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# Preoperative Triage for Detection of SARS-CoV-2 Infection in Surgical Patients: Lessons Learned for Resuming Surgery

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## Abstract

**Introduction:** Ensuring the safety of elective surgical activity requires the establishment of pathways to detect and prevent SARS-CoV-2 infection. We aimed to describe the impact of COVID-19 outbreak on hospital surgical activity, and to assess the incidence of perioperative COVID-19 diagnosis within 2 protocolized screening pathways, for elective and non-elective surgery.

**Methods:** Prospective cohort study of adults having surgery during the COVID-19 peak outbreak. The elective pathway included preoperative telephone surveys, and a quantitative Polymerase-Chain-Reaction Test (RT-PCR) only in patients who were asymptomatic and at low risk of infection. Only patients with negative screening had surgery. In the non-elective pathway, preoperative screening was performed during hospital admission. Patients were allocated to either routine or COVID-19 designated operating rooms, recovery areas, or surgical wards.

**Results:** During a 10-weeks period, 835 patients were considered for the elective pathway and 725 had negative RT-PCR results and surgery. This reflects an 83% reduction in surgical activity compared to 2019. Additional, 596 patients had non-elective surgery, representing a 28% reduction. Preoperatively, 39 patients (7.2%) tested positive for SARS-CoV-2 and had surgery through the non-elective pathway, compared to none in the elective pathway ($p<0.001$). Postoperatively, 1.4% of elective and 2.2% of non-elective patients tested positive ($p>0.05$). Mortality was higher in non-elective surgery (0.6% *vs*. 2.9%, $p<0.001$) and in COVID-19 patients (0% *vs*. 14%, $p<0.001$).

**Conclusion:** The low incidence of perioperative COVID-19 diagnosis in elective surgeries during the first weeks of the outbreak demonstrates the importance and effectiveness of preoperative screening combining phone surveys and RT-PCR.

**Keywords: Perioperative; SARS-CoV-2; COVID-19; Nosocomial infection; Surgical**

## Key Points

- Which is the impact of the recent COVID-19 outbreak on hospital surgical activity? Can the use of COVID-19 protocolized screening pathways ensure safety elective surgical activity for patients and health-care providers?
- Ensuring the safety of elective surgical activity for patients and health-care providers requires the establishment of pathways to detect and prevent nosocomial infection with SARS-CoV-2.
- In the pandemic peak scenario, the prompt implementation of a systematic screening for COVID-19 is the key for a low perioperative COVID-19 incidence and emerges as a potential strategy to minimize the impact on the surgical activity.

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## Introduction

Since the 2019 Coronavirus Disease (COVID-19) was declared a pandemic by the World Health Organization (WHO) on January 30th, 2020 [1], many hospitals became exclusive COVID-19 centers, thereby limiting non-COVID patients' access to health care. As a result, elective surgical activity has been drastically reduced worldwide, in an attempt to allocate the finite resources to COVID-19 patients [2]. Nevertheless, some surgeries cannot and should not be substantially delayed.

As the first COVID-19 wave started to fade, hospitals were no longer exclusively or predominantly committed to COVID-19 patients only, and re-considered non-COVID patients' needs. This situation compelled anesthesiology and surgical departments to establish pathways to detect and prevent the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) nosocomial infection and to ensure healthcare providers' safety. Although evidence regarding the safety of anesthesia and surgery in COVID patients was scarce, early reports showed increased risk of postoperative complications and mortality in patients with severe perioperative SARS-CoV-2 [3]. It remains unclear whether non-emergent surgery should be delayed in all patients with confirmed or suspected SARS-CoV-2 infection. Identification of asymptomatic and mild cases is challenging but important, since perioperative stress may exacerbate a current infection and result in fatal postoperative complications [4]. Although the incidence of asymptomatic COVID-19 ranges from 5% in the community to 14% in women admitted for delivery, there are no such data in the general surgical population [5,6].

Strategies aimed at maintaining "COVID free" surgical facilities have been reported, including the early detection of asymptomatic patients [7-9]. But the effectiveness of such strategies and their impact on patient outcomes remains unclear [7-9]. We therefore primarily aimed to describe the impact of the COVID-19 outbreak on the surgical activity in a tertiary hospital caring for a population with high prevalence of SARS-CoV-2. Secondarily, we aimed to assess the incidence of perioperative COVID-19 diagnosis and nosocomial infection within two COVID-19 protocolized screening pathways, for elective and non-elective surgery. Additionally, we sought to evaluate whether patients with perioperative COVID-19 diagnosis were at increased risk of postoperative complications compared to patients with no such diagnosis.

## Methods

### Study design and participants

We conducted a prospective single center cohort study of adult patients having surgery at Hospital Clinic of Barcelona (Catalonia), during the first weeks of the COVID-19 outbreak in Barcelona, from March 16th to May 25th, 2020. The study was approved by Hospital Clinic of Barcelona Institutional Review board (HCB/2020/0433) with waived individual consent.

Hospital Clinic of Barcelona (HCB) is a public University Hospital with 713 hospital beds, including 48 intensive care beds, serving as a community hospital for a population of 540,000 people. On February 15th, 2020, the first patient with COVID-19 was admitted at HCB. On March 16th, HCB implemented a contingency plan which included the designation of a committee consisting of surgeons, anesthesiologists, and nurse managers entitled to develop a prioritization strategy according to patients' diagnosis and surgery urgency, and to perform a day-to-day case-schedule review considering the hospital COVID-19 load. During this period, only health disorders that could not be deferred for more than 30 days were approved. As part of this strategy, a screening protocol for SARS-CoV-2 infection was implemented.

### Protocol

The elective pathway (Figure 1) was designed for patients in whom the acuity of the condition being treated allowed delay of surgery by at least 30 days without a significant negative impact on surgical outcome or disease process and when contacting patients before hospital admission was feasible. First, a telephone survey was performed by an administrative staff member 7 to 14 days before surgery in order to postpone surgery by at least 14 days if any clinical signs or symptoms of SARS-CoV-2 infection were suspected in patients or in their close contacts. For the non-excluded patients, education on the importance of social distancing, consistent use of masks, and hand hygiene was provided. Three days prior to surgery, a specific structured questionnaire (Table 1) developed by the Spanish Association of Surgeons was conveyed over the phone by a trained nurse, to identify patients at risk of having COVID-19 signs or symptoms [10]. Elective surgery was postponed by at least for 14 days if patients or their immediate contacts had confirmed or suspected COVID-19. Forty-eight hours before surgery, patients who remained asymptomatic and at low risk of exposure were assessed for SARS-CoV-2 infection with a quantitative Polymerase-Chain-Reaction test (RT-PCR) through a nasopharyngeal swab. To avoid further infection, we recommended strict measures of isolation since the nasopharyngeal swab was obtained until hospital admission. Only patients whose screening was negative were scheduled for surgery.

The non-elective pathway (Figure 1) was designed for patients in whom the indication for surgery was established only after hospital admission, postponing surgery was medically unreasonable, or if surgery was urgent or emergent. COVID-19 screening was performed during hospital admission. Patients were considered COVID-19 positive if they fulfilled either clinical, radiological, or laboratory criteria (Table 2). Patients who screened negative had surgery through the "clean" path, including routine operating rooms, Post-Anesthesia Care Unit (PACU), and surgical wards. Patients who screened positive had surgery in a COVID-19 path, including designated operating rooms, PACU, and surgical wards. Of note, both paths were in the same building but in different pavilions. Moreover, health care providers were exclusively working on either one of the areas, reducing the probability of transmission. For patients with multiple surgeries during the same hospitalization, only the first operation was considered.

Postoperative RT-PCR was not routinely performed unless patients developed any signs or symptoms of COVID-19. Routine follow-up was conducted by phone 15 days after surgery.

### Outcomes

Our primary outcome was to evaluate the impact of the COVID-19 outbreak on the surgical activity in a tertiary hospital caring for a population with high prevalence of SARS-CoV-2. The secondary outcomes were the incidence of preoperative COVID-19 diagnosis according to the screening criteria (Table 2) among patients scheduled for elective and non-elective surgery; and the incidence of postoperative COVID-19 diagnosis during the initial 15 postoperative days. The exploratory outcome was the incidence of postoperative

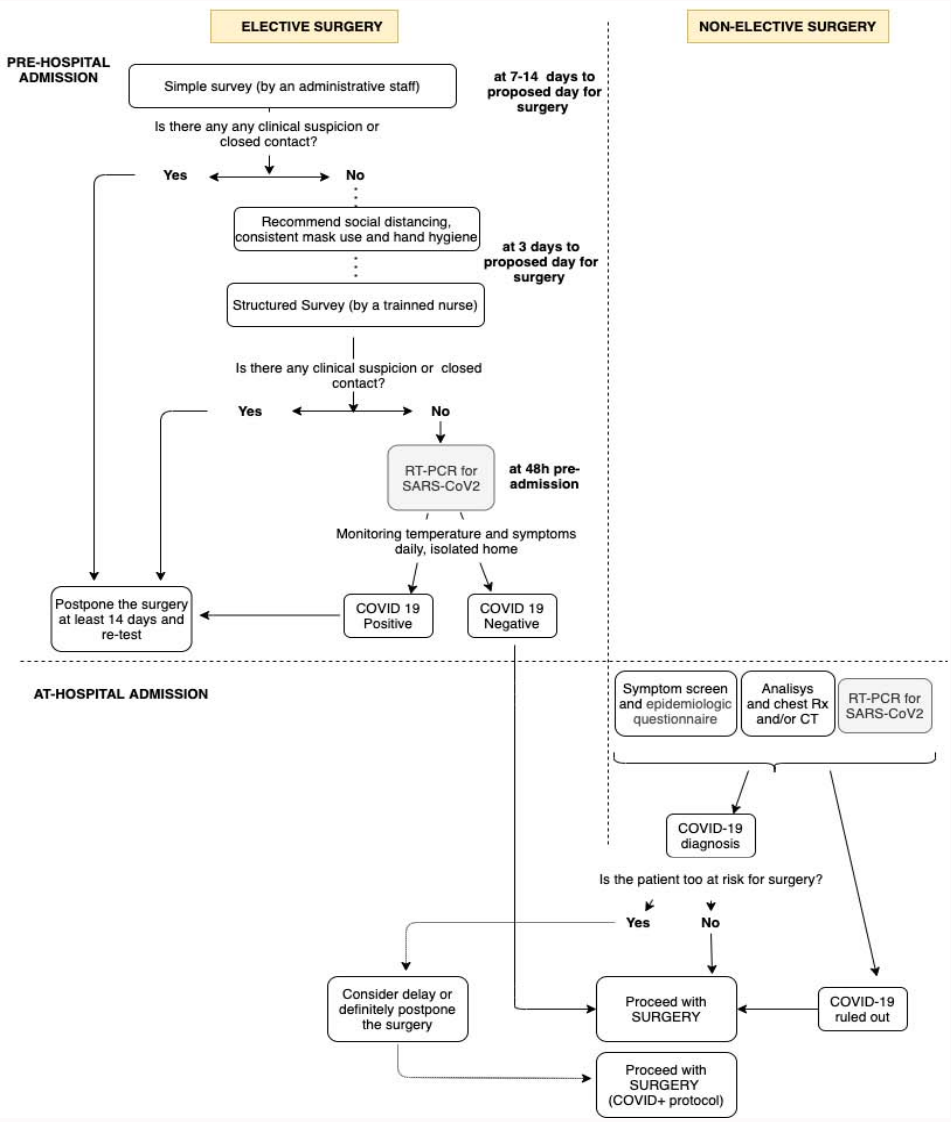


**Figure 1:** Screening pathways for elective and non-elective surgery.

complications and mortality in COVID-19 positive patients.

### Measurements

Qualifying patients were identified from the hospital surgical schedule database (SAP). Collected data included: (1) demographic and morphometric information; (2) comorbidities (3) surgery specialty; (4) perioperative clinical, radiological, and laboratory findings compatible with SARS-CoV-2 infection; and (5) postoperative complications and mortality within 15 postoperative days. Patients' electronic medical records in SAP were manually reviewed. Each COVID-19 suspected case was independently assessed by 2 adjudicators (RP and ER). Non-consensus and all positive cases were adjudicated by the senior investigator (GMP).

### Statistical analysis

Elective and non-elective pathways were compared by T-test or chi-square test, as appropriate. Data is expressed as mean ± standard deviation and number (%), as appropriate. Type 1 error was set at <5%. For data presentation purposes only, patients are grouped according to the pandemic phases established by the Spanish government. These phases were defined according to the percentage of COVID-19 related hospital admissions out of the total number of hospitalized patients phase I, nearly normal scenario (less than 5% COVID-19 related admissions); phase II, low level alert (5% to 25%); phase III, medium level alert (25% to 50%); phase IV, high level alert (50% to 75%); and phase V, emergency scenario with more than 75% COVID-19 related admissions [11].

## Results

In the 10-week period from March 16th to May 25th, 2020, 2404 patients with COVID-19 were admitted to HCB. COVID-19 dedicated wards were progressively opened and up to 130 intensive care beds were allocated according to this overflow. At peak workload, 85% of patients admitted to the hospital were diagnosed with a COVID-19 related disease.

During this period, 835 patients were considered for surgery through the elective pathway (Figure 2). Thirty of these patients were excluded due to being classified as high risk of having COVID-19 or SAR-CoV-2 infection by the first telephone survey, and additional 18

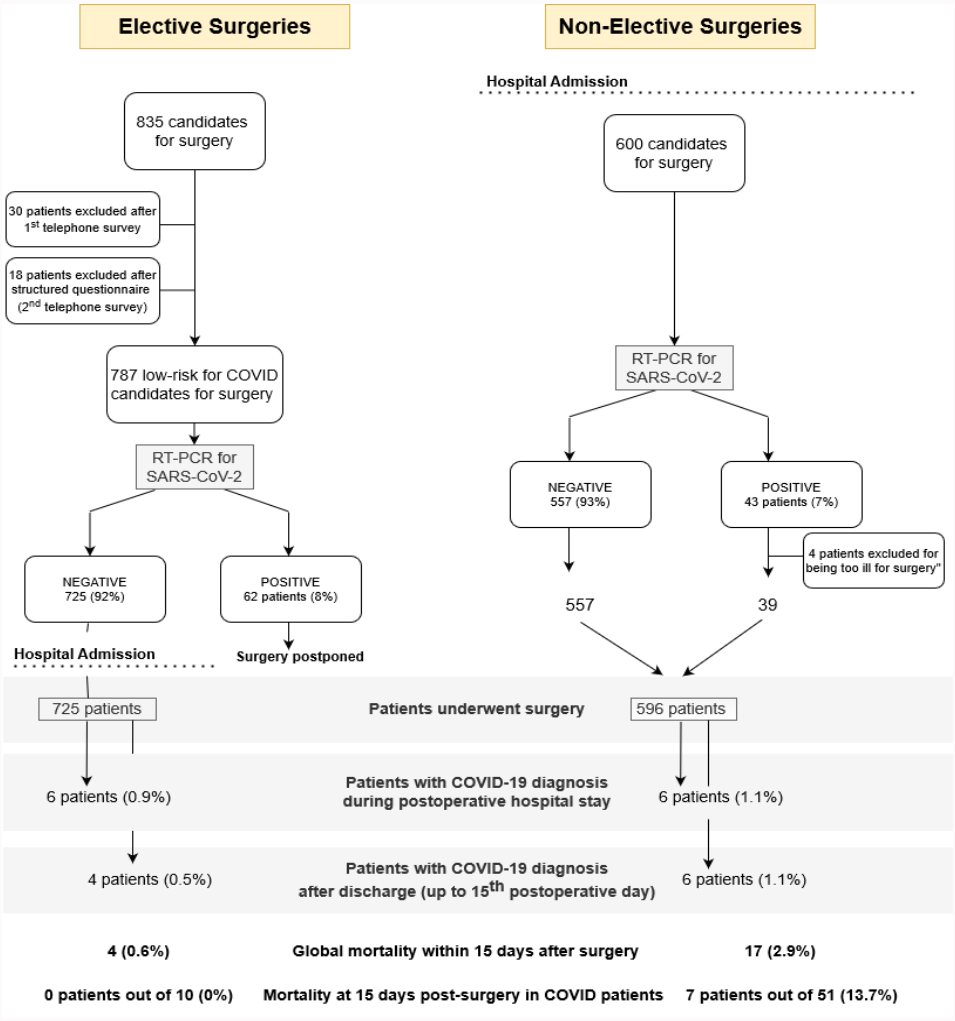


**Figure 2:** Flow chart of patient candidates for elective and non-elective surgery.

patients were later excluded by the second structured questionnaire performed 3 days before surgery. Therefore, those 48 surgeries were postponed. Seven hundred twenty-five patients out of the remaining 787 asymptomatic patients with low risk for contact (92%) had negative RT-PCR tests and had surgery during this period. Compared with the 4,389 elective surgeries performed during the same period in 2019, this represents an 83% reduction in elective surgeries during the COVID-19 pandemic outbreak.

Six hundred patients were admitted to the hospital and had scheduled surgery following the non-elective pathway (Figure 2). Five hundred fifty-seven patients (93%) were negative for SARS-CoV-2. Of the 43 positive patients, 4 multimorbid orthopedic patients with COVID-19 diagnosis had their surgery postponed for being considered too frail. The remaining 596 patients had surgery on the non-elective pathway. This represents a 28% (596/833) reduction in the number of non-elective surgeries compared to the similar period in 2019. Demographic, clinical, and surgical characteristics of the 1,321 patients having surgery and included in both pathways are described in Table 1.

During this time interval and according to the dynamic scenarios proposed by the Spanish Society of Surgeons [11], the number of surgeries performed was inversely proportional to the percentage of patients hospitalized with COVID-19 related disease (Figure 3). We observed an exponential decrease in the number of surgical procedures moving from phase II (low level alert scenario) to phase V (emergency scenario) achieving a 35% difference between those phases; similarly, we observed an inverse increase in surgical activity moving back from phase V to phase II (Figure 3). Concomitantly, there was a progressive increase of perioperative COVID-19 cases, ranging from 3.3% incidence in phase II to 11.6% in phase V (Figure 3).

Thirty-nine patients (7.2%) were operated in the non-elective pathway despite a diagnosis of COVID-19, compared to none in the elective pathway, p<0.001. Notwithstanding, 10 (1.4%) patients in the elective and 12 (2.2%) in the non-elective pathways became COVID-19 positive within the first 15 postoperative days (non-significant difference). Among those, 4 (0.5%) patients who had surgery in the elective and 6 (1.1%) in the non-elective pathway were diagnosed after hospital discharge (Figure 2). The median time from surgery to COVID-19 diagnosis was 3 (range 1 to 7) days.

The mortality rate was higher in the non-elective surgery group (0.6% *vs.* 2.9%, p<0.001), (Figure 2 and Table 3). Seven out of the 17 (41%) mortality cases in non-elective patients had COVID-19 diagnosis. No deaths attributable to SARS-CoV-2 infection were

**Table 1:** Preoperative clinical & epidemiological screening performed by trained nurses.

| |
|---|
| **Type of Surgery and Date** |
| **Clinical Screening** |
| Have you noticed within the last 2 weeks you had: (Yes or no) |
| a. Fever over 37º |
| b. Dry cough |
| c. Sort-of-breath |
| d. Severe fatigue (tiredness) |
| e. Muscle pain |
| f. Lack of smell |
| g. Lack of taste |
| h. Diarrhea |
| i. And there was not any other reason that justifies the symptoms you related. |
| Have you come to the hospital, health center or called the care provider for any of these symptoms? (Yes or no) |
| If yes, what attitude did they indicate you to take? |
| **Epidemiological Screening** |
| 1. Have you had any CONTACT within the last three weeks |
| - With a patient who has been confirmed COVID+? (Yes/no) |
| - With a patient who has been isolated for suspicious symptoms of COVID infection? (yes/no) |
| 2. Have you COHABITATE in the last three weeks |
| - With a patient who has been confirmed COVID+? (Yes/no) |
| - With a patient who has been isolated due to suspicious symptoms of COVID infection? (Yes/no) |
| 3. Have you been to the HOSPITAL for any medical consult, test or accompanying a family member within the last 3 weeks? (Yes/no). Reason: |
| 4. Have you been to the EMERGENCY UNIT for any reason within the last three weeks? (Yes/no). Reason: |
| 5. Have you been admitted to hospital for any reason within the last three weeks? (Yes/no). Reason: |
| 6. Have you been visited at your PRIMARY CARE CENTER for any reason within the last three weeks? (Yes/no). Reason: |
| 7. Do you WORK at a place with people at risk of COVID-19 infection such as hospitals, health center, nursing homes, etc? |
| **Epidemiological Report on Personal Habits (Yes/No)** |
| a) Do you wear a mask when you leave your home? |
| b) Do you wear gloves when your leave your home? |
| c) Do you maintain a safe distance from people when you are outside your home? |
| d) Do you wash your hands frequently? |
| COVID 19 Diagnostic Criteria |
| Clinical Diagnostic |
| a. Fever |
| b. Any of this symptoms: Cough/Rhinorrhea; Dyspnea; Anosmia; Headache |
| 2. Radiological Diagnostic : (X-ray or CT Scan) |
| 3. Positive RT-PCR Test SARS-CoV-2 |

observed in patients who underwent elective surgeries.

Overall, patients with a perioperative COVID-19 diagnosis had significantly more postoperative complications (40/61 patients, 66%) compared with non-COVID-19 patients (227/1,260 patients, 18%) including higher mortality (11% *vs.* 1%) ($p<0.0001$, each) (Table 3). Globally, 67% (26/39) of patients with preoperative diagnosis of COVID-19 developed a postoperative complication. Of note, this result is not significantly different than the complication rate of 64% (14/22) observed in patients diagnosed with COVID-19 postoperatively. Among non-elective patients only, 26 of the 33 COVID-19 positive patients who had a postoperative complication were diagnosed with COVID-19 before surgery that was not different than the complication rate 58% (7/12) in patients with postoperative diagnosis.

## Discussion

The growing requirement for COVID-19 dedicated wards and ICU beds during the COVID-19 outbreak reduced surgical activity worldwide [2,12]. In HCB, during the 10 weeks of the first wave of COVID-19 outbreak, the fraction of COVID-19 dedicated hospital beds ranged from 5% to 85% both in surgical wards and in ICU. Fifty-six thousand people were diagnosed positive for SARS-CoV-2 during this time interval in Catalonia alone. This prevalence was accompanied by a marked reduction in surgical activity, especially

**Table 2:** Patient candidates for elective and non-elective surgery.

| | Elective (n, 725) | Non-Elective (n, 596) | P Value |
|---|---|---|---|
| Age, years | 61.3 ± 0.6 | 52.9 ± 1.0 | <0.0001 |
| Sex (M/F) | 344 (47)/381 (53) | 204 (34)/392 (66) | < 0.0001 |
| ASA (1-2/3-4) | 479 (66)/246 (34) | 411 (69)/185 (31) | ns |
| HTA | 298 (41) | 184 (31) | < 0.001 |
| BMI, Kg/m$^2$ | 28 ± 5 | 27 ± 6 | ns |
| **Surgical Specialties** | | | <0.0001 |
| General Surgery | 157 (22) | 95 (16) | |
| Urology-Gynecology | 209 (29) | 25 (4) | |
| Cardio-Thoracic | 104 (14) | 22 (3) | |
| Vascular | 21 (3) | 12 (2) | |
| Obstetrics | 21 (3) | 225 (38) | |
| Neurosurgery | 42 (6) | 34 (6) | |
| Orthopedics -Traumatology | 27 (4) | 138 (23) | |
| Otorhinolaryngology | 39 (5) | 10 (2) | |
| Others[a] | 105 (14) | 35 (6) | |
| Preoperative COVID-19 Positive | 0 (0) | 39 (6.5) | < 0.0001 |
| Postoperative COVID-19 Positive | 6 (0.9)[b] | 6 (1)[c] | ns |
| Post-discharge COVID-19 Positive | 4 (0.5)[d] | 6 (1.1)[e] | ns |
| Mortality | 4 (0.6) | 17 (3) | <0.0001 |
| COVID-19 Mortality | 0 | 7 | |

Data is expressed as means ± SD and number (%). ASA: American Society of Anesthesiologist status; BMI: Body Mass Index. [a]Other surgeries: ophthalmology, maxillofacial, palstic; [b]6 patients among the 717 assessed; [c]6 patients with COVID-19 diagnosis among the 596 assessed; [d]4 patients with COVID-19 diagnosis among the 692 assessed; and [e]6 patients with COVID-19 diagnosis among the 538 assessed. The differences between elective and non-elective pathway were compared by using T-test of chi-square, as appropriated. P<0.05 was considered significant.

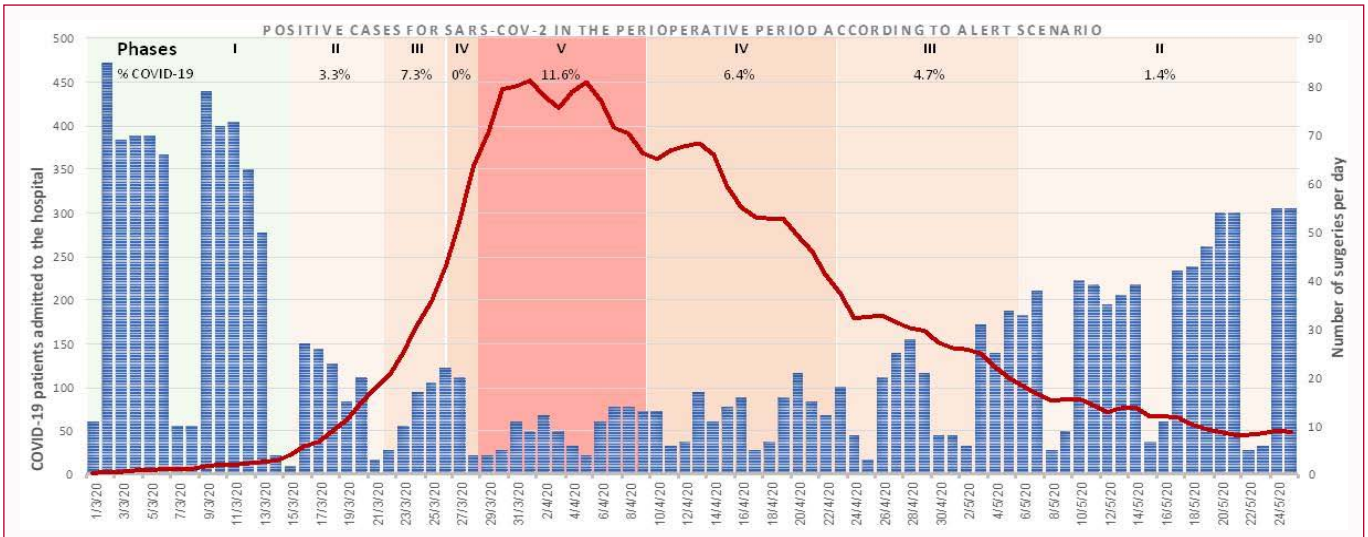


**Figure 3:** Number of surgeries and COVID-19 patients admitted to the hospital and diagnosed during the perioperative period according to alert scenario. % COVID-19, percentage of cases diagnosed in the perioperative period (from admission to 15 days post-surgery) per total of surgical procedures performed in a concrete alert scenario previously defined. Phase I, almost normal scenario <5% COVID-19 related admissions to ward and ICU; Phase II, low level alert scenario 5% to 25% COVID-19 related admissions; Phase III, medium level alert scenario 5% to 25% COVID-19 related admissions; Phase IV, high level alert scenario 50% to 75%. COVID-19 related admissions; Phase V, emergency scenario >75% COVID-19 related admissions. Blue columns are total of surgeries (elective & non-elective) performed per day. Red line is the total COVID-19 patients admitted to the hospital.

in the emergency scenario (phase V). This marked decrease of the surgical activity was also described by the COVID collaborative group [2]. They estimated that the global 12-week cancellation would be 82% for benign disease surgery and 38% for cancer surgery [2]. Our data showed these data might be even worst with an 83% reduction of elective surgery including cancer surgery. Three weeks after that peak, we progressively attempted to resume surgical activity, although this process is still under way. The cumulative impact of surgery cancellations is still to be revealed, but will certainly add to the already busy waiting lists.

To avoid unnecessary delays that might affect prognosis while

**Table 3:** Incidence of postoperative complications according to perioperative COVID-19 diagnosis.

**Table 3A:** All surgical population (n, 1321).

| | COVID-19 patients (n, 61) | Non COVID-19 patients (n, 1260) | P value |
|---|---|---|---|
| Patients with postoperative complications, n (%) | 40 (66) | 227 (18) | <0.0001 |
| COVID-Pneumonia | 17 (28) | 0 | |
| Respiratory failure | 14 (23) | 36 (3) | |
| Cardiovascular | 16 (26) | 54 (4) | |
| Renal failure | 13 (21) | 45 (4) | |
| DVT/PE | 6 (10) | 11 (1) | |
| Neurological | 8 (13) | 34 (3) | |
| Surgical infection | 8 (13) | 41 (3) | |
| Urinary infection | 5 (8) | 35 (3) | |
| Septic shock | 11 (18) | 36 (3) | |
| Re-intervention | 4 (7) | 35 (3) | |
| Mortality | 7 (11) | 14 (1) | <0.0001 |

**Table 3B:** Patients underwent non-elective surgery (n, 596).

| | COVID-19 Patients (n, 51) | Non COVID-19 patients (n, 545) | P Value |
|---|---|---|---|
| Patient with postoperative complications, n (%) | 33 (65) | 121 (22) | <0.0001 |
| COVID-Pneumonia | 12 (24) | 0 | |
| Respiratory failure | 15 (29) | 18 (3) | |
| Cardiovascular | 13 (25) | 29 (5) | |
| Renal failure | 12 (24) | 25 (5) | |
| DVT/PE | 3(6) | 7 (1) | |
| Neurological | 7 (14) | 24 (4) | |
| Surgical infection | 7 (14) | 22 (4) | |
| Urinary infection | 5 (10) | 26 (5) | |
| Septic shock | 12 (24) | 26 (5) | |
| Re-intervention | 3 (6) | 23 (4) | |
| Mortality | 7 (14) | 10 (2) | <0.0001 |

still preventing COVID-19 nosocomial infections and protecting health care providers, we designed two dedicated perioperative pathways [12]. The unique characteristics of SARS-CoV-2 infection including high infectibility, long incubation period, and nonspecific symptoms at disease onset contribute to the difficulty in detection of asymptomatic patients and those within the incubation period [13].

Another challenge is that contrary to dedicated ICUs, the PACU and operating rooms are semi-open spaces with complex air-filtration systems, so that containment of potential spread is nearly impossible. Previous reports on perioperative COVID pathways in orthopedic surgery [14], neurosurgery [9], and general surgery [15], also followed existing guidelines [15-17] and excluded COVID-19 elective cases in order to minimize the possibility of nosocomial transmission, and to reduce postoperative complications [15,16]. Moreover, all guidelines advocate for a strict preoperative COVID-19 questionnaire and RT-PCR screening as the key for pathway success [6,9,14,18-20]. However, they provide only scarce evidence of the pathway effectiveness in preventing nosocomial and health care providers infection [6,9,14].

The current 1,321 patient cohort is one of the largest databases evaluating perioperative SAR-CoV-2 infection during a peak period of the pandemic in a population with high COVID-19 prevalence. We demonstrated that structured preoperative screening utilizing phone questionnaires can save as many as 5% of RT-PCR tests by detecting patients at risk of having COVID-19. Nevertheless, RT-PCR remains highly recommended in this epidemiologic environment because the incidence of SARS-CoV-2 infection in asymptomatic and low risk contact patients was still 8%. Of note, we found no significant differences in the incidence of postoperative COVID-19 infection (1.4% *vs.* 2.2%) between the elective and non-elective groups. Considering the relatively short time from surgery to the postoperative diagnosis of COVID-19 (median 3 days), it is reasonable to assume that some of these cases were already asymptomatic carriers or within the silent incubation period and missed by the RT-PCR screening, rather than suffer nosocomial infection. These results are opposite to Schlosser et al. [7] who found no differences between universal testing and testing according to exposure risk, in 2 cohorts of about 60,000 patients scheduled for elective surgery. However, in that report, the rate of preoperative RT-PCR was 48% in the universal testing strategy group and 23% in the per-risk strategy group, compared to 100% in our elective surgery population. Moreover, Schlosser et al. [7] did not report on postoperative follow-up, so asymptomatic patients who become positive only after surgery due to the long incubation period cannot be assessed. Finally, the report by Schlosser et al. [7] included a population with low SARS-CoV-2 prevalence, while our study included scheduled surgeries within a period of peak incidence of COVID-19 cases in Barcelona that was considered highly affected by the COVID-19 pandemic.

On the non-elective pathway, the incidence of preoperative COVID-19 infection was 7% which is similar to the incidence reported in Barcelona population during those weeks [21]. Likewise, the similar incidence of postoperative COVID-19 diagnosis in the elective and non-elective groups emphasizes the effectiveness of this screening protocol in detecting COVID-19 patients and in preventing nosocomial infection using designated operating rooms and PACU for COVID-19 patients.

It is important to notice that 16% of the anesthesiologists working in the COVID-designated areas were infected during these weeks. As expected, this rate is higher than the overall 10% infection rate reported by the Spanish government in health care providers, presumably since our anesthesiologists were more exposed to high-risk aerosol-generating procedures than health care providers working in wards or emergency departments.

Finally, accordingly to previous reports [3,12,22], we observed that COVID-19 patients had nearly double the incidence of postoperative complications and higher mortality. Moreover, the rate of complications was similar between patients diagnosed with COVID-19 preoperatively and postoperatively, again reflecting on the importance of preoperative screening, both in minimizing viral spread and reducing the risks of postoperative complications.

## Limitations

The main limitation of the current report is its single center origin, in a tertiary hospital during the pandemic peak, making the results difficult to generalize to populations with lower COVID-19 prevalence. Additionally, the 2% incidence of postoperative new SARS-CoV-2 infection might be underreported given that only patients presenting clinical suspicion were tested postoperatively. Thus, asymptomatic patients might have not been detected. Finally, we were underpowered to detect association between postoperative

complications and SARS-CoV-2 infection.

Despite these limitations, the current work provides valuable information about the impact of the COVID-19 pandemic peak on surgical activity. The rather low incidence of postoperative COVID-19 diagnosis in elective surgeries (1.4%) during the first weeks of the outbreak reinforces the use of these pathways and demonstrates the efficacy of systematic preoperative screening for SARS-CoV-2 infection including not only RT-PCR but also structured questionnaire-based screening.

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