








Biosafety in intraoperative care for suspected or confirmed COVID-19 patients: experience report

Biossegurança para a assistência transoperatória a pacientes suspeitos ou confirmados da COVID-19: relato de experiência

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ABSTRACT

Objective: to report the experience of planning and implementing biosafety measures for intraoperative care for suspected or confirmed COVID-19 patients. **Method:** experience report developed in the operating room of a teaching hospital, between March and May 2020. The report consisted of four stages - Formation of the working group for planning the Standard Operating Procedure (SOP); Preparation of the SOP; Implementation and Evaluation of the SOP. **Results:** the measures implemented were the partial suspension of elective surgeries, relocation of professionals in the risk group, acquisition of personal protective equipment; strengthening of the communication system between teams; control of people and the surgical environment; care with surfaces, equipment and health products used in surgery and team training. **Conclusion:** the implementation of the SOP, although challenging, was essential for the continuity of safer surgical care in the pandemic context for patients, health workers and the institution.

Descriptors: Surgicenters; Nursing; Coronavirus Infections; Pandemics.

RESUMO

Objetivo: relatar a experiência do planejamento e implementação de medidas de biossegurança para a assistência transoperatória a pacientes suspeitos ou confirmados da COVID-19. **Método:** relato de experiência desenvolvido no centro cirúrgico de um hospital de ensino, entre março e maio de 2020. Foi composto por quatro etapas - Formação do grupo de trabalho para planejamento do Procedimento Operacional Padrão (POP); Elaboração do POP; Implementação do POP e Avaliação. **Resultados:** as medidas implementadas foram a suspensão parcial de cirurgias eletivas, realocação de profissionais do grupo de risco, aquisição de equipamento de proteção individual; fortalecimento do sistema de comunicação entre equipes; controle de pessoas e do ambiente cirúrgico; cuidados com superfícies, equipamentos e produtos para saúde utilizados na cirurgia e capacitação da equipe. **Conclusão:** a implementação do POP, embora desafiadora, foi essencial para a continuidade da assistência cirúrgica mais segura no contexto pandêmico para os pacientes, trabalhadores de saúde e instituição.

Descritores: Centros Cirúrgicos; Enfermagem; Infecções por Coronavirus; Pandemias.

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INTRODUCTION

Coronaviruses belong to a large family of viruses, most of which cause respiratory diseases in humans and trigger symptoms ranging from common colds to more rare and serious diseases⁽¹⁾, such as Severe Acute Respiratory Syndrome (SRAG), shock and multi-organ dysfunction⁽²⁾.

In late 2019, human cases of an unknown pneumonia were reported in the city of Wuhan, China, and attributed to a novel coronavirus, (SARS-CoV-2), which causes COVID-19⁽¹⁾. The occurrence of this respiratory disease, on March 11, 2020, was characterized by the World Health Organization (WHO) as a pandemic⁽²⁻³⁾. Due to the large-scale involvement of the population and the limited knowledge about this agent and the management of cases, great challenges were imposed, especially for health services.

It is known that transmission of the SARS-CoV-2 virus occurs through respiratory droplets produced when an infected person coughs or sneezes, but also through contact, through which self-inoculation of the virus can occur. However, although the mechanism is not yet clearly established, aerosol transmission is strongly suggested, especially in the performance of procedures that generate aerosols⁽³⁾. Once contaminated, the infected person can transmit the virus between the second and the fourteenth day, and the specifics of the case and conduct must be evaluated considering risk and safe practices⁽²⁾.

In the pandemic context, indirect transmission must be considered, as the virus is known to survive on different types of surfaces. Its viability can be influenced by the type of surface, ambient temperature and relative humidity of the air⁽⁴⁻⁵⁾.

COVID-19 stands out for its rapid dissemination, difficult containment, severity⁽²⁾ and its transmission within health services, such as clinics and hospitals, which has been occurring all over the world⁽³⁾. Thus, the disease influenced several aspects of the routine and dynamics of these services.

The surgical center (SC) is a hospital unit where anesthetic-surgical, diagnostic and therapeutic procedures are performed, both on an elective and urgent and emergency basis⁽⁶⁾. Surgical practices were directly affected as a result of the COVID-19 pandemic, with the need for suspension of elective procedures and prioritization of urgent and emergency procedures to reserve beds for patients with respiratory infections, especially in Intensive Care Units (ICU)⁽⁷⁾.

Notably, the management of surgical center environments involves huge challenges and limitations due to the work process itself, which is marked by unpredictability and the constant need for (re)planning and (re)organizing actions, in addition to the constant search for safety in the transoperative period⁽⁶⁾.

In this context, planning for safer maintenance and resumption of surgical procedures, both for patients and for

the professional team, became a challenge and was based on new protocols, specific checklists and practices for prevention and control of SARS-CoV-2 transmission⁽⁷⁾.

Thus, the need to care for patients with a confirmed or suspected diagnosis of COVID-19 in a surgical unit led to the need to develop a standard operating procedure (SOP). The SOP is a management tool based on scientific evidence that supports the reasoning and decision-making of health professionals. It consists of the systematization and detailed description of the processes of a unit that allows the standardization of the techniques of a given procedure and provides greater safety for patients and employees involved in the process⁽⁸⁾.

Thus, the aim of the study was to report the experience of planning and implementing biosafety measures in intraoperative care for suspected or confirmed COVID-19 patients.

METHOD

This is an experience report on the planning and implementation of an SOP aiming at biosafety measures in the intraoperative care of suspected or confirmed COVID-19 patients, in an SC of a large teaching hospital in the city of Goiânia, Goiás, Brazil, from March to May 2020.

This hospital institution is highly complex and has 116 surgical beds, 11 operating rooms (OR) and 255 general beds, distributed in four inpatient units, three intensive care units, emergency room, outpatient clinics, hemodialysis, hemodynamics, SC and Sterile Processing Department. The surgical procedures performed in the various specialties of the center are gynecology, otorhinolaryngology, general surgery, thoracic surgery, orthopedics, plastic surgery, urology, proctology, cardiac surgery, pediatric surgery and vascular surgery.

After the COVID-19 pandemic was declared, adjustments were made to services, such as the suspension of elective surgeries in some specialties. Faced with the urgency of standardizing conducts to face the pandemic, the team was mobilized for the management of surgical patient care through the elaboration of an "SOP for Assistance of Patients with Suspected or Confirmed COVID-19 in SC".

This process consisted of four stages: 1. Formation of the workgroup to discuss and elaborate the Standard Operating Procedure (SOP) with the participation of clinical nurses and the anesthesiology technician in charge under the coordination of the unit manager; 2. Preparation of the institutional document - SOP; 3. SOP implementation; and, 4. Evaluation.

For stage 2, a literature review was initially carried out, based on institutional guidelines and standards, to incorporate the best evidence for the local reality, followed

by the establishment of pertinent norms and routines in all stages of the transoperative period. In this continuum, the document was evaluated and approved by the *Serviço de Controle de Infecções Relacionadas à Assistência à Saúde* (Health Care Related Infection Control Service) (SCIRAS) and approved by the *Divisão de Apoio Diagnóstico e Terapêutico* (Diagnostic and Therapeutic Support Division), to which the SC is subordinate and later published on the institution's website.

It was established that the SOP would be implemented in all work processes involving suspected or confirmed cases of COVID-19 and in procedures in the oral and maxillary, otorhinolaryngology and thoracic specialties, which are associated with the nasopharynx, trachea and lungs, all of which are high risk for aerosol formation⁽⁹⁾.

After approval of the SOP, a group of nurses was created for its implementation in stage 3. The SOP was promoted intensively for 14 days through face-to-face educational activities from April 27 to May 7, 2020, with the teams during all shifts to reach the greatest number of participants. Fifteen meetings were held with 58 employees, the nursing and anesthesiology teams and workers from the sanitation and cleaning service.

Notably, SCIRAS carried out epidemiological team training throughout the hospital, which included biosafety measures in the areas of nursing, sanitation and cleaning service, laundry, hospital porters, among others, with a focus on donning and doffing.

The face-to-face meetings observed the maximum capacity of six to eight people per period and all the foreseen safety measures, including the two-meter distance and use of face masks⁽¹⁰⁻¹¹⁾. On these occasions, some adjustments were made to the SOP, as per discussions and suggestions from the teams involved. The assessment, step 4, was carried out informally, considering the feedback from the health team in incorporating the recommendations.

THE EXPERIENCE

Organizational adaptations in the surgical center

Considering the recommendations of technical standard No. 06 of 2020 of the National Health Surveillance Agency (ANVISA)⁽⁷⁾, among the elective procedures commonly performed in this SC, only oncological and cardiac surgeries, sequential surgeries in orthopedics, urgencies and emergencies were maintained. All other procedures were reprogrammed to allocate resources and space for the care of COVID-19 patients.

Based on the care dynamics of the SC, exclusive operating rooms (OR) were selected to perform surgical procedures on

patients with suspected or confirmed cases of COVID-19, according to the recommendation of ANVISA⁽⁷⁾, and other rooms were selected for unavoidable procedures, according to the exceptions of the ordinance of the municipality of Goiânia No. 1061 of 2020⁽¹²⁾.

Of the 11 ORs in the SC, only three remained in operation - one for urgent and emergency care and two for elective procedures. The distribution of these rooms took into account the reduced transit of people in the SC and the protection of patients presumably without COVID-19^(9,13-14). Since implementation of the SOP and until 06/14/2021, 14 surgical procedures were performed on suspected patients and 71 on patients affected by COVID-19 among the various surgical specialties.

Furthermore, as part of the organizational adaptations, health professionals in the COVID-19 risk group (aged 60 years or over, diabetics and hypertensives) were relocated to non-care areas to ensure their safety. This should be a concern of health services, because, in addition to the individual risk, workers may consequently become ill, leading to reduced human resources and the possible inability to meet the demand generated by the pandemic^(7,14). In the same period, ten professionals from the unit tested positive for SARS-CoV-2, according to the SCs monitoring and follow-up spreadsheet. However, an occupational causal link could not be established to the SC, as some worked in other institutions and the local epidemiology was already characterized as a community-transmitted disease.

Another factor related to occupational risk is the proper use of personal protective equipment (PPE), which must be made available by health services⁽³⁾. Thus, the hospital invested heavily in the acquisition of all necessary PPE (surgical mask, cap, waterproof apron, coats, protective glasses, face shield and mask type N95 or PFF2)⁽¹³⁻¹⁴⁾.

In order to optimize the organization of the SC, information such as the signaling of suspected or confirmed COVID-19 cases and the planning of patient care logistics, including the exact amount of supplies, equipment and instruments to be used, is now required. This information was included in the surgical notice, which is an instrument for communicating the procedure to the SC.

Intraoperative adaptations

Prior to the transport and arrival of patients with suspected or confirmed cases of COVID-19 to the SC, it was established that the organization of the OR and the availability of all necessary supplies, equipment and staff clothing to perform surgeries would be checked by the nurse and the surgical team using a checklist. In addition, the defined team should be properly dressed to receive the patients. A nursing professional was included in the routine to receive and accompany patients and prepare medical records, charts and tests duly wrapped in

a plastic bag. At this time, guidelines on the use of surgical masks were reinforced both for health workers (hospital porters and nurses) and patients⁽⁹⁾.

Because access to the airways is critical due to the great viral spread, the number of people in the OR should be restricted. Therefore, it was established that the surgical team would enter the OR after the patient's endotracheal intubation and exit before extubation⁽⁷⁾. In addition, during intubation/extubation and surgery, OR doors should be kept strictly closed^(9,13) and marked with the precautions to be adopted in the context of COVID-19 (contact and aerosols) and PPE guidelines (donning and doffing). Moreover, the prohibition of the use of adornments and entry of personal objects was emphasized, as they can be potential means of spreading the virus⁽¹³⁾.

The number of people in the OR was limited to the minimum number of team members required for the procedure. It was also recommended that surgeries be performed by the most experienced surgeon to reduce the operating time and, consequently, the exposure of all staff, with the exchange of team members during the surgeries restricted to emergency cases⁽⁷⁾.

Routinely, a nursing technician was provided to the external area of the OR and maintain compliance with the prescribed precautions, minimize the risk of contamination and exposure of the employees involved, as well as provide essential and unforeseen materials, equipment and supplies for the surgery^(9,13).

Considering that the physical structure of the SC is old and does not include a negative pressure system, as recommended by ANVISA⁽⁷⁾, it was established that the air conditioning of the OR would be kept off during potentially aerosol-generating procedures⁽¹⁵⁾, thus reducing the risk of exposure of medical and nursing staff.

A high-efficiency particulate air (HEPA) filter was used to protect the ventilation circuit of anesthesia machines. In situations that required changing the anesthesia machine of the intubated patient for disconnection until a new connection, the team should occlude the endotracheal tube with a surgical clamp, thus preventing the dispersion of aerosols in the OR⁽¹³⁻¹⁴⁾.

The transoperative period also included filling out all forms outside the OR, positioning the tip of the aspirator close to the scalpel electrode (to prevent smoke dispersion) and the use of a waterproof disposable apron for greater protection of professionals. During laparoscopic surgeries, the insufflation pressure of carbon dioxide (CO₂) should be kept at the minimum standard^(7,9,13).

Radiology and blood bank professionals, who occasionally provide complementary services in the SC, were instructed to follow the same routine procedures already described in the SOP, including the use of PPE and other precautions.

Adaptations of the operating room decontamination process

After surgery, according to the recommendations⁽⁹⁾, the leftover surgical instruments and other reusable health products were sent to the sterile processing department in rigid containers, packed in milky-white bags and identified as COVID-19. Leftover medicines and supplies with wrapping or blister that could not be cleaned or sterilized should be discarded. Despite the rationality of these items on the market, considering the new pandemic scenario, these precautions were necessary since the external surface of these products could be contaminated and create a reservoir of the virus, which favors transmission.

After removing the entire ventilator circuit, filters and soda lime, the anesthesia machine, equipment, furniture and surfaces were disinfected with quaternary ammonia⁽⁹⁾. Sequentially, the previously trained tactical team of the sanitation and cleaning service should terminally clean the OR using the same product, standardized by the institution.

Although little is known about the subject, a study showed that SARS-CoV-2 aerosol particles can remain viable in the environment for up to three hours⁽⁵⁾. Thus, this interval was established for the next surgery, preceded by preparatory cleaning of the OR.

CONCLUSION

The development and implementation of this SOP for the care of surgical patients, facing an emergency public health situation was a great challenge, especially due to the short period and the gaps in knowledge about SARS-CoV-2 at the time.

The team was initially apprehensive, anxious and often frightened during the procedures, considering the exposure to such a new and serious situation. However, throughout the SOP implementation process, the team gradually gained security and autonomy.

Some professional nursing technicians, surgical team physicians and anesthesiology staff seemed reluctant to adhere to some steps of the SOP, such as applying the checklist before starting the procedure and restricting the number of people in the OR, which required the timely intervention of nurses from the SC to ensure the safety of everyone involved in the process.

The elaboration, dissemination and implementation of this SOP are considered essential for the adequacy of the health service. The construction of this new work process highlighted the importance of the nurses in leadership, in the permanent education of the teams, in the standardization and monitoring of work processes and in coping with any adversity, especially in an SC in the pursuit of biosafety measures for patients and health workers.

The teams' commitment, proactivity and collaboration were crucial for the effective implementation of the SOP and responses to its requirements. Consequently, it is possible to continue the surgical assistance of patients more safely, as well as promote adequate working conditions for all those involved in the care of these patients in this health institution.

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