission. Regarding comorbidities, it was found to be the most associated with arterial hypertension in 44.7%, diabetes in 26.5% and heart disease in 25.6%. Regarding acute cholecystitis, according to the Tokyo guidelines, 90.7% were non-serious. 47.9% had initial antibiotic treatment, 31.5% surgical, and 20.6% had percutaneous drainage. 92.5% of surgical procedures were laparoscopic, without being modified by having or not having COVID in 98.8%. According to severity, it was observed that in mild cases, only 27.6% underwent surgery, in moderate cases 30.6% had surgical intervention and in severe degrees, 50% required percutaneous drainage and only 14% underwent surgery. with a more frequent failure rate in the case of severe cholecystitis. 26% had some post-surgical complication, where 14.9% were grade 4 and 5 according to the Clavien Dindo classification and the most frequent was grade 1 [70.1%]. The mean hospitalization was 4.48 days in patients with surgery versus 9.74 days in those managed conservatively, being statistically significant, as was mortality, which was 1.3% versus 3.2% in patients with conservative treatment, even, with higher mortality in patients with percutaneous drainage [15.1%] versus patients with surgery or antibiotic management [1.2% and 2.4% respectively]. In the case of patients with COVID, 80.9% who had been operated, had a grade I complication and 6.4% were grade IV, with a median stay of 5 days, also

being longer, in the conservative treatment subgroup [7.51 versus 2.94 days], but their mortality was not influenced in these subgroups. For patients with a negative test on admission [227 patients], the infection rate was 4.6% during their stay, with a 4.7 times higher risk of contagion if their stay was longer than 7 days. In patients with COVID, their overall mortality was 11.9%, having 4 times more risk of dying than patients with a negative test. They comment that there was a perception of an increase in the number and severity of acute cholecystitis during the pandemic at the beginning, but later it decreased, which could have caused the increase in severity. Besides, recommend avoiding surgical management at all costs in patients with COVID, including patients with acute cholecystitis, due to the greater number of postoperative complications, both respiratory, hemorrhagic, and thrombotic. This was not the case in the case of patients with a negative test, since the use of conservative management increased the length of stay and the risk of infection, with worse results [16].

There is no discussion of the benefit generated by emergency laparoscopic surgery versus open surgery in gastrointestinal diseases, generating less morbidity, better restoration of intestinal transit and a shorter hospital stay, allowing patients to return to their activities more quickly, although always counting on the possibility of increasing surgical time with this modality [17].

In 2021, a retrospective, single-center study was conducted in the United Kingdom by the Royal College of Surgeons of England to assess laparoscopic gastrointestinal surgery versus open surgery during the pandemic in 2020 and whether management by of the health server generated contagion, excluding anesthesiologists from the service due to their increased risk per se. There were a total of 247 cases, of which 134 were elective procedures and 113 urgently, comprising only 73 patients, with a median age of 56 years, 53% were women. Twenty were elective and 53 urgent. Of the approaches, fifty-five laparoscopic, requiring conversion in 3 cases and 18 open. In the analysis of health personnel, their median infection was six. There was no difference in terms of age, sex, and ASA for the types of approach a follow-up of 49 days on average and 5% died, being older than 55 years with ASA equal to or greater than two and had undergone emergency open surgery for benign pathology and all had COVID. With reference to the laparoscopy group, none died. Among the

infected personnel, there was no significant difference between the laparoscopic and open groups. The average number of days in hospital was 5 and it was significantly shorter in the laparoscopic group with $p=0.01$. Having as a discussion, the probability that in patients with laparoscopic surgery, the shorter hospital stay reduces exposure to COVID, concluding the safety of said procedure [17].

It is also commented that the virus has been detected in peritoneal fluid in case- positive patients, however, cases of transmission by surgical aerosolization have been rare and not exclusive to laparoscopic surgery, with no evidence of COVID infection by laparoscopy smoke [17].

The use of laparoscopy is a variable that, despite the risk of potential viral dissemination with the pneumoperitoneum, had no changes in its incidence, although this risk could have contributed to inducing physicians to a conservative approach, without the complications of surgery. open [18].

Regarding the recommendations regarding laparoscopy, the colleges of the United Kingdom and Ireland suggest using it, only in highly selected cases, due to the risk of transmission with aerosols and when using it, avoiding gas leakage as much as possible, however, there are no trials that support said assertion; delay should be avoided in patients who need surgical treatment. Even when using it, the stay is reduced, generating less patient-physician contact and risk of infection [18].

In patients with COVID and data of acute abdomen due to surgical pathology, they had a rapid deterioration in case of conservative treatment in some studies. There is talk of worsening of the disease if they underwent surgery and were in the incubation period [19].

It has come to recommend not performing anastomosis, to minimize the risk of leaks and the need for multiple subsequent surgeries [19].

It was also found that the days of hospital stay were longer in patients who had COVID as a post-surgical complication, however, there were no changes in mortality in this subgroup [20].

In other articles, despite the lack of clear information, the possibility of using laparoscopic surgery with the necessary aerosol management

measures was affirmed, observing in one study in Turkey, that seven laparoscopic surgeries were performed without any complication or propagation by aerosols. but if with a reduction in hospital stay and a decrease in pain; recommending its use in emergency surgery is performed by experienced surgeons [20].

It is important to note that there is no evidence of aerosolization risk of the virus during pneumoperitoneum and surgery [21].

Although it is not possible to exclude the change in lifestyle during confinement, which may have contributed to reducing the incidence of surgical pathologies, as well as the lower use of non-steroidal anti-inflammatory drugs and corticosteroids due to the recommendations of causing a possible worsening of COVID, which could alter the incidence of diverticulitis and gastrointestinal perforations [22].

There were other studies that indicated an increase in the number of cases with hernias and a decrease in the number of cases due to acute appendicitis; however, in the case of the latter, an increase in the number of complicated, clinical, laboratory, and laboratory appendicitis was indicated. surgically, being consistent with the delay in the management of said pathologies, in addition to increasing the stay in these patients [23].

In some parts of Europe, an increase in the morbidity-mortality of emergency surgeries was observed during the pandemic, compared to that observed before it, observing that the severe cases were those that arrived at the hospital and required true management. by surgery, although it was not always statistically significant [24].

Regarding surgical pathologies due to trauma, a decrease in their incidence was observed, with fatal accidents decreasing by 67% in England compared to 2019, prior to the pandemic; or in Greece, where the rate of car accidents decreased [24].

All these data found are not absolute, due to the discrepancy obtained in the results of each country in the world [25].

In patients with COVID-19 and hospital admission for a surgical disease, management should be the same, with no changes in their treatment, only considering this disease as a comorbidity, without changing the known

diagnostic pathway, however, during the pandemic, up to 40% of procedures were observed as conservative treatment, mainly in patients with appendicitis and cholecystitis, the main pathologies of the emergency surgery service [26].

Without leaving aside, the necessary isolation must be managed in case of suspicion of COVID, taking the necessary perioperative measures [27].

There was a variable that remained stable in most of the studies analyzed, such as intestinal obstruction, whose incidence did not decrease, and even increased in some studies, due to its pathophysiology that did not allow postponing medical attention [28].

Without forgetting that after the end of the pandemic that spread, there has been concern about the increase in the frequency of emergency consultations and services, which has been reflected in the number of patients treated [28].

But there are studies that prioritize avoiding contact with the patient with COVID, looking for the possibility of postponing surgical treatment, but if this is not possible, check the availability of an operating room for COVID patients, involving the minimum personnel for the procedure; discordant with the majority of the bibliographies obtained, where they point out the importance of avoiding delay in treatment to avoid complications, although if it is pointed out, that in case of overcrowding in the emergency department, prioritize the management of complicated patients, managing conservative some pathologies [29].

It has been said that the total number of surgical patients decreased during the pandemic by up to 60%, however, in contrast to what was thought, in a study carried out with surveys for surgical professionals to assess the impact of COVID-19 on surgery in Germany, 59% did not report a delay in the time until diagnosis, only 25% reporting delay until diagnosis, having as main risk factors for delay, intrahospital logistics, lack of surgical personnel and lack of intensive care unit. Subjectively, more serious gastrointestinal diseases were also observed, mainly appendicitis and cholecystitis; however, the articles that describe the high rate of morbidity and mortality due to pulmonary complications in patients with COVID-19 should be considered,

although it is commented that the fear of not going to the emergency room has generated an increase in the complications of each disease, in addition to having a delay in the diagnosis and treatment time due to the diagnosis and management protocols of these patients [30].

4. CONCLUSION

During the pandemic there were changes in the health environment, finding a decrease in the rate of admissions to the emergency area, occurring in a similar way in surgical admissions, however, in some parts of the world complications were found in patients due to the delay in attending, diagnosing and treating these pathologies, it being of vital importance to initiate in each country a medical-surgical protocol on how to act in the event of a pandemic and to be fully aware of the risks and benefits of using advanced medical equipment during an event of this significance.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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