

Coronavirus disease 2019 vaccine and in vitro fertilization outcomes: myths vs. facts



The coronavirus disease 2019 (COVID-19) outbreak had a strong detrimental effect on fertility services and the mindset of couples seeking fertility treatment. On December 11, 2020, the Food and Drug Administration issued an emergency use authorization for the Pfizer-BioNTech COVID-19 (BNT162b2) vaccine, a lipid, nucleoside-modified messenger ribonucleic acid (mRNA) vaccine encoding the spike glycoprotein of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On August 23, 2021, the Food and Drug Administration approved a Biologics License Application for the use of the Pfizer-BioNTech COVID-19 vaccine in persons aged >16 years (1).

Despite a growing body of evidence regarding the safety of the Pfizer-BioNTech COVID-19 vaccine, the vaccination campaign has been accompanied by concerns regarding the possible immune-mediated detrimental effects on female fertility, which has led to partial public apprehension and vaccination reluctance. An increasing number of groups of investigators have focused on the potential correlation between mRNA COVID-19 vaccine and in vitro fertilization (IVF) outcomes. Orvieto et al. (2) conducted an observational study including couples who underwent ovarian stimulation (OS) for IVF before and 7–85 days after receiving the second dose of the Pfizer-BioNTech COVID-19 vaccine. The investigators did not find any differences in the length of OS, total dose of gonadotropins used, number of oocytes retrieved, oocyte maturity rate, fertilization rate, and top-quality embryos before and after receiving the vaccine (2). Bentov et al. (3) conducted a cohort study investigating the effect of immune response to COVID-19 infection or vaccination with the Pfizer-BioNTech COVID-19 vaccine on follicular microenvironment and function. Anti-COVID-19 immunoglobulin G antibodies were detected in measurable amount in the follicular fluid and serum of individuals with prior COVID-19 infection as well as those with a history of vaccination. However, there was no evidence of any detrimental effect on follicular function or ovarian response to stimulation, including follicular steroidogenesis, oocyte yield, and oocyte maturity rate (3).

In their retrospective cohort study, Avraham et al. (4) aimed to investigate the influence of BNT162b2 vaccination on ovarian response and IVF treatment outcomes. The study included 200 vaccinated and 200 age-matched unvaccinated controls who underwent IVF between January 1, 2021, and April 31, 2021. The mean time interval between vaccination and egg retrieval was 29.4 days (14–68 days). The investigators reported similar IVF cycle characteristics, including the

total gonadotropic dose, peak estradiol level, endometrial thickness on trigger day, and number of oocytes retrieved per cycle between the 2 groups. The investigators did not find a difference in the oocyte fertilization rate and mean number of cryopreserved embryos at both cleavage and blastocyst stages. In addition, for those who underwent fresh embryo transfers, the clinical pregnancy rates were comparable between the vaccinated and unvaccinated participants (4).

The investigators accurately point to some limitations in the study, including its retrospective nature and the lack of data on male partners regarding prior vaccination or infection. In addition, although clinical pregnancy rates were similar between the 2 groups, the study was powered to detect an 11% reduction in the pregnancy rate. Although the aforementioned limitations should be considered, the investigators provide a timely and valuable contribution to our knowledge regarding anti-COVID-19 vaccination and assisted reproductive technology outcomes.

Considering the potential for severe morbidity and mortality among pregnant women infected by the SARS-CoV-2 virus and the growing evidence supporting the lack of any detrimental effect of mRNA SARS-CoV-2 vaccine on OS and associated pregnancy rates, reproductive endocrinologists should discuss COVID-19 vaccination with all patients and encourage vaccination during evaluation and treatment for infertility (5).

Susan Nasab, M.D.

Sina Abhari, M.D.

Division of Reproductive Endocrinology and Infertility,
Department of Gynecology and Obstetrics, School of
Medicine, Johns Hopkins University, Baltimore, Maryland

<https://doi.org/10.1016/j.fertnstert.2022.04.005>



DIALOG: You can discuss this article with its authors and other readers at <https://www.fertstertdialog.com/posts/35047>

REFERENCES

1. Dooling K, Gargano JW, Moulia D, Wallace M, Rosenblum HG, Blain AE, et al. Use of Pfizer-BioNTech COVID-19 vaccine in persons aged ≥ 16 years: recommendations of the Advisory Committee on Immunization Practices—United States, September 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:1344–8.
2. Orvieto R, Noach-Hirsh M, Segev-Zahav A, Haas J, Nahum R, Aizer A. Does mRNA SARS-CoV-2 vaccine influence patients' performance during IVF-ET cycle? *Reprod Biol Endocrinol* 2021;19:69.
3. Bentov Y, Beharier O, Moav-Zafir A, Kabessa M, Godin M, Greenfield CS, et al. Ovarian follicular function is not altered by SARS-CoV-2 infection or BNT162b2 mRNA COVID-19 vaccination. *Hum Reprod* 2021;36:2506–13.
4. Avraham S, Kedem A, Zur H, Youngster M, Yaakov O, et al. COVID-19 vaccination and infertility treatment outcomes. *Fertil Steril* 2022;117:1291–9.
5. American Society for Reproductive Medicine. COVID-19 updates and resources, Available at: <https://www.asrm.org/news-and-publications/covid-19>. Accessed March 20, 2022.