9th Yazd International Congress and Student Award on Reproductive Medicine with 4th Congress of Reproductive Genetics

Poster Presentations

P-158
Complications of COVID-19 and male fertility: Literature review

Moshrefi M[1, 2], Mangoli E[2, 3], Ghasemi-Esmailabad S[2, 3], Khalili MA[2, 3].

1. *Medical Nanotechnology and Tissue Engineering Research Center, Yazd Reproductive Sciences Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.*
2. *Research and Clinical Center for Infertility, Yazd Reproductive Sciences Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.*
3. *Department of Reproductive Biology, Yazd Reproductive Sciences Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.*

Email: khalili59@hotmail.com

Background: Coronavirus disease 2019 (COVID-19) is a disease with respiratory signs, but it causes complications for other organs, as well. The virus can damage all the cells that express Angiotensin-converting enzyme 2 (ACE2). Studies have detected virus RNA in semen and testis of patients and the signs of orchitis and testicles discomfort confirmed the male reproductive system (MRS) damages. But, in some cases, the disease is more complicated with probable long-term damage to MRS. The reason may be due to the factors that affect both MRS and COVID-19.

Objective: Therefore, the present study aimed to list the complications, which have adverse effect on COVID-19, MRS and male fertility.

Materials and Methods: We reviewed all published papers (till December 9th, 2020), from Google Scholar, PubMed and Scopus, including original articles, reviews, guidelines, letters to editor, comments on guidelines, editorials, clinical trials and case reports. All published reports were screened using the following words: SARS-CoV-2, corona virus, COVID-19, "severe acute respiratory syndrome coronavirus 2", "2019 ncov", male reproduction, testis, semen, sperm, male factor infertility, fertility treatment, male reproduction, obesity, smoking, vitamins, oxidative stress, fever, stress, supplements and ACE2.

Results: Some interfering factors for both COVID-19 and MRS are listed as follows: 1) Vitamin D deficiency is destructive for both male fertility and COVID-19. It has positive correlation with acrosome reaction and sperm motility. 2) Vitamin C has positive effect on immune system. Its deficiency is a risk for severity of COVID-19. It can improve both sperm parameters and DNA fragmentation. 3) Supplementation like vitamin E, Zinc, and omega-3 play a supportive role in COVID-19, due to antioxidant and immunomodulatory properties. 4) Smoking is a risk factor for both COVID-19 and male fertility. Smokers' cells up-regulate ACE2 expression. They show a higher percentage of severe cases of COVID-19. The rate of both smoking and COVID-19 in men is higher than women. But, there is a paradox on the correlation of smoking and COVID-19. Some paper suggested the protective effect of smoking for COVID-19; while, the majority decline this issue. 5) Physical and psychological stress increase cytokine. In COVID-19, together with the physical stress, hospitalization causes a level of psychological distress. Stress is a negative factor for MRS, too. 6) The viral infections, through fever and cytokines production, have a negative effect on spermatogenesis and MRS. Cytokine storm is a hyperinflammatory syndrome, characterized by fever, hypercytokinemia and multi organ failure. COVID-19 induce changes in cytokines profile which implicate for male fertility. 7) Fever and hyperthermia reduce sperm quality. It has considerable deleterious impact on spermatogenesis. 8) ROS production in COVID-19 and oxidative stress interferes the male fertility. The mechanism of reproductive damage in COVID-19 is through the ROS. 9) Obesity is independent risk factor for COVID-19 and male fertility.

Conclusion: The above-mentioned factors may interfere with COVID-19 and male fertility, preliminary by ROS production, spermatogenesis failure and sperm DNA fragmentation.

Key words: *COVID-19, ROS, Smoking, Vitamins.*