

Organizational Aspects of Clinical Safety in Surgical Patients during the Covid-19 Pandemic in a Tertiary Level Hospital

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Abstract

Introduction: The emergency situation, caused by COVID-19, gave rise to the adoption of a series of measures to face these extraordinary circumstances. In our Region, the month in which our healthcare structures were most stressed was last April'20.

Objective: The objective of this work is to review the different management aspects, focusing on security for patients who required surgical intervention at our hospital during that month.

Methods: It's a retrospective and descriptive of consecutive cases, which studies surgical activity during April'20 contrasting with activity previous to pandemic.

Results: 1) The complexity and safety of the preoperative circuits were increased both by the triple screening by anamnesis and by the analytical screening of antigen detection in smears. 2) Obstetrics activity increased in +17.6% and in the rest of surgical services it decreased in planned surgery in -76.3%, and in urgent surgery in -21.8%, due to a decrease in the number of available and functional operating rooms in -45.8% and 75.6% respectively, compared to February'20. 3) Incidences in the surgical check-list, although anecdotal, improved their profile, including issues related to the lack of results of the test (for the presence of antigen in smears) prior to an urgent surgical procedure; and a second type of incidence consisted of the need for non-face-to-face verbal informed consent. 4) Temporary postponement of delayed surgical interventions allowed a decrease in hospital occupancy by -29.5%. 5) Donation and transplantation activity was maintained under normal conditions, without any restrictions by the effect of the pandemic. 6) In our hospital, we could follow the recommendations given by authors on their reference document.

Conclusion: Despite the limitations of our study, we can prudently deduce the follow: The incidence rates in our environment alongside with our consolidated health care service (both material and human resources), the early application of the safety measures stated on the reference document, together with the integrity and maturity shown by our human team, made it possible to ensure the safety of surgical patients. It's important to keep in mind two kinds of patients whose situation improved thanks to these measures that were adopted: the obstetric and transplanted patients.

Keywords: COVID-19 Pandemic; SARS-CoV-2 Infection; Safety Management; Surgery

Abbreviations

COVID-19: SARS-CoV-2 virus; in reference to patients infected with COVID-19; IPE: Individual protection equipment; MASU: Major Ambulatory Surgery Unit; NO-COVID-19: In reference to patients non-infected with COVID-19; °C: Degrees Celsius; ORPD: Occupational Risk Prevention Department; PCR: Viral antigen detection test for COVID-19 in nasopharyngeal smear; PMPHD: Preventive Medicine and Pub-

lic Health Department; Pre-COVID: In reference to patients suffering from clinical syndrome compatible with COVID-19 infection, whose nasopharyngeal test was negative; Pre-PCR: In reference to patients whose COVID-19 status were unknown; in terms of Public Health recommendations, the patient is treated as potentially infected until the test result is known

The public health emergency caused by the SARS-CoV-2 virus (hereinafter referred to as COVID-19) was declared by the World Health Organization on March 11, 2020. This declaration motivated the adoption of a series of extraordinary measures, first by the Government of the nation [1] and at the same time and later, by the Region authorities.

Our center is a third level hospital (991 beds installed for hospitalization). It provides health care to the metropolitan area of its capital, as well as to its municipality (Health Care Area). Furthermore, it is the reference center for the surgical pathology of certain specialties, which are absent in the rest of the hospitals of the Region [2].

There is another first level center in the same municipality (195 beds installed), which has another section of Orthopedic Surgery and Traumatology, among others.

The reference population includes 219,686 inhabitants of the municipality and as a reference center 1,022,800 users from the entire Region [3]. On the other hand, this population is one of the oldest in the country, with about 25% over 65 years old [4].

In our Region, the peak of new daily confirmed cases was March 20th with 142 new cases. Since then, there was a decrease in saw teeth until the 54 new cases on April 21 [5]. The peak of hospitalization was reached on April 1st with 226 positive admissions (between the two health centers of the municipality). Since then, there was a gradual and slow decline to 122 admissions on April 25. The peak of intensive care unit admissions was reached on April 2nd with 58 severely infected patients. These were decreasing in number, although more slowly than the previous indicator, to 28 patients on April 25) [5]. This hospital occupancy was defined as a moderate incidence rate [4]. In particular, the accumulated cases per 100,000 inhabitants in the last 14 days registered in April 10, 2020 was 87.9 cases in our Region [6] and was a low rate, compared to the rest of the country's Regions, which presented an average incidence of 197.7 cases and a range between 44.8 and 580.8 cases.

Since the declaration of the pandemic, our healthcare area has been the recipient for all positive cases in the autonomous community, regardless of their severity. Later, in the following weeks, other centers were adapted in coordination with the Health Service to house these infected cases. The criteria for deciding on the admission of each patient included the patient's address, severity and associated pathology. After the peak of the pandemic, the hospital progressively returned to being the main receiving center for infected cases.

In our health area and Region, the month in which the health structure was most stressed by the COVID-19 was last April'20. In this month, the highest peaks of cumulative incidence were reached in both infected and admitted patients (in conventional and critical units). Hence, in our opinion, it is of interest to know the level of safety of the surgical patients attended in terms of the organizational aspects of their care.

On April 3, 2020 was published the document of the working group led by Balibrea, *et al* [7]. The authors made a number of recommendations in the approach to surgical patients during the pandemic.

Subsequently, on May 16, 2020, the Ministry of Health [8] published aspects related to the safety of patient care during the pandemic, in which various professional associations participated, including those already mentioned [7].

Aim of the Study

The aim of this work is to review the organizational model and the different organizational aspects recommended [7], regarding the care of patients who required surgical intervention in our hospital center at the time of greatest stress suffered by the organization of the COVID-19 pandemic.

Methods

Statistical analysis

This is a retrospective, descriptive study of consecutive cases, which studies surgical activity both in quantity and quality. In particular, it focuses on patient safety in terms of decisions made on organizational aspects during the pandemic, taking as a reference the established standards [7].

For this purpose, the activity and measures carried out in the month of greatest stress in the hospital organization (April '20) are studied, and contrasted with a month prior to the pandemic, whose duration (in working days) and available resources were similar (February '20).

Scope

The hospital has 33 operating rooms installed, divided into 5 surgical blocks: a) Block-1 for adults with 10 operating rooms, b) Block-2 with 10 operating rooms, c) Block of Major Outpatient Surgery Unit (hereinafter, MASU) with 4 operating rooms for all adult patients scheduled in a non-admission regime, and which has its own day hospital and rooms for adaptation to the environment and resuscitation, d) block mother and child with 7 operating rooms, distributed in 3 of adults 3 children's operating rooms (both in MASU regime and admitted), and 1 emergency operating room. And e) ophthalmologic block, with 2 operating rooms and its own surgical day hospital.

Care circuits

Within the preoperative circuit (both programmed and urgent patients), the triple triage of the 3 questions was incorporated. This questionnaire incorporated the following questions: Absence of close contacts in the last 14 days. Absence of temperature higher than 37.5°C in the last 3 days. And no symptoms at that time.

If any question was answered in the affirmative, the surgery was delayed and the public authorities were informed of the situation through epidemiological surveillance in order to control the situation and any contacts. In the urgent circuit, the risk/benefit of the intervention was assessed by the different specialists involved.

These questions were asked in 4 moments before the time of the intervention by the clinical staff: When the patient was called for admission (surgical department). Upon entering the center (Admission unit). Upon admission to the inpatient unit (nursing staff). At the entrance of the surgical block (nursing staff).

In the urgent circuit the triage of the first moment was not carried out.

Also, and within the preoperative circuit (programmed and urgent) it was implemented the accomplishment of the test of nasopharyngeal smear for the technique PCR. Prior to the operation, surgical patients had a sample of nasopharyngeal exudate collected with a pre-moistened sterile swab, Copan Liquid Amies Elution Swab (eSwab, Copan, Italy). The presence of COVID-19 viral load was analyzed

by detecting the viral genome using a multiple quantitative PCR. The nucleic acids were purified by MagNa Pure System (Roche, Geneva, Switzerland) for half an hour at 37°C. The extractions were subjected to an amplification reaction using the commercial preparation Taqman Fast 1-Step Master Mix (Life Tech, Carlsbad, California, USA), supplemented with a mixture of primers and Taqman probes, directed against two ORF1ab and N genes [9]. The time to obtain the result from the arrival of the sample to the laboratory had a minimum processing time of 3.5 hours. This processing was prioritized according to the type of request (preferential or programmed). Its validity was established by the Department of Anesthesia in 48 hours. In case the negative result of the test was previous to this time, and in selected cases, it was repeated urgently before induction.

Also, the usual pre-surgical checklist was maintained in the pre-surgical circuit throughout the pandemic, which included the completion of 7 questions. In addition, the surgical checklist was also incorporated into the medical record. It collected 31 intraoperative records along with incidents, if any. Both checklists were evaluated by the Quality Department.

As for post-surgical care, both COVID-19 patients and patients without COVID-19 infection (hereinafter, NO-COVID-19) were attended. Differentiated circuits were established, both in operating rooms and in resuscitation or critical care units, and by different professional levels. They were attended by the corresponding physician, either an anaesthesiologist or an intensivist, depending on the place of admission of the patient, the overcrowding of the patient, and the availability of these professionals.

In the COVID-19 patient spaces, the professionals worked with high safety individual protection equipment (hereinafter IPE), following the standards established by the occupational risk prevention department (hereinafter ORPD).

The rooms where COVID-19 patients were located had a negative pressure of -5 to -15 Pascals, provided by the staff from the department of engineering and maintenance.

The cleaning, both in the operating rooms and in the critical and resuscitation rooms, was carried out using 0.05% sodium hypochlorite after usual detergent and the washing of IPE (face shields) with 70% ethanol [10].

In cases where it was not possible to establish the infection status prior to the surgical procedure, a high-security IPE was used for each of the professionals. In this case, an isolated box location with the occupational safety conditions recommended by the ORPD was also sought, pending the analytical result and its definitive postoperative location (this type of patient was called “pre-PCR” or pending the result).

Differentiated and independent hospitalization units were established for COVID-19 patients, from NO-COVID-19 patients.

Other hospitalization units (where high security IPEs were used) were searched for patients called “pre-COVID”, who presented clinical and radiological parameters (including thoracic computerized axial tomography) compatible with COVID-19 infection, but with negative analytical results. In this case, the workers used high security IPE.

Finally, NO-COVID-19 hospitalization units were also enabled to maintain normal care for other users, regardless of the pandemic situation.

Exclusion criteria

Patients with a non-surgical profile (coinfecting or not) who have been treated in the critical care units are excluded from this review.

The activity carried out in the month of January '20 is excluded as it has fewer working days than the month under study (20 days). On the other hand, the month of March '20 had a behaviour of extreme activity, when the state of alarm was declared in its second fortnight with the consequent postponement of the delayed activity.

During the month of May '20 started the progressive increase of the surgical activity in the so-called Transition Phase [11]. In addition, rapid tests and other serological tests were incorporated, whose sensitivity is different from PCR [12], so this month is discarded from the present study.

The qualitative and quantitative indicators of the surgical waiting list cannot be compared, since during the alarm state the guarantees regarding the waiting time of the patients to be operated were stopped normatively.

The description of the activity or status of non-surgical or non-hospital device-directorates is not part of the scope of this study.

Furthermore, other clinical safety criteria were not reviewed [7], such as: a) Clinical parameters or biological markers to differentiate systemic affection or sepsis of abdominal origin, such as the presence of digestive symptoms or the different analytical studies required in the diagnosis of patients. b) Approach, and the use of minimally invasive approaches, or precaution in the use of the pneumoperitoneum, or the use of electric scalpel, or the discouragement of endoanal type interventions. c) Treatment for COVID-19 patients requiring pharmaceutical measures, as well as types of antiviral medication, side effects and contraindications, use of oxygen therapy or steroids or non-steroidal anti-inflammatory drugs, or even the testing of interactions in the case of antiviral use. d) The individual actions carried out by the ORPD are not described in this study, given that they have been subject to the privacy of each worker, or assessment of the indication for post-exposure prophylaxis by the workers.

Results

The compliance with the items established in safety by Balibrea, *et al.* is reviewed [7]. They are stratified into sections for greater expository clarity.

Ethical issues

Attention in the face of undelayable surgical treatment

The following were proposed as urgent surgical care processes that could not be postponed: attention to childbirth, urgent interventions, and interventions indicated with preferential priority. The activity data are described below (Table 1). When surgical waiting lists were retrospectively analyzed, the output of all the patients operated on in April'20 were 100% registered as priority 2 or less, so that the postponement of the delayed pathology was complied with as a rule.

	February'20	April'20
Number of operating rooms scheduled morning (average)	26.0	14.1
Number of operating rooms scheduled afternoon (average)	9.0	2.2
Hospital occupancy (%)	87,80%	58,30%
Number of working beds	986	984
Hospital mortality index	5,30%	5,60%
Index of deaths in surgical departments out of number of discharges (%)	1,57%	1,62%
Number of births	142	167
Cesarean index (%)	15,50%	21,60%
Number of total surgical procedures	1896	610
Number of urgent surgical procedures	294	230
Number of scheduled surgical procedures	1602	380

Surgical sessions performed	744	320
Scheduled surgical performance (morning and afternoon, %)	75.6%	81.3%
Surgical suspensions (%)	4.0%	2.3%
Ratio of scheduled ambulatory/admitted interventions (%)	45,70%	7,60%
Number of total transplants performed	8	8
Number of hepatic transplants	1	0
Number of kidney transplants	6	7
Number of cardiac transplants	1	1
Index complete records pre-surgical checklist (%)	99,85%	100,00%
Index complete records checklist surgical verification (%)	99,05%	98,56%

Table 1: Assistance indicators of the tertiary level center.

Comprehensive and appropriate training of the teams

Training has been provided in the handling of IPE and in other aspects related to the pandemic, both by the ORPD, the Preventive Medicine and Public Health Department (hereinafter, PMPHD) and through the Training Unit. In addition, protection criteria were established following the established standard [13].

Simulation of these situations and handling of IPE

It has been carried out before the arrival of the pandemic throughout the month of February '20.

Clinical protocol and current regulations

Surgical patients were triaged with the three questions in the 4 moments before being operated, as a first guarantee of Public Health.

As for the surgical schedule of the patients, following the criterion of their seniority in surgical waiting list registry (which excludes admitted and urgent patients), the patient whose surgical indication referred to a period of 90 days or less (registered as priority 1 or 2) was taken by definition as a non-delayable patient, and this criterion was established in necessary cases by the corresponding department, depending on the aggravation of the patient’s clinical situation.

All the documentation elaborated by the Health Service has been distributed in time and form to all the surgical S^o, as well as the one elaborated by the SMPSP. This information included: The different surgical circuits, of critics, resuscitation, emergencies and hospitalization. This elaboration corresponded to the departments and units involved, and they were guarded by the Quality Department. Likewise, it was re-edited in case of new evidence [14].

Information and informed consent

The recommendations of the Healthcare Area Ethics Committee were disseminated to all departments, which included both the increased surgical risk in case of COVID-19 infection, and the risk of nosocomial infection by COVID-19 during their admission. In this sense, it was given as usual along with the rest of individualized risks in each patient, leaving a written record in his case, and signing the informed consent prior to their intervention.

Precautions for a suspected or confirmed COVID-19 patient

Differentiated admission protocol between urgent and programmed admission, between COVID-19 and NO-COVID-19 patients: Documentation was prepared and disseminated for systematized implementation.

To differentiate suspicious patients from confirmed patients

The definitions of both pre-COVID and pre-PCR patients in transit were established. Thus, four different subpopulations of admitted patients were established. Different circuits and locations were established for each subpopulation.

Diagnostic tests for COVID-19 infection in case they need to be operated

Routine detection of the antigen when intervention is required: It has been commented in the section Methods, its implementation and systematization, having been carried out by means of PCR universally to the surgical population attended.

Approach route

- Minimally invasive access: The document has been disseminated for the knowledge of the different surgical sectors.
- Precaution in the use of the pneumoperitoneum: Same as above.
- Caution in the use of electric scalpel: Same as above.
- Use of central negative pressure systems in the operating rooms.

The structure of our recently opened center (June '14) has allowed for a variation in the pressures of both the different facilities and locations: operating rooms, critical care units and hospitalization rooms. Once the specific assistance in that location was finished, the Engineering Department at the request of the device-directorate, or the Surgical Department, or Unit returned it to its initial pressure.

Discouraging minimally invasive endoanal or transanal interventions: The document referred to has been disseminated for the knowledge of the different surgical departments.

Caution during stoma care

Same as the previous one. In addition, high security IPE has been provided to the professionals who provide such care, at all necessary locations.

Precautions for professionals

Use of IPE: These IPE has been used in both COVID-19 patients, pre-COVID patients and pre-PCR patients.

Placement and removal of them

We have already commented on the courses of both the ORPD and the PMPHD. All the professionals were offered training and education in aspects of the COVID-19, as well as in the placement of IPE, hygienic measures, access to official sources and continuing education programs [4].

Protocol of action in the surgical area

Use of checklist

In the month of February '20, out of 1903 records collected, compliance was reported in 1900 records (99.8%), while in April '20 out of a total of 612 patients collected, 100% of the cases reported compliance.

Two new incidence profiles were detected, namely the one related to the absence of PCR analytical results from an urgent surgical patient, which was resolved by taking a new smear before anesthetic induction and the need for IPE for the surgical staff.

A second incident profile detected during the pandemic was that surgical and anesthetic consents were obtained by telephone from the family. This issue was recorded in his medical history.

With regard to the surgical checklist, 9 incidents out of 941 complete records (1.0%) were recorded in the month of February '20, while in the month of April '20 7 incidents out of 483 complete records (1.4%) were recorded.

In the first case the incidents were related to 1 false allergy record that was modified, 1 patient without an identification bracelet that was printed and placed in the antechamber, 3 related to incorrect instruments requesting their replacement with another alternative box, 1 patient with bladder catheterization difficulty that was resolved by the specialist, 1 patient with dentures that was removed, 1 case of absence of identification stickers that were printed in the operating room, and 1 computer error (server crash) so the paper contingency plan was activated.

In the month of April '20 the incidents were: 2 related to incorrect instruments, 1 consent to surgery and anaesthesia by telephone, 1 patient with teeth which were removed, 1 respirator that failed and forced to change the operating room, and 1 patient without the result of the PCR that forced the placement of high security IPE of all these staff.

Designation of specific operating rooms COVID-19

Four specific operating rooms were designated for patients infected with COVID-19, namely: 1 for departments located in block-1, another operating room for departments in block-2 and 2 in the mother-child block, one for adults and another one for children.

Care indicators (Table 1)

As for the surgical activity carried out, in February '20 there were 31 operating rooms installed for programmed surgery and 2 operating rooms installed for urgent pathology (one in the mother-child block and another for blocks 1 and 2). There were 744 surgical sessions, with an accumulated programmed surgical performance of 75.6% (calculated with a duration of 7 hours per morning session and 4 hours per afternoon session). An average of 26.0 working operating theatres per day in the morning and 9.0 in the afternoon (from Monday to Thursday) was obtained, based on the available staff in the different professional categories. The accumulated suspension rate was 4.0% (including causes attributable to patients, organization or clinical situation) [15].

During the second half of March '20, an average of 14.9 operating theatres per day were programmed in the morning, and 2.7 in the afternoon. The 2 NO-COVID-19 emergency operating rooms were maintained. At the beginning of the pandemic, 4 operating rooms were established for COVID-19 patients, after having defined the differentiated circuits for COVID-19 and for NO-COVID-19, and the 2 NO-COVID-19 emergency operating rooms were maintained. Throughout April 20, 14.1 scheduled surgeries were carried out in the morning (-11.9 sessions per day compared to February 20, -45.8%), and 2.2 in the afternoon (-6.8 sessions per day compared to February 20, -75.6%), obtaining a total number of 320 sessions (-424 monthly surgical sessions compared to February '20, -57.0%) with a surgical yield of 81.3% (April '19: 74.0%), which is +5.7% more than February '20, and +7.3% more than April '19. The number of surgical suspensions amounted to 2.3% (April '19: 3.4%), which represents a decrease of -1.7% compared to February '20 and -1.1% compared to April '19.

During the month of February '20, 1602 total programmed interventions were carried out (February '19: 1481) and 294 total urgent interventions (February '19: 335). During April'20, 380 total programmed interventions were carried out (April'19: 1350; with respect to February'20 this represents -1222 interventions, -76.3%), and 230 total urgent interventions (April'19: 340; with respect to February'20 this represents -64 interventions, -21.8%). Therefore, the total number of interventions made was 610.

The ratio of scheduled outpatient/inpatient interventions was 45.7% in February'20 (45.0 in Feb'19), 36.5% in March'20 (45.6% in Mar'19), and 7.6% in April'20 (41.0% in Apr'19).

In that month of February'20, 142 births were carried out (February'19: 145) with a caesarean rate of 15.5% (February'19: 10.3%); in April'20, 167 births were carried out (which represents an increase of +25 births with respect to February'20, +17.6%; April'19: 164), with a caesarean rate of 21.6% (April'19: 11.0%).

As for the activity of transplants, in February'20 6 renal, 1 heart, and 1 liver were performed (February'19: 6, 1 and 2 respectively); of cornea 4 transplants were performed (February'19: 2). In April'20, 7 renal transplants were performed (April'19: 5), and 1 heart transplant (April'19: 2). No liver or cornea transplants were recorded in April'20 (April'19: 3 and 4 respectively).

The overall hospital occupancy in February'20 was 87.8% of the 986 beds in operation at the center (February'19: 92.2% and 985 respectively); in March'20 it was 69.2% and 981, while in April'20 it was 58.3% and 984 beds in operation (April'19: 85.2% and 983 respectively), a decrease of -29.5%.

The total of hospital exitus in the 14 surgical departments (taking separately the Obstetrics and Gynecology sections) was 1.6% (24 exitus of 1526 discharges) in February'20, and 1.6% (12 of 738) in April'20.

The overall accumulated hospital mortality rate [15] was 5.3% in February '20, and 5.6% in April '20, which was stratified into surgical services were respectively between February '20 and April '20 the following: Cardiac surgery without any exitus in April'20 (2.7 and 1.5% respectively between both months), general surgery with 1 exitus in April'20 (4.0 and 2.9%), children's surgery without exitus (0.0 and 0.0), plastic surgery without exitus (0.0 and 0.0), thoracic surgery without exitus (1.1 and 0.7%), gynecology without exitus (0.0 and 0.0), maxillofacial surgery with 1 exitus in April'20 (0.0 and 0.8%), neurosurgery with 2 exitus in April'20 (4.4 and 4.9%), obstetrics without exitus (0.0 and 0.0), ophthalmology without exitus (0.0 and 0.0), otolaryngology with 1 exitus in April'20 (1.5 and 1.5%), orthopedic surgery and traumatology with 1 exitus in April'20 (1.2 and 1.4%), urology with 2 exitus in April'20 (1.0 and 1.2%) and vascular surgery with 3 exitus in April'20 (5.1 and 5.5%).

In the surgical waiting list registry related to April'20, 100% of the patients had a priority less than or equal to 2 (preferential and urgent patients) [16].

Independent transfer circuit of patients COVID-19: Different documents were prepared, which have been agreed upon, disseminated, implemented and systematized.

Limitations for professionals: Professionals and patients' circuits have been established with limited access, including critical units, hospitalization, consultations, and surgical rooms.

Use of disposable material: Use of disposable instruments has universally been maintained.

Closing doors and guillotines where possible, as is usually recommended, in the presence or absence of a pandemic.

Prioritize mechanical sutures: The universal use of disposable instruments has been maintained

Resuscitate the patient in the same operating room.

This recommended measure has not been necessary in our center, since the maximum installed capacity of critical beds (both intensive and resuscitation ones) has not been reached. In addition, a new provisional critical unit (12 posts) was set up in our center, but its opening was finally not necessary.

Discard material from the operating room: It was carried out from the first moment and as usual, in case its disinfection and sterilization were not indicated.

Thorough cleaning of all surfaces: According to the protocol established by the SMPSP and implemented from the beginning of the pandemic, by the outsourcing company in charge of cleaning the center.

Attitude towards a professional with suspected infection by COVID-19:

- Communication with the ORPD: The infected workers and their intimate contacts were studied and coordinated by the ORPD, establishing the recommendations on an individual basis. These recommendations included among others: use of full IPE, adaptation of the job conditions, isolation at home, or temporary sick inability.
- Existence of protocols for this purpose: The ORPD recommendations have evolved based on the pandemic. They collected the worker's level of risk, his profesigram and their level of protection, including recommendations such as duration of their isolation, or repetition of PCR test, among others.
- Dissemination of knowledge in the management of COVID-19 pandemic: These protocols are documented, disseminated, implemented and systematized. The pager has been kept open 24 hours a day, 7 days a week, advising and supporting the figure of the Chief of the Guard. The advice of the Director of Internal Medicine and Coordinator of the COVID group, as well as the Director of Emergencies, has been counted on. Pagers have also been enabled for the PMPHD and ORPD, along with the rest of the usual duty station of the hospital.
- Assessment of workplace aspects: Taking into account the type and time of exposure, as well as the clinical service to which the worker belonged, the decision could include continuing with their work, or being removed from the usual job position cautiously. Also, the recommendations from the ORPD, that could include sick inability, or adaptation of the job, among others, were favored.

Biological exposure protocol: The ORPD indications were followed, as in the previous items.

According to the second seroprevalence survey of IgG-type immunoglobulins in our Region (17), the prevalence proportion in active healthcare professionals was 3.2% (95% confidence interval: 0.08 - 16.7), while in the overall population was 1.6% (95% confidence interval: 0.9 - 2.21).

Discussion

This is a retrospective, descriptive study of consecutive cases that studies our surgical activity during pandemic, both in quantity and quality aspects related to patient safety, in terms of decisions made in organizational issues. For that, the standards established by Bali-brea, *et al.* [7] have been revised. Activity carried out was measured during the month of greatest stress in the hospital organization (April '20), and was described to compare with a control month, prior to the pandemic (February '20).

First of all, seroprevalence rates among health workers were low compared to the general population. But it was one of the lowest rates in the country, in the period from April 27, 20 to May 17, 20 [17]. These circumstances allowed us to unfold COVID-19 and NO-COVID-19 circuits, as well as to establish checkpoints with teleworking. In this way, we tried to guarantee health care safety, by means of having teams of reserve people, for a possible case of professionals' intrahospital infection.

The hospital mortality rate of surgical services was similar comparing both months, but small differences between them were observed. However, this indicator has the biases of excluding both deaths from intensive care units (which do not allow assigning them to the main service, until after their transfer to the ward), and patients from MASU (who do not require admission). In our region, a moderate incidence rate for COVID-19 has been registered, where 2 out of 3 deaths were observed in the elderly population of residential establishments [4].

We have performed less surgical activity in all surgical services, as expected. This was a consequence of postponing the surgical activity that allowed a delay, from the declaration of the state of alarm [1]. However, the activity of the donation and transplantation program was maintained in similar terms to other months prior to the pandemic, which was a consequence of having the material means (operating rooms and differentiated critical units available) and teams of professionals for that program. Therefore, the decision to maintain this program seems a priori correct, based on the available data.

Surgical activity was decreased in an average of 3 out of 4 scheduled patients, and in more than one out of 5 urgent patients. Nonetheless, an increase in activity in the Obstetrics Section of the Gynecology department was registered, as expressed in Results. Also, the cesarean index was higher with respect to the control month, as well as the same month of the previous year. However, this increase could be related to the initial idea of greater fetal-maternal safety with cesarean procedure, which the bibliography seemed to support in cases of doubt about maternal or fetal well-being due to COVID-19 [14].

A better use of the available operating rooms has been observed by all services in the month studied, as expected. Operating theatres had lower availability: a) both by structure, since they decreased substantially in the number and average daily of surgical sessions, b) and by available staff of all categories, when checkpoints and teleworking were established. These decisions established in order to minimize the contacts of professionals with COVID-19 patients, and to guarantee the possibility of substituting professionals infected, in case of contagion, were effective, by showing that the prevalence rates in workers was low [17].

Talking about the postponed scheduled surgery, the most delayed patients were those belonging to the ambulatory major surgery unit (MASU block). This kind of patient usually presents benign and chronic, so delayable, pathology. At the time of writing this discussion, we are in the recovery phase of activity and practically normalized. Nowadays, our organization is more prepared to contain the pandemic, with social and hygienic measures, among others (partitions, companions, programming, rooms to wake-up, universal hygienic masks, protection of professionals with IPE, etc.).

Therefore, the decision to postpone this profile of surgical patients in the first place, given that they have benign and chronic pathologies, was justified. This allowed us to avoid both the possibility of nosocomial infections (due to the occupation of waiting rooms, now already adapted in number and limited accompaniment), and the circulation of a large number of patients and the greater traffic of professionals in this unit.

The scheduled operating rooms had fewer surgical patients suspended during the pandemic. This indicator of greater efficiency of the surgical block was good in general terms, despite the fact that the organizational complexity of the preoperative circuit was increased. We deduce that the surgical services adapted adequately to the new organizational models, achieving and even improving this safety indicator. The lower pressure from the surgical waiting list facilitated their administrative and organizational work. On the other hand,

the confinement of the population also played a prominent role in reducing suspensions due to the patient (resignations, disappearance of pathologies, etc.).

It has already been mentioned that the safety of the presurgical circuit was favored both by triple triage by anamnesis, and by analytical screening for antigen detection in PCR smears.

A relevant point in the opinion of the authors is to note that the postponement of the admissions of these patients with delayable pathology mentioned, propitiated and caused a substantial decrease in hospital occupancy (of almost one out of every three beds). This made it easier to enable split circuits, both in hospitalization and in critical care units. In addition, it facilitated the availability of resources for the maintenance of donation and transplantation activities.

When analyzing the surgical waiting list outputs [16], none of the operated patients were registered with priority 3 (allows delay), which speaks in favor of safety and diligence in the way of scheduling by the chiefs of all surgical services. Also, this implemented the safety in the exposure of surgical patients with delayable pathology, scheduled or not, avoiding an unnecessary risk for them.

The use and fulfillment of the checklists is another relevant indicator of surgical safety. This was optimized during the pandemic compared to the control month. On the other hand, the registration of incidents in these surgical checklists, although anecdotal, increased their profile. These included questions related to the absence of a test result (presence of antigen in nasopharyngeal smear) prior to surgery. In this sense, another subgroup of surgical patients called pre-PCR had to be stratified (who usually presented an urgent nature), which forced the establishment of circuits and resuscitation rooms pending the result of the test in smears.

The other type of incidents recorded in these checklists was related to the need for verbal informed consents. The confinement of the population caused the impossibility of some patients to be accompanied in many cases during their process. This made it necessary to leave a written record of this situation in the medical record (by means of a verbal consent by telephone or videoconference).

Regarding the rest of the qualitative criteria that are reflected in the reference document [7], it was not possible to establish comparisons between both periods, since in most cases they are issues that are recommended to be established, and that were not implemented prior to the pandemic. These have already been commented on in the Results section. But, we do want to underline that in all the recommended criteria, efforts have been made by the organization, since the date of publication to deploy and expand them in dates after the pandemic. They have been documented, implemented and systematized throughout the initial moments of the pandemic, and later updated according to the state of science.

In summary, the measures adopted have allowed us to provide safe surgical care. It should be noted that the incidence of the pandemic in our Region was one of the lowest in the country [6], which implied that, with a little bit of time and a careful preparation, the application of these recommended measures was effective.

Conclusion

With all the caution required by the aforementioned limitations, it can be seen that, with a low incidence rate, together with our consolidated health structure, both in material and human resources, as well as the early establishment and, as far as possible, of all the recommendations referred as standards, and the maturity of the people who managed and provided their services at that time, allowed to guarantee care in conditions of safety during the pandemic. Two subgroups of patients stand out in whom their care was maintained during the pandemic: obstetric patients and patients to be transplanted.

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Conflict of Interests

The authors declare that they have no conflict of interest.

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