

Medical Arrangement Strategies for Infertility Female Patients during COVID-19 Mini-Outbreak

Hong-Xing Li, M.Sc.^{1,2}, Yan Pang, M.Sc.³, Di Cao, M.M.¹, Xiao-Ling Ma, Ph.D.^{1,2*}

1. Reproductive Medical Center, The First Hospital of Lanzhou University, Lanzhou, China
2. Key Laboratory for Reproductive Medicine and Embryo of Gansu Province, Lanzhou, China
3. PET-CT Center of Gansu Provincial Hospital, Lanzhou, China

Abstract

Over the past two years, COVID-19 pandemic is an unprecedented health emergency. All countries have taken their own measures to mitigate the spread of the virus in the first and subsequent mini-outbreaks of infection. In view of the current situation of small outbreaks of COVID-19, guidelines on epidemic prevention should be developed specifically for reproductive medical centers. It is necessary to establish a dynamic patient assessment and management system to identify patients who need priority fertility treatment during epidemic control. Female Patients were assigned as grade A and required hospitalization in the inpatient ward after egg retrieval. Patients who underwent controlled ovarian stimulation were classified as grade B, and they can choose to be hospitalized at home according to their own convenience. Patients undergoing frozen embryo transfer (FET) cycle or planned downregulation with gonadotropin-releasing hormone agonists were defined as grade C, who could continue the assisted reproductive technology (ART) treatment cycle with negative COVID-19 nucleic acid test and there was no fever or respiratory symptoms. This brief comment summarizes the working procedure of the reproductive medical center in the first hospital of Lanzhou University in China to minimize the probability of hospital infection and ensure the safe conduct of assisted reproductive technology therapy.

Keywords: Assisted Reproductive Technology, COVID-19, Ovarian Hyperstimulation

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The aim of the study is to design medical arrangement strategies for infertility patients during COVID-19 mini-outbreak according to the working procedure of our reproductive medical center. Over the past two years, COVID-19 pandemic and mini-outbreak is an unprecedented health emergency in most cities (1). Currently the dominant global variant of COVID-19 is the delta (B.1.617.2) and omicron (B.1.1.529) strain. The emerging Omicron variant may become the new dominant strain (2-4). During the COVID-19 mini-outbreak period, routine *in vitro* fertilization (IVF) work routine has been changed fundamentally according to the epidemic situation and government policies. It is a grave problem of iatrogenic transmission and hospital infection because COVID-19 is transmitted mainly through droplets. Many doctors and nurses have also been infected by COVID-19, for example, the percentage of healthcare workers who were anti-SARS-CoV-2 IgG-positive at Kaunas hospitals was 1.16% (5). Clinical studies have shown that the proportion of hospital infection patients was once as high as 41.3% (6). Furthermore, cryopreservation of reproductive cells and embryos represents a very important aspect of assisted reproductive technology

(ART) (7). Although there is no obvious clinical evidence until now, liquid nitrogen has been contaminated by COVID-19 during production process, it may be a source of infection of embryos (8, 9). Therefore, the cryopreservation of sperm and embryos must be virus-free. We have designed COVID-19 prevention measures for reproductive medical center by referring to the Health industry standard WS/T311 2009 Technical Specifications for Hospital Isolation in China in order to reduce exposure opportunities of patients in hospitals. In our hospital, all patients and partners were required two consecutive nucleic acid negative proofs of COVID-19 tests within 72 hours before inpatient hospitalization. In this article, the discussion was only about female infertility patients, the male partner had negative COVID-19 nucleic acid test and no fever or respiratory symptoms.

This study was approved by the Ethics Committee of the First Hospital of Lanzhou University (LDYYLL2019-42).

First-visit patients in infertility clinic should be suspended if possible. The other outpatients are

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*Corresponding Address: Reproductive Medical Center, The First Hospital of Lanzhou University, Lanzhou, China
Email: ldyyszzx@163.com



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diagnosed and treated at different time interval. Seats in the waiting area are scattered. Strictly abide by the principle of "one doctor, one care, and one patient". Patients need to be accompanied only in special circumstances such as inconvenient walking. And patients should wear masks, undergo temperature detection and fill in an epidemiological questionnaire before entering the reproductive center.

On the premise of virus protection, patients who have already started the treatment of downregulation or controlled ovarian hyperstimulation are suggested to refer to the original treatment plan if possible (Fig.1). Simply speaking, patients undergoing the treatment cycle should first go to the fever clinic if their body temperature were higher than 37.3°C or go to the respiratory department if they have cough and other respiratory symptoms.

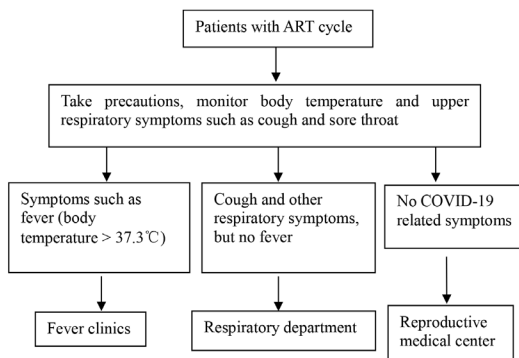


Fig.1: Treatment process of patients undergoing assisted reproductive technology (ART) cycle.

In view of the present situation, it is necessary to establish stratified dynamic assessment and treatment arrangement strategy for infertile patients during COVID-19 mini-outbreak (Table 1). Briefly, patients may suffer from ovarian hyperstimulation syndrome after egg retrieval who were assigned as grade A. So they were required hospitalization in the inpatient ward. Every patient and the partner lived in a single ward room which was equivalent to selfisolation. It is much safer for patients to be hospitalized than to come to the hospital frequently in our area. Patients were classified as grade B underwent controlled ovarian stimulation who need inject follicle-stimulating hormone every day. So they can choose to be hospitalized or be at home according to their own convenience. Patients undergoing frozen embryo transfer (FET) cycle or planned downregulation with gonadotropin-releasing hormone agonists were defined as grade C who could continue the ART treatment cycle with negative COVID-19 nucleic acid test and no fever or respiratory symptoms. If it is permitted, the patients and partners should be suggested to self-isolate them from the beginning of controlled ovarian stimulation to the ART procedure when it is finished. If a patient develops symptoms or screens positive during treatment, reverse transcription-polymerase chain reaction (RT-PCR)

should be tested and treatment would not proceed until the patient screens negative according to the national guidelines. Patients and partners who were symptomatic after oocyte retrieval should be advised to freeze all their embryos (10).

Table 1: Stratified dynamic assessment and treatment arrangement strategy for infertile female patients during COVID-19

Hierarchical evaluation	Classification of patients	Medical arrangement
Grade A	Patients after egg retrieval	Hospitalization in the inpatient ward
Grade B	Controlled ovarian stimulation patients from other cities	Hospitalization in the inpatient ward (escorts are only allowed under special circumstances)
	Controlled ovarian stimulation patients in this region	Choose home or inpatient ward according to the patient's convenience
Grade C	Patients with planned downregulation or Patients undergoing frozen embryo transfer (FET) cycle	Patients with negative COVID-19 nucleic acid test and no fever or respiratory symptoms can start treatment cycle
Grade D	First-visit patients in infertility clinic	Postpone treatment as much as possible

Patients who need pregnancy confirmation and ultrasound follow-up were suggested to visit the nearest hospital. The relevant medical examination data of local medical treatment process can be retained. To reduce unnecessary doctor-patient contact during COVID-19 mini-outbreak, we use telemedicine to minimize the frequency of repeated patients' visits at the center. If there is any problem during the fetal inspection after ultrasound examination in local hospital, the patient could consult doctor in charge through online platform or telephone. Preparations must be done before calling, medical card number or identity document (ID) number, recent medication records, and paper and pen if necessary.

In short, during the COVID-19 mini-outbreak period, the work of assisted reproductive medicine should focus on the public perspective, prepare sufficient response plans and advocate online diagnosis, and continue to work with patients to ensure efficient prevention, coordination and response measures to curb outbreaks. Besides, it is also necessary to refine the hospital process, relieve the physical and mental pressure and economic pressure of patients, and minimize social panic to the greatest extent.

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Authors' Contributions

H.-X.L., Y.P., X.-L.M.; Contributed to conception and design. Y.P., D.C.; Were responsible for overall supervision. H.-X.L.; Drafted the manuscript, which was revised by D.C., X.-L.M. All authors read and approved the final manuscript.

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