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# Postoperative Management During the Pandemic Coronavirus Disease 2019 (COVID-19) Era

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**ABSTRACT**

**COVID-19 is the current pandemic caused by SARS-COV-2 with high incidence and mortality. The disease is mainly transmitted by respiratory droplets. The clinical spectrum of this disease ranges from asymptomatic to fatal. Based on clinical and contact history, cases were defined as suspected, probable, and confirmed cases. This pandemic affects health services including obstetrics and gynecology postoperative services, such as management of the operating room and post-operative care room, monitoring of signs and symptoms, early detection of COVID-19, management of newborns from CS, and follow-up.**

**Keywords:** COVID-19, mortality, early detection, management.

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## I. Introduction

At the end of December 2019, an outbreak of pneumonia with an unknown cause began in Wuhan, Hubei Province, China. The causative agent was later found to be a coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Meanwhile, the disease was called COVID-19. This disease then spread globally, and in March 2020 was declared a pandemic by the World Health Organization (WHO) [1]. The structure of the virus is similar to the viruses that cause SARS and Middle East Respiratory Syndrome (MERS). Similar to SARS and MERS, this disease initially presents clinically as acute respiratory and lung infection [2].

The incidence and fatality of this disease are quite high. On October 21, 2020, the number of global cases reached 41,433,946 cases. However, this figure is still increasing. In Indonesia, the first case of COVID-19 was reported in early February 2020. Since then, until October 21, 2020, the number of cases in Indonesia reached 373,109 cases. The mortality of this disease until October 21, 2020, reached 1,135,103 people globally with a fatality rate of 4.0% while in Indonesia the number of deaths reached 12,857 people with a fatality rate of 3.45% [3].

The main transmission of this disease is via respiratory droplets and close contact. This disease has a wide and varied clinical spectrum, from asymptomatic to fatal. The main clinical symptoms are respiratory system symptoms and fever. Respiratory symptoms include cough, runny nose, and shortness of breath. However, other symptoms that are not related to the respiratory tract can also occur, such as diarrhea, rash, and other systemic symptoms [4].

The COVID-19 case definition in Indonesia was initially divided into asymptomatic person, person under surveillance, patient under observation, and confirmed case. However, in June 2020 it has been changed to suspect, probable, and confirmed case. The classification is based on the severity of symptoms and contact history. For therapeutic purposes, COVID-19 can be divided into mild, moderate, and severe symptoms. Severe symptoms are usually present in a patient with Acute Respiratory Disease Syndrome (ARDS) and cytokine storms. The severe symptoms are more common in elderly patients or patients with cardiorespiratory or metabolic comorbidities [5].

The high risk of COVID-19 transmission has changed the life habits of many people. Medical personnel who always interact with the public at health services are more at risk of being exposed to SARS-CoV-2. Every health service must conform to health protocols, including postoperative services, to reduce transmission of COVID-19 to health workers and patients. In addition, the mortality rate in patients who were newly diagnosed in the postoperative period is higher than in patients who were already known to be infected preoperatively. Therefore, a special strategy is needed to reduce the risk of transmission, morbidity, and mortality in patients and health workers who interact with patients in the postoperative setting.

## II. Literature Review

### A. Definition, Etiology, and Clinical Course

COVID-19 is an infectious disease caused by SARS-CoV-2. This disease spread globally in early 2020. SARS-CoV-2 is a large single-stranded RNA virus. This virus uses protein S (spike protein) to attach to its host cell via the Angiotensin-Converting Enzyme-2 (ACE-2) receptor. These receptors are found in various human organs, especially in the respiratory and digestive tract. This is why COVID-19's symptoms are mainly related to these two organ systems besides the systemic symptoms [6].

At the beginning of infection, the protein S bonds with the ACE-2 receptor mediated by the type 2 transmembrane serine protease (TMPRSS2) which is present in the host cell. The TMPRSS2 activates the receptor and breaks down the S protein. The bond mediates the virus' entry into the cell where new viruses will be produced [6]

Primarily, SARS-CoV-2 is transmitted directly via nasal or oral droplets. The risk of transmission is higher if a person is exposed for at least 15 minutes with less than 2 meters (6 feet) distance. The exposure time is shorter in symptomatic patients. Indirect transmission can occur via contact with contaminated objects. In inanimate objects, the virus can be detectable for up to 3-4 days but dies quicker in 48-72 hours. The virus lasts longer in impermeable inanimate objects. Other possible routes of transmission are fecal-oral and vertically from mother to child [7].

The incubation period varies from 2-14 days, with a median of 5–6 days. Presymptomatic viral shedding occurs 2–3 days before symptom onset. Upper respiratory tract viral load occurs around the same time as symptom onset [7].

### B. Clinical Symptoms

The clinical manifestations of COVID-19 vary from asymptomatic to critical. Statistically, about 81% of patients have mild symptoms, 14% have severe symptoms, and 5% have critical symptoms (such as multiple organ failure, septic shock, and respiratory failure) [2].

The most common symptoms are fever which occurs in more than 90% of patients, shortness of breath (53-80%), dry cough (60-86%), fatigue (38%), myalgia (15-44%), and nausea, vomiting, and diarrhea (15-39%). Impaired smell and taste perception are atypical symptoms that occur in 3% of patients [5].

Comorbidity in patients increases the hospitalization rate. About a quarter of patients present with comorbidities. However, the percentage is higher in patients who are hospitalized, typically around 60-90% [5].

### C. Diagnosis

Until now, the gold standard for diagnosis is RT-PCR SARS-CoV-2 RNA to detect the core material of the virus. Samples can be taken from nasal, pharyngeal, or sputum swabs. Samples from bronchoalveolar lavage have higher sensitivity. Samples taken on day 3 since the onset of symptoms have higher sensitivity. Overall, the sensitivity of PCR was around 33-88% [8].

Serology is often used as a screening tool even though its validity and accuracy vary. IgM and IgG are the two types of immunoglobulins detected in this serological examination. IgM is formed earlier. It is produced by plasma cells which are derived from B lymphocytes. These B lymphocytes are activated around 6-8 days after infection. On the other hand, IgG is formed about 2-3 days after the formation of IgM [8].

Other laboratory examinations that may help in COVID-19 diagnosis include inflammation marker tests, coagulation function tests, and liver function tests. Inflammation marker tests may show increased C-reactive protein (CRP), lymphopenia, and mild thrombocytopenia. Coagulation function tests may show thrombocytopenia, prolonged prothrombin time, and increased D-Dimer. Liver function tests may show increased values. In a radiologic examination, COVID-19 may show diffuse and peripheral ground-glass opacity (GGO) appearance [9].

### D. Management

The management of COVID-19 has two targets: supportive target (including respiratory support) and virus target (including host response). The first target is to maintain oxygen levels in the blood by providing oxygen supplementation. The second target can be attained by using antivirus (such as remsidivir), immunomodulators (such as tocilizumab), anti-inflammatory agents (such as dexamethasone), antibodies (such as plasma convalescence), anticoagulants, and fibrinolytic drugs. These medications have different efficacy and are used in different phases [6].

### E. Complication

Approximately 17-35% of treated patients were admitted to the Intensive Care Unit (ICU). The most frequent indication for ICU admission is respiratory failure. Other complications include renal failure (9%), hepatic dysfunction (9%), bleeding and coagulation disorders (10-25%), and septic shock (6%) [6].

## III. Postoperative Routine Management in Obstetrics and Gynecology

According to the recommendations of the Enhanced Recovery After Surgery (ERAS) Society, preoperative, intraoperative, and postoperative management should be integrated. Several therapies are given in all three phases. Postoperative management includes fluid management, analgesia, ileus prevention, urine drainage, and prevention of nausea and vomiting [10].

Fluid therapy is started in the preoperative phase. Undetected hypovolemia can lead to complications including acute renal failure, surgical infection, sepsis, delirium, and a

longer duration of hospitalization [10].

Analgesia modalities that can be given to postoperative patients include acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), bupivacaine, epidural analgesia, and abdominal blocks. Postoperative multimodal analgesia, administration of drugs with different modes of action to reduce opioid administration, is recommended. The goal of providing analgesia is to improve the patient's quality of life. Perioperative pain is associated with more complications, a longer length of stay, and increased treatment costs. This multimodal principle of pain management method is also recommended in post-cesarean section (CS) patients [10].

The prevalence of ileus is quite high in gynecological surgery. It is estimated that about 30% and 40% of ovarian cancer patients who underwent debulking require bowel resection. Prevention of ileus can be done by keeping the patient in a euvolemic state, reducing the dose of opioids, and giving early feeding. Post-CS, chewing gum within 12 hours with a duration of 15-60 minutes, 3-6 times a day is recommended for ileus prevention [10].

Urine drainage in gynecological surgery is recommended to be done with short duration catheter placement (<24 hours). Likewise, in CS, it is recommended to use a catheter for a short duration. This is because catheter use is associated with a longer length of treatment, a longer time required for the first voiding, slower mobilization (walking), and discomfort in patients [11].

Prevention of postoperative nausea and vomiting is carried out by loading fluids. Antiemetic administration is effective in reducing the incidence of postoperative nausea and vomiting. As with analgesia, multimodal intervention for nausea and vomiting is recommended [11].

## IV. Postoperative Management in Obstetrics and Gynecology in the COVID-19 Era

The type of postoperative therapy given during the COVID-19 pandemic was not different from before the COVID-19 era. Such postoperative therapy as mentioned above includes fluid management, analgesia (opioids), prevention of ileus, urinary drainage, and prevention of nausea and vomiting. However, the management strategies are different [10].

In wound care, during the administration of postoperative drugs, it is necessary to use appropriate Personal Protective Equipment (PPE) to reduce the risk of contact with the patient's body fluids. Health workers who come into contact with patients should be isolated for at least 14 days [1]. PPE is divided into three levels and is used according to the level of transmission risk. Level 1 is the routine PPE. Level 2 is used by workers related to or on duty in the COVID-19 room. Level 3 is used by health workers who perform medical procedures on COVID-19 patients [11].

Specific post-operative management changes during the COVID-19 pandemic consist of management of the operating room and post-operative care room, monitoring of signs and symptoms and early detection of COVID-19, management of newborns from CS, and follow-up.

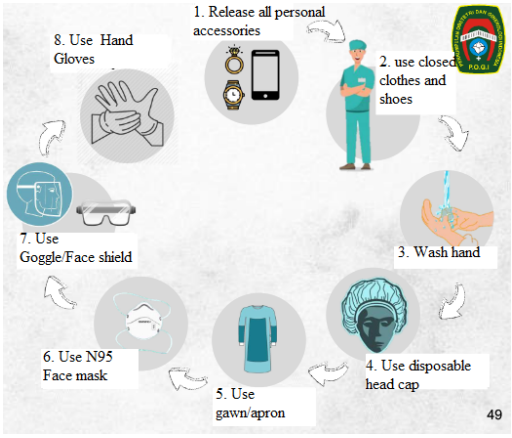


Fig. 1. PPE level 2 and how to use it.

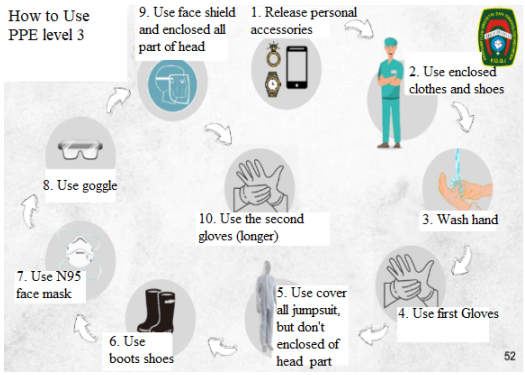


Fig. 2. PPE level 3 and how to use it.

Patients who are still under anesthesia should be treated in the operating room until the patient is fully conscious to avoid aerosol spread. The operating room should be sterilized according to standard procedures. Subsequent surgeries should be delayed to reduce infection or contamination. The delay time is set according to the local protocol [12].

Patients without COVID-19 can be treated in the usual postoperative care room, but temperature checks and respiratory symptoms monitoring should be carried out. Patients with fever or respiratory symptoms should be isolated and tested to rule out SARS-CoV-2. Suspected or confirmed patients should be isolated in their room with negative pressure ventilation, adequate oxygen supply, and nebulation if necessary [1]. Patients with suspicion of nosocomial COVID-19 need to undergo early examination either by PCR or imaging to speed up the diagnosis. This approach is to prevent the negative effects of COVID-19 [12].

Elderly and immunocompromised patients have a high risk of COVID-19. Therefore, strict protection must be applied to this group [13].

Postoperative and preoperative management cannot be separated. Preoperative SARS-CoV-2 examination has a significant effect on patients and health workers. The mortality rate of patients who have just been diagnosed with COVID-19 in the postoperative period is pretty high. A study reported three patients with a mean age of 70 years who were newly diagnosed with SARS-CoV-2 after surgery showed a mortality rate of 66.6% [6]. Another study reported that in thoracic surgery as many as 7 out of 13 patients became seriously ill and 5 of them died. In elective surgery, 44.1% of 34 patients required intensive care and 20.6% died. Overall, postoperative mortality in patients with COVID-19 who were undiagnosed before surgery was 26.5% [8]. Another study

found that the COVID-19 mortality rate for postoperatively diagnosed patients was higher than preoperatively diagnosed patients (20.4% vs 9, 1%). Pulmonary is the main complication associated with this mortality [9]. Because COVID-19 which was not diagnosed preoperatively might increase patient morbidity and mortality, it is important to perform the SARS-CoV-2 examination, especially in elective operations. Aside from providing proper preoperative, intraoperative, and postoperative patient management, this can also reduce postoperative complications in patients and reduce virus transmission from patient to patient and patient to medical personnel [8].

In CS surgery, besides maternal management, the management of newborns is also important. At the start of the pandemic, there were concerns about vertical transmission from mother to child. Some studies found negative SARS-CoV-2 results in the amniotic fluid, vaginal mucosa, placenta, umbilical cord, cord blood, and neonatal feces. Nasopharyngeal swab examination in newborns immediately after birth was also found to be negative. Outbreaks by viruses with similar genetic material (SARS and MERS) also did not show vertical transmission. However, a serial case found a positive swab result which was done on the second day after birth. There was another case that had a positive result 16 hours after birth. It is important to note that in these cases the PCR examination was not performed on blood specimens. In other case series, the IgM antibody was present in newborns, which increases the likelihood of vertical transmission because IgM cannot cross the placenta [14]. With these data, vertical transmission is still uncertain. Therefore, to reduce transmission through respiratory droplets, newborns from confirmed COVID-19 mothers should be treated separately from the mother for 14 days or until the limit of transmission risk has been passed. These newborns should be treated in isolation rooms and tested for COVID-19. Breast milk is still recommended to be given with the help of breast pumps [13].

Postoperative follow-up could be done with telemedicine to reduce contact. For some patients who require physical examinations, follow-up could be done face-to-face but should always adhere to health protocols [15].

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