

Facing the SARS-Cov-2 outbreak: What should Obstetrician and Gynecologist need to do?

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Abstract

Coronavirus Disease 2019 (COVID-19) is an emerging disease with a rapid increase in cases and deaths since its first identification in Wuhan, China, in December 2019. As of March 21, 2020, more than 193,327 confirmed cases of COVID-19 have been reported in 178 countries and states, and Italy is currently the country with the highest number of confirmed cases outside of China. The WHO declared a public health emergency of international concern (PHEIC) on January 30, 2020, and characterised the COVID-19 situation as a pandemic on March 11, 2020, in response to the human-to-human transmission and rapid growth of the outbreak. The popularity of COVID-19 has obviously entered a new stage and has spread rapidly in countries outside China. As the front-line clinical workers, Obstetricians and Gynaecologists should be vigilant to assess whether pregnant women or female patients are suspected or confirmed of infection, improve their knowledge of prevention and treatment of COVID-19, and take effective precautionary measures. Here, we reviewed the current understanding of COVID-19, combined with the particularity of the patients in gynecology and obstetrics, and share our experience of current clinical practice recommendations and precautions taken at frontline, and discuss how obstetricians and gynaecologists should prepare themselves to deal with the outbreak of this disease.

Biological Characteristics and Transmission

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has weak resistance. It can be inactivated by 56 for 30 minutes, 75% ethanol, chlorine containing disinfectant and peracetic acid¹. SARS-CoV-2 spike protein uses the SARS-coronavirus receptor, and binds angiotensin-converting enzyme 2 (ACE-2) for entry host cells. The SARS-CoV-2 belongs to the subgenus sarbecovirus, and has 96.2% homology with bat coronavirus. The current view is that COVID-19 was introduced into humans through an unidentified intermediary animal.

Human to human transmission occurs mainly through the spread of respiratory droplets up to 2 meters, and may cause infection through contact on the contaminated surface. The virus is also found in fecal samples of patients, indicating that there may be a fecal oral transmission pathway; however, this route requires further investigation². Epidemiological records in China suggest that up to 85% of human-to-human transmission has occurred in family clusters, with an absence of major nosocomial outbreaks³. Pre symptomatic infectiousness is a concern and many countries are now using 1–2 days of symptom onset as the start day for contact identification⁴.

Maternal-infant vertical transmission is questionable. A recent study showed no evidence of intrauterine infection of COVID-19 caused by vertical transmission from mothers who developed COVID-19 pneumonia in their third trimesters. The samples of amniotic fluid, cord blood, newborn throat swab and breast milk of 9 patients were analyzed, and 6 of them were negative for SARS-COV-2⁵. But previous studies have shown

the possibility of materno-fetal transmission of human coronavirus (HCoV) with evidence of the virus exists not only in maternal respiratory swabs, but also in vaginal swabs⁶.

Diagnosis

The main clinical manifestations are fever, fatigue, myalgia, dry cough, and shortness of breath. The diagnosis of COVID-19 is based on comprehensive contact and travel history and precise laboratory tests. Currently the primary epidemiologic risk factors for COVID-19 include travel from mainland China (especially Hubei Province) or close contact with infected individuals within 14 days of symptom onset. Current diagnostic tools were the nucleic acid or virus gene tests. In a recent report, sensitivity of chest CT in diagnosing COVID-19 was shown to be greater than that of RT-PCR (98% vs 71%)⁷. As the risk of radiation to the fetus is very small, chest CT scan is considered to be the most useful test to confirm or exclude pregnant women with viral pneumonia.

Treatment

Early identification and isolation are imperative for COVID-19 control. Those diagnosed with infection should be promptly admitted to a negative pressure isolation ward. For patients with severe acute respiratory distress syndrome, inhaled nitric oxide, high frequency oscillatory ventilation and extracorporeal membrane lung may be useful. In addition, the convalescent serum of SARS-CoV-2 recovered patients may be used for SARS-CoV-2 infection, because the mortality of SARS convalescent patients after treatment is significantly reduced⁸.

In China, antiviral therapy has been routinely used for the treatment of COVID-19 and is also recommended for pregnant patients. The combination of lopinavir/ ritonavir and Antiproteinase therapy is the first choice. and α -interferon is inhaled by atomization. In addition, Remdesivir and chloroquine are promising anti-COVID-19 drugs as they can inhibit SARS-CoV-2 virus in vitro⁹. Antibiotics should be used if there is evidence of secondary bacterial infection and corticosteroids are generally not recommended for the treatment of COVID-19, as it may delay the removal of virus.

Because COVID-19 might increase the risk for pregnancy complications, management should be in a medical institution with close maternal and infant monitoring. Data on COVID-19 and SARS in pregnancy are sparse. In the two reports describing 18 cases of pregnancy with COVID-19, all of them were infected in the third trimester, and clinical manifestations were similar to those of non-pregnant adults. In the case of SARS, the mortality rate of the largest 12 pregnancies was 25%. Complications included ARDS in four, DIC in three, renal failure in three, bacterial pneumonia in two and sepsis in two cases.

General Measures

As the largest class III grade of Obstetrics and Gynecology hospital in North China, Tianjin Central Obstetrics and Gynecology Hospital did not completely halt the services to outpatient and emergency patients during the 2019-nCoV outbreak. The following are the preliminary measures:

- Temporarily close the outpatient operation, and the gynecological outpatient department adopts the appointment registration system to reduce the patient flow.
- All selective operations in gynaecological ward were postponed, only for emergency operations. The obstetric clinic and ward were carried out normally.
- Doctors must wear personal protection equipment (PPE) , include masks, surgical caps, protective suits, gloves and goggles at work, and take off their PPE only after their work to a designated disposable area.
- Start free online and telephone consultation to meet the medical needs and reduce the flow of patients to the outpatient service.
- People entering the clinic buildings must wear masks, and get their body temperature monitored by professionals wearing PPE. Only one accompany person is allowed to enter the clinic. If anyone having fever

(body temperature [?]37.3), travel history to Wuhan or clear contact with residents in Wuhan in last two weeks, or contact with people having fever would be directly sent to the fever clinic for screening.

-Set up a special isolation team, which is composed of specialized doctors and nurses, and is responsible for caring for patients who meet the screening isolation standards. All medical staff must receive regular online training to keep abreast of the latest developments in COVID-19.

Precautions in Perinatal Period

The physiological changes of pulmonary function during pregnancy increase the susceptibility and severity of pneumonia¹⁰. Early studies have shown that prenatal pneumonia is associated with high perinatal mortality and therefore requires active treatment to prevent and correct maternal hypoxia, which include: oxygen inhalation to keep oxygen saturation above 95%; hydration support; timely considering delivery to improve maternal oxygenation; empirical antibiotics to prevent secondary bacterial infections. Administration of Betamethasone 12mg intramuscularly followed by another dose 24 hours later to promote fetal lung maturity when preterm delivery is anticipated.

At present, there is no study on the vaginal mucosa or secretion samples of pregnant women infected with COVID-19, but based on the previous study results on tubular virus (HCoV), we should try to avoid the exposure of newborns with all maternal body fluids. The specific measures include: Individualize the mode of delivery according to the specific conditions of the gestational age and delivery conditions; sucking the nasopharynx before the first breath of the baby; no delayed cord ligation and clean the mother's blood and amniotic fluid as soon as possible; infected or suspected mothers should avoid breastfeeding until recover completely or has been confirmed not to have COVID-19.

Management of Gynecological Cancer Patients

The novel coronavirus is more susceptible to infection in gynecological cancer patients due to the systemic immunosuppressive state caused by the malignancy itself, or surgery/radiotherapy and chemotherapy. Standardized management should be implemented for gynecological cancer patients to achieve scientific and accurate protection.

Patients who need surgery should be individualized according to their condition. In case of life-threatening conditions, such as rupture or bleeding of gynecological tumor, emergency operation and treatment should be carried out on the premise of adequate protection. The epidemic investigation should be further improved when the condition is stable. Patients with advanced tumor or rapid progress of disease should be treated as early as possible and those with precancerous lesions, such as cervical intraepithelial lesions, should be treated as soon as possible after the epidemic situation is stable.

For patients with severe myelosuppression, fever or the elderly and other high-risk groups receiving chemotherapy for malignant tumors, G-CSF and GM-CSF can be used prophylactically after chemotherapy to avoid leucopenia and improve immunity. Fever after operation or chemotherapy should be differentiated from novel coronavirus infection. CT examination should be performed again if necessary and with isolation of the infected patients as soon as possible.

Management of Emergency Department (ED)

Through free online consultation, the hospital can initially divide the patients. It is recommended that non-emergency patients delay their visits and highly suspected patients can go to the fever clinic through the green channel. Online consultation can effectively reduce the emergency workload and promote the early detection of potential cases.

We divided the ED into general and fever treatment area. Pre-examination and triage shall be carried out by designated healthcare workers. For suspected cases, the hospital assigned an independent fever clinic room, fever and high-risk maternity observation room, CT and ultrasound examination room. These can reduce cross infection by limiting the range of activity of patients and ED personnel.

In addition, priority should be given to the provision of PPE and medical devices for the ED, cancel or postpone the non-emergency appointments and operations, and medical staff should be dispatched from other departments to the ED. These measures focus the hospital's limited supply on the staff most in need of protection.

Based on the flexibility and effectiveness of the above management strategies, our hospital has kept a record of "zero infection" since the outbreak of COVID-19.

Conclusion

As the popularity of COVID-19 continues to spread globally, we need to plan and prepare well. Obstetricians and gynaecologists will be at the forefront of special patient management, so we need to know more about the virology, epidemiology and clinical data of COVID-19. Learn from the past experience of SARS, understand the current epidemiological factors of COVID-19, master the knowledge of infection prevention and control, and do well in the treatment of infected patients on the premise of self-protection. Using a multidisciplinary team management approach, sharing data, knowledge and expertise are very important.

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REFERENCES

- [1] Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, et al. First case of 2019 novel coronavirus in the United States. *N Engl J Med*. 2020;382(10): 929-936.
- [2] Wu F, Zhao S, Yu B, Chen YM, Wang W, Song AG, et al. A new coronavirus associated with human respiratory disease in China. *Nature*. 2020;579(7798):265-269.
- [3] WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). February, 2020.
- [4] Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *New Engl J Med* 2020;382(12):1177-1179.
- [5] Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *The Lancet*. 2020;395(10226): 809-815.
- [6] Gagneur A, Dirson E, Audebert S, Vallet S, Quillien M, Baron R, et al. Vertical transmission of human coronavirus. Prospective pilot study. *Pathol Biol (Paris)*. 2007;55(10):525-530.
- [7] Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, et al. Correlation of chest CT and RT-PCR testing in Coronavirus Disease 2019 (COVID-19) in China: a report of 1014 cases. *Radiology*. 2020; Feb 26:200642..
- [8] Mair-Jenkins J, Saavedra-Campos M, Baillie JK, Cleary P, Khaw FM, Lim WS, et al. The effectiveness of convalescent plasma and hyperimmune immunoglobulin for the treatment of severe acute respiratory infections of viral etiology: a systematic review and exploratory meta-analysis. *J Infect Dis*. 2015;211(1):80-90.

[9] Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, et al. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) in vitro. *Cell Res.* 2020;30(3):269-271.

[10] Weinberger S, Weiss S, Cohen W, Weiss J, Johnson T. Pregnancy and The Lung. *American Review of Respiratory Disease.* 1980;121(3):559-581.