



Emergency Gynecological Care during the Spread of Coronavirus Infection

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The article examines the features of providing emergency gynecological care during the spread of coronavirus infection. The author comes to the conclusion that the majority of urgent gynecological cases are complex, and a significant part of them requires urgent surgical care. Also, an important role in this process is played by the organization of environmental safety and disinfection, competent management of medical waste. All of the above will optimize the process of diagnosis and treatment of emergency gynecological patients and reduce the risk of exposure to infectious pathogens on medical personnel as part of the application of planned measures for the prevention and control of COVID-19.

Keywords: Coronavirus infection; gynecology; emergency care; prevention; antiviral protection.

1. INTRODUCTION

After an outbreak of infection in December 2019 in Wuhan, its pathogen quickly spread to 192 countries, resulting in more than 100 million known cases of infection and more than 2.2 million deaths to date. The World Health Organization (WHO) has assigned an official name to this epidemic disease: coronavirus infection 2019 (COVID-19). On February 11, 2020, the International Committee on the Taxonomy of Viruses renamed the causative agent COVID-19 to severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) [1].

Despite the fierce fight against the spread of coronavirus infection by doctors around the world, regular prevention and control of COVID-19 will be relevant in the near future to contain the spread of this infectious disease.

New sporadic cases are still being registered in many countries, often the disease is wave-like, and for this reason medical personnel are still at high risk of contracting COVID-19, especially for medical personnel working in emergency departments (including emergency gynecology clinics).

In response to the continuing risk, national health authorities in various countries approve standards as part of the diagnostic and treatment process in medical institutions for regular prevention and control of the epidemic. Medical institutions must comply with these protocols, standardizing the process of diagnosis and treatment with strict compliance with prevention and control measures. These recommendations are aimed at optimizing both the treatment of patients and the safety of medical personnel. [1]

Abdominal pain and vaginal bleeding are the main complaints of gynecological patients. Most of these urgent cases are complex and can include a variety of diseases. In the context of the ongoing COVID-19 epidemic, medical personnel are at greater risk of infection and face greater difficulties in clinical practice than in the past. In this regard, a number of questions arise concerning the provision of emergency gynecological care. Therefore, in order to improve the diagnosis and treatment of emergency gynecological conditions during the COVID-19 pandemic, it is necessary to carefully summarize the experience of using prevention

and control measures in modern conditions, discussing the characteristics of emergency gynecological diseases and the risk of exposure to appropriate medical personnel during clinical work. In addition, it is necessary to study the recommendations for standardization of preliminary examination, hospitalization, gynecological surgery strategy, environmental planning and disinfection management, as well as other medical procedures for patients of emergency gynecological care [2].

2. MATERIALS AND METHODS

The paper examined the literature sources within the framework of the research topic, as well as used comparative and analytical methods.

3. RESULTS

For patients seeking emergency medical care, the command-and-control center 120 should determine potential risks using an early warning scale.

Emergency room doctors should quickly determine whether patients have a fever, whether there is a history of travel to areas with a high risk of morbidity, a history of contacts with COVID-19 patients, etc. This is necessary to identify the possibility of infection of the patient [3].

When receiving patients with medium and high risk of infection, medical personnel should apply enhanced (secondary) protection and transport patients in an ambulance with negative pressure. During transportation, it is necessary to inform the clinic in advance about this in order to ensure safety measures for doctors who will receive the patient. [4] The requirements for primary and secondary protection of medical personnel are presented in Table 1.

The procedure for transporting patients with suspected COVID-19 should be strictly observed. During transportation, medical personnel must strictly observe three-level protective measures; hospitals with negative pressure isolation stretchers should use them during transportation to avoid the spread of SARS-CoV-2. For patients who need urgent surgical care, a special transport channel should be created to enter the operating room of emergency isolation. Specially designated personnel should ensure unhindered

passage to avoid having to stop on the route, which reduces the risk of exposure to other hospital personnel.

Before receiving a patient, if the results of imaging and a test for nucleic acid or SARS-CoV-2 antibodies cannot be obtained to determine the patient's status with respect to COVID-19, a thorough assessment of the patient's medical history and a preliminary analysis of the clinical manifestations of the disease should be carried out [5].

The triage station must first assess whether the patient's vital functions are stable. For patients in critical condition, emergency treatment should be carried out under secondary protection. For non-critical patients with stable vital signs, the triage station should assess whether the patient belongs to the medium or high-risk group. It should be carefully monitored to determine whether a patient has traveled from a high-risk region of COVID-19 in the last 14 days.

It is also necessary to examine the patient for a history of close contact with a confirmed or suspected case of COVID-19 or the demonstration of symptoms of respiratory infection, such as fever (armpit temperature $\geq 37.3^{\circ}\text{C}$), cough, etc. [6].

The study for nucleic acid and SARS-CoV-2 antibodies should be carried out in a timely manner. In the absence of fever, respiratory symptoms, or an epidemiological history of potential contact with COVID-19, medical personnel can quickly accept patients for examination and treatment under the protection of the first level. Emergency gynecological care can include a wide range of diseases and is often accompanied by other complications. Most gynecological patients experience abdominal

pain and vaginal bleeding. Fever is often found in infectious diseases of the pelvic organs, which creates difficulties for medical personnel when distinguishing an surgical abdomen from COVID-19. Gynecological emergencies include ectopic pregnancy, rupture of the corpus luteum, rupture of an ovarian tumor, abnormal uterine bleeding, intra-abdominal hemorrhage that causes hemorrhagic shock, malignant tumors of the pelvic cavity with a concomitant large volume of pleural effusion or ascites, vulvovaginal injuries, etc. All these diseases can be accompanied by abdominal pain or fever. Since patients with COVID-19 may also have abdominal pain or fever, the attending physician should conduct a thorough differential diagnosis.

Patients with gynecological operations or a history of cancer have a reduced immune function and are at increased risk of lung infection. The use of a ventilator leads to a longer postoperative restoration of lung function.

Currently, minimally invasive surgical approaches, such as laparoscopy and hysteroscopy, are widely used. During laparoscopic surgery, pneumoperitoneum can lead to a decrease in lung volume, an increase in airway pressure, a delay in the circulation of CO_2 and a decrease in the elasticity of the lungs, which does not contribute to the timely postoperative restoration of their function [7].

In patients of emergency gynecology, multiple complications are also often observed. Emergency surgery requires the joint participation of several departments – gynecology, anesthesiology, infectious diseases department, surgical department and other departments when making decisions and creating a multidisciplinary group of medical specialists.

Table 1. Requirements of primary and secondary protection of medical personnel

Primary protection	Strict compliance with the principle of standard prevention; rules of disinfection and isolation. It is necessary to wear overalls, hats and surgical masks. If necessary, you need to wear gloves (latex, nitrile). It is necessary to strictly observe hand hygiene, pay attention to the protection of the respiratory tract and mucous membrane.
Secondary protection	Strict compliance with the principle of standard prevention; rules of disinfection and isolation. It is necessary to wear medical protective masks, work clothes, insulation clothing, shoe covers, gloves (latex, nitrile) and work caps. It is necessary to properly put on and take off protective equipment and pay attention to the respiratory tract, oral cavity, nasal mucosa, as well as hygiene and eye protection.

Medical care should be carried out in accordance with the requirements of modern protocols developed as part of the protection of medical personnel from coronavirus infection. Gynecologists are advised to take appropriate levels of protection in accordance with the patient's risk of developing COVID-19; the various emergency care sites that the patient visits should be taken into account. When receiving patients from a low-risk group at the stage of preliminary examination and sorting, doctors should apply primary protection.

When providing care to patients who have not excluded COVID-19, doctors and other medical personnel are recommended secondary or tertiary protection during gynecological examinations or invasive procedures, such as retrovaginal arch puncture or abdominal puncture. Hand hygiene should include washing your hands with running water before and after wearing gloves or removing insulating clothing. At the reception and consultation, the patient's temperature should be re-evaluated. It is necessary to collect the patient's medical history to check for symptoms associated with COVID-19; in particular, it is necessary to investigate the presence of a history of headache, odor changes, diarrhea, cough and sputum. The patient's medical history should also be collected for contacts with known / suspected cases of COVID-19 or recent trips to high-risk regions. Patients should also be asked in detail about their sexual history, family and childhood history, menstrual history, gynecological complications and other relevant medical history.

Fever accompanied by respiratory symptoms is a typical manifestation of patients with COVID-19, but in some patients with COVID-19, nausea, diarrhea, abdominal pain and other symptoms are the first sign of infection and there may be no typical respiratory manifestations. This is what can lead to doctors making an incorrect diagnosis and allowing the spread of infection in a medical institution.

In the current conditions of regular prevention and control of the COVID-19 epidemic, optimization of the workflow of the clinical laboratory is of great importance. When collecting, testing and transporting samples from patients of the emergency clinic, it should be remembered that this process for patients with suspected COVID-19 should be performed by professionally trained medical personnel.

The results of SARS-CoV-2 nucleic acid testing for patients in emergency care should be ready within 4-6 hours. Patients with a positive test result for nucleic acid should be immediately reported to the authorities controlling the spread of the disease in the country.

In addition to tests for nucleic acid and SARS-CoV-2 antibodies, lung CT, standard blood tests, blood clotting functions, liver and kidney functions, electrolytes, HCG tests, pre-transfusion tests, blood group tests and gynecological B-ultrasound tests are performed. It is often required for gynecological patients. Gynecological ultrasound is useful when examining a patient for possible intraperitoneal bleeding, formation in the pelvis and ectopic pregnancy. It is recommended that ultrasound and CT rooms are located in the emergency department, where possible. A special examination channel should be created in the department, separate from the usual channel for staff and patients, while it is desirable to provide routes for the movement of patients and staff in a one-way direction.

It is necessary to thoroughly disinfect the ultrasonic sensor and the CT control table. Equipment, surfaces, floors and air should be disinfected, and protective equipment should be placed in a specially designated place.

4. DISCUSSION

Strategies for emergency gynecological surgery should also be considered.

Initially, preoperative reports should be made to the doctor on duty, the medical department, the infection control department of the hospital and other management departments. Appropriate surgical methods should be selected, and the strategy of the operation should be discussed with the appropriate personnel in the operating room and anesthesiological departments, so that the surgical position of the patient and the method of anesthesia are determined. It is also necessary to discuss with colleagues possible intraoperative or postoperative complications and draw up a detailed treatment plan, including the following departments, depending on the situation: gynecology, anesthesiology, operating room, infection, internal diseases, surgery [8].

It is necessary to minimize the number of personnel involved in surgery. If a surgical disease is detected during the operation,

additional surgical staff may be invited to participate in the procedure. It is also necessary to contact the blood transfusion department to ensure adequate blood supply if necessary. Doctors and nurses involved in the operation must be trained in protection and be familiar with the three-level operational protection measures.

In hospitals without operating rooms with negative pressure, the operation can be organized independently in an operating room with positive pressure with air purification equipment; in an emergency, you can use a regular operating room, but the operating room should be located as far away from other areas as possible. When working in an operating room with positive pressure, it is necessary to turn off the air conditioning system or increase the ventilation of the operating room. When performing an operation in a room with negative pressure, it is necessary to turn on the air and negative pressure cleaning system 30 minutes before the operation.

When performing a laparoscopic operation, it is necessary to prepare a closed air intake device in advance and reliably protect the spread of the aerosol. It is necessary to prepare all surgical instruments and equipment in advance, including sutures, hemostatic materials, etc. It is necessary to avoid additional deliveries of missing equipment to reduce the risk of infection. It is also necessary to check the availability of uninterrupted communication between the operating room and the personnel located in the external perimeter, and make sure that the communication lines are ready for emergency use.

Operational approaches can be different, and they should be chosen on a case-by-case basis. Most emergency gynecological operations are pelvic or perineal surgery, including open surgery (to avoid adverse consequences for lung function), laparoscopic surgery (after evaluating lung function and the likely duration of the procedure), diagnostic curettage, spontaneous abortion and vulvovaginal trauma.

It is necessary to take into account the influence of personal protective equipment on the visual, auditory and tactile sensory ability of medical personnel. The surgeon should take into account the above factors and choose an open or laparoscopic operation according to the individual location or volume of the operation [9].

Such medical personnel should observe a number of precautions during the operation.

1) Medical personnel should use tertiary protection. Surgical patients who are not undergoing general anesthesia should wear surgical face masks.

2) During a comprehensive study, the working time should be minimized as much as possible. Medical personnel should act carefully and avoid contamination with the patient's blood and other biological fluids.

3) Attention should be paid to the potential risk of aerosol formation. Special care should be taken during tracheal intubation, sputum suction and other operations in which aerosols may form.

4) If possible, the use of surgical equipment, such as electrosurgical knives and ultrasound knives, should be avoided; where the use of these instruments is required, they should be used with minimal power. When using an electric knife, use a smoking device or a sealed suction device as often as possible to minimize the spread of aerosols.

5) A long working time should be avoided; the operation should solve the primary problem that has occurred.

6) In the absence of additional protective equipment in the pathology department, intraoperative examination of frozen sections should not be carried out; it is necessary to use safer alternative methods of examination. Further treatment after an emergency operation can be carried out after the results of pathology are reported through a standard pathology pipe.

7) All equipment, tools and medicines should be used only by one person. Devices for anesthesia that come into contact with the patient's respiratory tract, such as visual laryngoscope lenses, breathing masks, filters, etc., should be disposable.

8) During the entire operation, the staff is not allowed to leave the operating room. Persons wishing to enter must wear protective equipment before entering the operating room.

9) After the operation is completed, infection control and disinfection of the operating room should be carried out in accordance with the recommendations for the protection of the operating room.

10) Surgical samples should be packed in double-sealed bags for transportation.

11) At the end of the operation, protective equipment should be removed before leaving the isolated operating room. All medical waste generated during the operation should be packed

in a double-layer medical waste bag and disposed of as infectious medical waste.

12) After the operation, the operating room and equipment should be thoroughly disinfected. Continuous surgical intervention should be avoided.

Postoperative patients should be transported to the isolation unit via a dedicated transport channel. The results of tests for nucleic acid and SARS-CoV-2 antibodies should be reported in a timely manner. If the patient tests positive for COVID-19, the respiratory infections department should take over the patient's treatment after surgery, and gynecology will provide assistance as needed. After the patient's condition has stabilized, patients with confirmed COVID-19 should be transferred to a designated hospital for treatment. If infection with SARS-CoV-2 is excluded, the patient can be transferred to the general ward for further treatment [10].

It is necessary to monitor the patient's temperature after surgery. If the patient has a fever, it is necessary to find out its cause, including postoperative complications, such as infection and pulmonary embolism.

Patients with shortness of breath should be prescribed appropriate oxygen therapy, depending on the degree of oxygen saturation of the blood.

It is necessary to be attentive to the signs of multiple organ failure; actively prevent and treat complications such as heart, brain and kidney diseases, as well as promptly conduct supportive therapy for organs.

Measures should be taken to prevent pulmonary embolism. Pulmonary embolism can cause clinical manifestations similar to the symptoms of COVID-19: chest tightness, shortness of breath, decreased blood oxygen saturation. If necessary, you can use a CT scan of the lungs.

Medical waste from suspected or confirmed patients with COVID-19 should be treated as infectious waste. It is necessary to use double-layer yellow bags for medical waste for transportation. Sharp objects must be placed in a special plastic box and sealed. Disposal bags and boxes for sharp objects should be sprayed with a disinfectant with a chlorine content of 1000 mg / l. before collection and transfer by a trained cleaner [10].

The waste should be moved to the temporary storage point of medical waste along the specified route at the specified time. Only authorized personnel should have access to the medical waste storage area. Infectious waste must be collected and disposed of using a medical waste disposal vehicle within 48 hours; the date and amount of medical waste must be registered and signed at the time of removal.

Non-infectious waste generated by patients who are not infected with COVID-19 should be treated as general medical waste and stored and treated separately from infectious waste.

5. CONCLUSION

Therefore, in modern conditions, it is necessary to optimize the timely diagnosis and treatment of emergency gynecological patients and reduce the risk of infection of medical personnel working in the conditions of the COVID-19 epidemic. However, the constantly changing situation with the spread of coronavirus infection suggests the need to coordinate protective measures of medical personnel, taking into account the epidemiological situation and the need to ensure the protection of medical personnel when providing emergency gynecological care.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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