

The occurrence of COVID-19 infection in preoperative testing of asymptomatic patients

A ocorrência de infecção por COVID-19 em pacientes assintomáticos na testagem pré-operatória

La ocurrencia de infección por COVID-19 en pruebas preoperatorias de pacientes asintomáticos

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ABSTRACT: Objective: To analyze the occurrence of asymptomatic surgical patients with a positive COVID-19 test, delimit the epidemiological profile, identify the type of surgery and specialty, as well as determine the time for performing the surgical procedure after a positive test. **Method:** This is a retrospective cohort study, in a large, philanthropic hospital in São Paulo, carried out from March to September 2020, based on the analysis of medical records. **Results:** There were 4,870 surgical procedures, of which 3,688 patients underwent a PCR test. The occurrence of positive and asymptomatic surgical patients was 1.7%; in the epidemiological profile, there is a predominance of males, middle-aged, with ASA II anesthetic risk classification and in procedures of the specialties of orthopedics, urology, gynecology, and gastroenterology. The test was carried out two days before the procedure and the presence of patients with symptoms within 14 days after testing was 0.5%. **Conclusion:** The occurrence of positive and asymptomatic surgical patients was small within the quantitative analyzed, the findings of this study are similar to those of national and international studies in relation to specialty, comorbidities, and age.

Keywords: COVID-19. COVID-19 serological testing. Elective surgical procedures. Pandemics.

RESUMO: Objetivo: Analisar a ocorrência de pacientes cirúrgicos assintomáticos com teste para COVID-19 positivo, delimitar o perfil epidemiológico, identificar o tipo de cirurgia e a especialidade, bem como determinar o tempo de execução do procedimento cirúrgico após testagem positiva. **Método:** Trata-se de um estudo de coorte retrospectiva, em um hospital de grande porte, filantrópico, de São Paulo, realizado no período de março a setembro de 2020, baseado na análise de dados de prontuário. **Resultados:** Foram 4.870 procedimentos cirúrgicos, dos quais 3.688 pacientes tiveram coleta de exame PCR. A ocorrência de pacientes cirúrgicos positivos e assintomáticos foi de 1,7%; no perfil epidemiológico, observa-se predominância de sexo masculino, meia-idade, com classificação de risco anestésico ASA II e em procedimentos das especialidades de ortopedia, urologia, ginecologia e gastroenterologia. A execução do teste foi de dois dias pré-procedimento e a presença de pacientes com sintomas em até 14 dias após testagem foi de 0,5%. **Conclusão:** A ocorrência de pacientes cirúrgicos positivos e assintomáticos foi pequena dentro do quantitativo analisado, os achados deste estudo são similares aos de estudos nacionais e internacionais em relação a especialidade, comorbidades e idade.

Palavras-chave: COVID-19. Teste sorológico para COVID-19. Procedimentos cirúrgicos eletivos. Pandemias.

RESUMEN: Objetivo: Analizar la ocurrencia de pacientes quirúrgicos asintomáticos con prueba COVID-19 positiva, delimitar el perfil epidemiológico, identificar el tipo de cirugía y especialidad, así como determinar el tiempo para realizar el procedimiento quirúrgico luego de una prueba positiva. **Método:** Este es un estudio de cohorte retrospectivo, en un gran hospital filantrópico de São Paulo, realizado de marzo a septiembre de 2020, basado en el análisis de registros médicos. **Resultados:** Se realizaron 4.870 procedimientos quirúrgicos, de los cuales se recolectó examen PCR a 3.688 pacientes. La ocurrencia de pacientes quirúrgicos positivos y asintomáticos fue de 1,7%; en el perfil epidemiológico predomina el sexo masculino, de mediana edad, con clasificación de riesgo anestésico ASA II y en procedimientos de las especialidades de ortopedia, urología, ginecología y gastroenterología. La prueba se realizó dos días antes del procedimiento y la presencia de pacientes con síntomas dentro de los 14 días posteriores a la prueba fue del 0,5%. **Conclusión:** La ocurrencia de pacientes quirúrgicos positivos y asintomáticos fue pequeña dentro de lo cuantitativo analizado, los hallazgos de este estudio son similares a los de estudios nacionales e internacionales en relación a especialidad, comorbidades y edad.

Palabras clave: COVID-19. Prueba serológica para COVID-19. Procedimientos quirúrgicos electivos. Pandemias.

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INTRODUCTION

The coronavirus disease (COVID-19) became responsible for the collapse of public and private services in health systems¹⁻⁴. Due to its great potential for transmission, contagion, and lethality in the world, the World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (PHEIC) and, later, in March 2020, it was characterized as a pandemic⁵.

COVID-19 is a highly transmissible acute respiratory infection with great severity potential⁴ with a wide clinical presentation spectrum, from asymptomatic patients to patients with critical illnesses⁶.

The incidence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in asymptomatic patients corresponds to a range of 1.6 to 56.6% of cases in the literature⁷. The first case of COVID-19 in Brazil occurred on February 26th, 2020⁵; currently, there are 36.64 million confirmed cases⁸.

In view of the unprecedented situation, in March 2020, government authorities chose to prioritize care for the high demand of patients infected with the new coronavirus and suspended consultations and elective procedures for indefinite periods, depending on the epidemiological situation of each country^{2,4}.

According to the surgical triage guideline, published by the WHO in 2020, the organization's main objective was to prioritize emergency surgeries and postpone elective procedures until the pandemic is under control⁹.

Due to the lack of effective treatment and even the absence of an immunizing vaccine, many hospitals and surgical clinics have had to restructure and reorganize their care processes based on the guideline¹⁰.

In England, the phenomenon generated great impacts in the specialties of trauma, orthopedics, and otorhinolaryngology. There was an approximate drop of 38% in both specialties and a 40% reduction in surgical referral, compared to 2019¹¹.

According to the survey established by the Financial Accountability Office of Ontario, Canada, it is estimated that 52,700 surgical procedures were canceled or avoided in the period from March 15th to April 22nd, 2020¹⁰. In Pakistan, in 2020, there was a reduction of 41.5% of total elective surgeries compared to the previous year¹⁰.

Among the factors that may have contributed to the extension of surgeries in the pandemic, fear, the transfer of Perioperative Nursing professionals and anesthesiologists to

areas of care for critical patients, in addition to multiple risks of infection by the virus, stand out¹⁰.

During this period, public and private health institutions had an overload in their national health system, with occupation of operating and anesthetic recovery rooms as intensive care beds⁹.

However, the reduction in referrals for surgeries generates delays in carrying out therapeutic procedures, worsening pre-existing conditions and patients' prognosis, and greater financial impact on health systems⁵.

The period of greatest cancellation corresponds to the first year of the pandemic, with a gradual return of elective procedures and normalization of surgical flow only after two years, as professionals began to have a greater understanding of the course of the pandemic and strategies could be incorporated².

However, despite a better path and the resumption of surgical procedures during the pandemic, data on the incidence of asymptomatic surgical patients and their profile are limited in the literature. As students of the Clinical Surgical Residence, the interest in knowing this profile of the surgical patient at the institution where the work was carried out is justified by the lack of scientific knowledge and the potential of this study to add knowledge to the scientific literature through the determination of asymptomatic surgical cases.

OBJECTIVES

To analyze the occurrence of asymptomatic surgical patients with a positive COVID-19 test, delimit the epidemiological profile, identify the type of surgery and specialty, as well as determine the duration of the surgical procedure after positive testing for COVID-19 of asymptomatic surgical patients.

METHOD

This is a retrospective cohort observational study, based on the analysis of medical records of surgical patients treated from March to September 2020, with pre-surgical PCR collection and positive testing for COVID-19, however asymptomatic. The initial data on testing derive from the database of the Hospital Infection Control Committee (HICC) and, subsequently, from a search in electronic medical records.

The purpose of the retrospective cohort study is to collect previous information and point out statistical associations, for a period of time, about individuals¹².

The main source of data were the medical records of surgical patients with an elective procedure from March 2020 to September 2020, who were tested prior to the procedure by RT-PCR and had positive results in the test but were clinically asymptomatic. These testing and clinical data make up the HICC database that was consulted to determine the medical records to be analyzed.

The study site was a large, philanthropic hospital located in the city of São Paulo. Equipped with 24 operating rooms for performing general procedures, from low to high complexity, the average attendance is 1,500 surgical procedures per month.

The sample was variable and included the number of patients with positive and asymptomatic test results.

Inclusion criteria for analysis of the electronic medical record were: surgical patients, from the HICC database, tested positive, though asymptomatic, in the period defined for the study, and without age restrictions.

Exclusion criteria were: patients undergoing urgent or emergency procedures (do not depend on test results to perform the procedure), reoperation, and diagnostic procedures performed in the Surgical Center.

The variables analyzed were: surgical procedure, medical specialty, American Society Anesthesiology (ASA), age, gender, preoperative diagnosis, clinical history, time to perform the surgical procedure after a positive result and presence of respiratory signs during hospitalization.

Data collection was carried out by the researcher and supervised by the supervisor and co-supervisor, first by consulting the HICC database, to identify surgical patients with positive tests and asymptomatic clinics. Subsequently, the electronic medical records of these previously identified patients were consulted to assess the study variables.

The data were transferred to an Excel[®] spreadsheet, for the construction of the database and descriptive analysis of the variables using tabulations (simple and relative frequencies), for qualitative or categorical variables, and calculations of mean, median, standard deviation, and percentage, for the quantitative variables.

This study committed to comply with Resolution 466/2012¹³. As this was an analysis of data from the medical records and due to the absence of direct contact with patients questioning, the waiver of signing the informed consent was requested, and the researcher undertook to preserve the data, in accordance with the Brazilian General

Data Protection Regulation (*Lei Geral de Proteção de Dados* – LGPD). The study was approved by the Research Ethics Committee, under number 5.708.693.

RESULTS

In total, 4,870 elective surgeries were performed from March 2020 to September 2020. However, based on the inclusion and exclusion criteria, as well as gaps, mandatory testing, and symptomatic patients, 3,688 patients were tested by RT-PCR for SARS-CoV-2 preoperatively and analyzed in this study.

Of these 3,688 patients, 65 were positive, with 02 symptomatic ones. The study identified 63 (1.7%) asymptomatic SARS-CoV-2 positive patients who underwent the surgical procedure during infection. Of these, 65.1% (n=41) were females and 34.9% (n=22) were males. Mean age was 49 years (SD±19 years). The maximum age identified was 85 years and the minimum age was 3 years. The surgical procedures performed on the 63 patients are shown in Table 1.

From the personal clinical background, it was found that, of the infected patients, 25.39% (n=16) have dyslipidemia (DLP); 22.22% (n=14), high blood pressure (HBP); 17.46% (n=11), hypothyroidism; 11.11% (n=7), anxiety; 6.34% (n=4), diabetes mellitus (DM); and 1.58% (n=1), hyperthyroidism and gastroesophageal reflux disease (GERD).

As for the ASA classification, only nine patients were evaluated using an electronic medical record, including seven with ASA II and two with ASA I.

Suspected or positive patients underwent a surgical procedure in an exclusive room, with flow directed to a patient with COVID-19, using a specific protocol and personal protective equipment (PPE).

The mean time for disclosure of the result of the RT-PCR exam for SARS-CoV-2 was 3 days (SD±7 days), with a median of 2 days. The minimum time found was 0 days (result on the same day of surgery) and the maximum time, 135 days from testing to the period of the surgical procedure.

The first test for RT-PCR was on April 20th, 2020, but mandatory collection of the test for COVID-19 was introduced on April 6th, 2020. It should be noted that surgical patients with a test for COVID-19 were identified after the procedure, maximum time of 4 days after surgery or surgical approach.

The mean length of stay of the 3,688 surgical patients in the analyzed period was 4 days (SD±10 days), with a median of 2 days. The minimum length of stay was 1 day and the maximum was 210 days.

Regarding pre-anesthetic evaluation and determination of anesthetic risk classification (ASA), only 727 patients were evaluated by electronic assessment. They were: ASA I: 34.3% (n=249); ASA II: 57.9% (n=421); ASA III: 7.6% (n=55); and ASA IV: 0.3% (n=2). Additionally, 2,961 patients did not have anesthetic evaluation records in the electronic medical record due to the data collection period coinciding with the implementation of this format; consequently, many recordings were performed manually and were not included in the evaluation of this study.

As for the clinical history of these patients, comorbidities such as HBP and DLP were more prevalent, followed by DM.

In assessing the presence of symptoms within 14 days after testing, 99.3% (n=3,633) had no symptoms and 0.5% (n=19) had mild symptoms, followed by 0.2% (n=6) with moderate to severe manifestations. Of these, 0.6% (n=23) had respiratory symptoms.

Of the patients who tested positive for COVID-19, 117 underwent surgery after 8 weeks, while 37 had their surgical procedure rescheduled before 8 weeks (Table 2).

The increase in the number of days, in addition to being related to the diagnosis of COVID-19, was contributed by

other justifications. The main reasons include: change in conduct related to COVID-19 (asymptomatic and symptomatic), unavailability due to private matters, and clinical instability.

Although the monthly average of surgeries in the institution is 1,500 surgeries, it was identified that the pandemic caused a slowdown in the surgical rhythm, reaching a drop of 70%.

In the first month of the pandemic, March, 929 (61.93%) procedures were registered, which corresponds to 38.07% below the main target. The worst month, compared to the Surgical Center mean, was April, with 203 (13.53%) procedures performed, and the best, compared to the six months

Table 2. Surgical rescheduling time after positive COVID-19 test. São Paulo, Brazil, 2020.

	n	%
RT-PCR SARS-CoV-2 performed	3,686	100
Surgeries rescheduled and performed within eight weeks or more – COVID-19 positive	117	3.17
Surgeries rescheduled and performed in less than eight weeks – COVID-19 positive	37	1.00

Table 1. Procedures performed, grouped by specialty, in positive and asymptomatic patients. São Paulo, Brazil, 2020.

Specialty	Procedure performed	n	%
Orthopedics	Disc herniation, dorsal or lumbar; multiple and single microneurolysis; percutaneous denervation of joint facets; foraminal infiltration; percutaneous rhizotomy; single tenorrhaphy; tenolysis in the osteofibrous tunnel; knee arthroplasty with implant; spine arthrodesis; complex knee injuries; meniscus repair or suture; total hip arthroplasty	15	23.8
General surgery	Cholecystectomy with and without cholangiography; umbilical herniorrhaphy; laparotomy to release bands; laparotomy for abscess drainage; gastric septation by laparoscopy; hemorrhoidectomy; anal fistulectomy	11	17.4
Gynecology	Surgical hysteroscopy; oophoroplasty; laparoscopic oophorectomy; dilation of the cervix; trachelectomy; hysterectomy	6	9.52
Mastology	Breast reconstruction with skin flaps; quadrantectomy; breast reconstruction with prosthesis; nipple-areola plaque reconstruction; simple mastectomy	5	7.93
Vascular	Surgical treatments for varicose veins; definitive shunt placement	4	6.34
Cardiovascular	Pacemaker placement	3	4.76
Ophthalmology	Eyelid ptosis; surgical correction of eyelid entropion; facectomy with intraocular lens	3	4.76
Plastic	Extensive injuries, scars or tumors; fasciocutaneous flap rotation; otoplasty; inclusion of breast prosthesis	3	4.76
Anesthesia	Peripheral nerve block; epidural or subarachnoid neurolytic block	2	3.17
Otorhinolaryngology	Tonsillectomy; intranasal ethmoidectomy	2	3.17
Urology	Flexible Uterorenolithotripsy; bladder tumor - endoscopic resection	2	3.17
Neurosurgery	Deep brain electrode implant	1	1.58
Head and neck	Total thyroidectomy	1	1.58

of the pandemic, was September, with 997 (66.46%) surgical procedures performed.

DISCUSSION

In the initial phase of the pandemic, elective surgical procedures were postponed, causing a significant drop in surgical turnover. This same profile was seen in several countries^{14,15}. This minimizes the risk for both patients and the healthcare team, as well as reducing the use of necessary resources such as beds, ventilators, and PPE.

During the pandemic, in the region of Lombardy, in northern Italy, an area of extremely high epidemic impact, an orthopedic surgical hospital reduced its surgical care to orthopedic cases of emergency and trauma only, and gave up beds to care for infected patients, prioritizing discharge demand arising from the pandemic. To maintain proper care flow, important factors were identified that influence the hospital's ability to maintain operations with strict patient triage, differentiation of flows and paths within the hospital, tracking and sharing of information in rapidly changing scenarios¹⁴.

In Spain, procedures were reduced during the pandemic and diagnostic strategies were tested in surgical patients, in search of better identification of positive and asymptomatic patients who could develop postoperative complications¹⁵.

During this period, preoperative testing was crucial, as was the case in this study. In the literature, the justification for preoperative screening is associated with the offer of operational risks related to the infection of employees and the performance of procedures that can generate aerosol¹⁶.

In addition, presumed suspected or infected patients with SARS-CoV-2 require operating rooms that are adequately ventilated and filtered or that have negative pressure, limited staff, and separate flow processing of materials¹⁷.

Regarding the surgical specialty in asymptomatic patients, the results of this study are similar to those of an Australian study with 3,037 patients, with a predominance of orthopedic, urological, gynecological, and gastrointestinal surgeries. However, this study differs from our findings regarding the number of positives found in elective surgical patients, with no contamination in their population¹⁸.

The profile of patients in this study is classified as anesthetic risk ASA II, compatible with healthy patients with controlled comorbidity. Regarding comorbidities, our findings are similar to those of another study¹⁵ that identified the presence of hypertension and DM.

In a Chinese epidemiological study with 1,427 surgical patients, the rate of infection by COVID-19 was 0.98%, lower than that found in the present study (1.7%). In that work, middle-aged and aged patients with preoperative lung infection were more susceptible to SARS-CoV-2 infection after surgery¹⁹.

The profile of positive asymptomatic patients was predominant in women — in turn, the profile of negative patients consisted of men — both middle-aged (50 years old), results similar to those of other studies^{15,19,20}, but different from a study²⁰ that registered patients aged 60–70 years.

The results of the present study showed a low percentage of patients with mild symptoms after 14 days of preoperative testing, results lower than those of a French study²⁰ (17%) that identified three deaths, a fact that did not occur in this study.

A 46% decrease in surgical procedures is estimated in the Unified Health System (*Sistema Único de Saúde* – SUS)²¹; In the institution studied in this work, reduction reached 69%, with 154 surgeries rescheduled in the selected period, similar to what was found at the University Hospital²².

CONCLUSION

The occurrence of positive and asymptomatic surgical patients was small within the quantitative analyzed. The findings of this study are similar to those of national and international studies in terms of specialty, comorbidities, and age. The percentage of symptomatic patients after testing had little representation within the sample, with low severity and no deaths.

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None.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

AUTHORS' CONTRIBUTION

Uchiya EH: Conceptualization, Data curation, Formal analysis, Writing – original draft. Lobo RD: Conceptualization, Methodology, Writing – review & editing. Souza CS: Conceptualization, Data curation, Methodology, Writing – review & editing.

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