









Vaccine

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The Safety and Efficacy of inactivated COVID-19 vaccination in couples undergoing assisted reproductive technology: A prospective cohort study

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Abstract

Background

The safety of the COVID-19 inactivated vaccine on pregnancy outcomes in couples undergoing assisted reproductive technology remains uncertain due to limited and speculative evidence. Existing studies primarily focus on the vaccination status of females, with scant information available regarding the vaccination status of male partners. Moreover, there is minimal research tracking live birth outcomes.

Objective(s)

The objective of this study was to evaluate the impact of COVID-19 inactivated vaccine administration on the outcomes of in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) cycles in infertile couples in China.

Methods

This prospective cohort study involved couples undergoing IVF treatment at Sichuan Jinxin Xinan Women & Children's Hospital from August 2021 to September 2022. Based on whether they received vaccination before ovarian stimulation, the couples were divided into the vaccination group and the non-vaccination group. We compared the laboratory parameters and pregnancy outcomes between the two groups.

Results

After performing propensity score matching (PSM), we observed similar live birth rates (41.23% vs. 44.08%, $P=0.555$), clinical pregnancy rates (52.61% vs. 54.98%, $P=0.625$), biochemical pregnancy (62.56% vs. 63.98%, $P=0.762$), and ongoing pregnancy rates (49.76% vs. 51.18%, $P=0.770$) between the vaccinated and unvaccinated women. Also, no significant disparities were found in terms of embryo development and laboratory parameters between the groups. Moreover, male vaccination had no impact on patients' pregnancy outcomes in assisted reproductive technology (ART) treatments (all $P>0.05$). Additionally, there were no observable effects of vaccination on embryo development and pregnancy outcomes among couples undergoing ART (all $P>0.05$).

Conclusion(s)

The findings suggest that COVID-19 vaccination did not have a significant effect on patients undergoing IVF/ICSI with fresh embryo transfer. Therefore, it is recommended that couples should receive COVID-19 vaccination as scheduled to help mitigate the COVID-19 pandemic.

Introduction

In the context of the COVID-19 pandemic, the administration of COVID-19 vaccines has become a crucial strategy to mitigate the spread of the virus and its associated impact on public health [1]. As the spread of COVID-19 and vaccination against it continue, it is essential to understand the effects of these vaccines on various aspects of health, including their impact on fertility and assisted reproductive technology (ART) outcomes. However, there is limited information on the specific effects of these vaccines on fertility and ART outcomes [[2], [3], [4]]. This knowledge gap has led to concerns among individuals who are planning to undergo ART, particularly IVF and ICSI, as well as those considering the timing of conception and vaccine administration [5,6].

To date, studies have offered preliminary evidence regarding the safety of COVID-19 vaccines in relation to fertility. Meta-analyses consistently indicate that COVID-19 vaccines have no significant impact on fertility in both females and males [[4], [5], [6],

[7], [8], [9]]. These studies consistently report no notable differences in the number of obtained, produced, and matured oocytes among individuals undergoing ART, regardless of their COVID-19 infection and vaccination statuses [10,11]. It was observed that mRNA SARS-CoV-2 vaccines do not affect the treatment outcomes or ovarian reserve in subsequent IVF cycles [[12], [13], [14]]. These findings provide a certain level of assurance regarding the safety of pregnant women to the vaccines. However, most studies have primarily examined the impact of mRNA vaccines; and evidence on the safety of inactivated vaccines for IVF outcomes is limited.

Up to now, two main types of vaccines have been used to combat the COVID-19 pandemic: mRNA-based vaccines and inactivated virus-based vaccines [7,8]. Both types prevent COVID-19 infection but differ in composition and immune response [7,9]. A significant portion of the global population has received inactivated COVID-19 vaccines, yet data on their effectiveness, especially in subfertile populations, remains limited.

Additionally, most studies have focused on the pregnancy outcomes of women who received the vaccine, while excluding the vaccination status of their male partners. This study incorporates the vaccination information of male partners into the analysis, allowing us to comprehensively assess the impact of inactivated COVID-19 vaccine administration on IVF and ICSI outcomes among infertile couples. Understanding the effects of COVID-19 vaccination on fertility and ART outcomes is crucial for healthcare providers and individuals undergoing fertility treatments. This knowledge will help make informed decisions and provide appropriate obstetric guidance.

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Section snippets

Study design and participants

We designed a prospective cohort study at Sichuan Jinxin Xinan Women & Children's Hospital in Chengdu, which included couples undergoing IVF treatment from August 2021 to September 2022. This cohort study was approved by the Ethics Committee of Sichuan Jinxin Xinan Women & Children's Hospital (2021-014).

Exclusion criteria included a history of COVID-19 infection, based on self-reports and regulations from China's Zero-COVID policy (a dynamic strategy aimed at eliminating all

COVID-19 cases ...

Vaccination of infertile couples

A total of 5,993 couples undergoing fresh embryo transfer were recruited between August 1, 2021 and September 30, 2022. After excluding patients without vaccination information (n=4,936), those lost to follow-up (n=69), or those involved in sperm donation (n=266), a total of 722 couples were included. Among these, 511 females received a COVID-19 vaccination prior to undergoing controlled ovarian stimulation (COS) and were categorized into the vaccinated group. The remaining 211 females, who ...

Discussion

The safety of COVID-19 vaccines in women undergoing IVF/ICSI treatment remains uncertain. Understanding the effects of COVID-19 vaccine administration on fertility potential and ART outcomes is crucial for healthcare providers and couples seeking fertility treatment. Our data suggest that couples undergoing ART who receive inactivated vaccines did not experience any impact on embryo development and pregnancy outcomes.

Our strength lies in the fact that this study is a prospective cohort study ...

Conclusions

In conclusion, the evidence provided by this study suggests that inactivated COVID-19 vaccine administration does not have an adverse impact on IVF outcomes. In situations where there is a risk of contracting the novel coronavirus, it is recommended to receive the COVID-19 vaccine as per the established guidelines. This information is crucial for couples planning to conceive, especially those undergoing ART, as it alleviates concerns about the potential impact of vaccine administration on ...

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CRedit authorship contribution statement

Juan Yang: Writing – original draft. **Ying-Ling Yao:** Methodology. **Xing-Yu Lv:** Data curation. **Li-Hong Geng:** Supervision. **Yue Wang:** Project administration. **Enoch Appiah Adu-Gyamfi:** Formal analysis. **Xue-Jiao Wang:** Project administration. **Yue Qian:** Methodology. **Ming-Xing Chen:** Methodology. **Zhao-Hui Zhong:** Validation. **Ren-Yan Li:** Visualization. **Qi Wan:** Writing – review & editing. **Yu-Bin Ding:** Supervision. ...

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. ...

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References (45)

R. Ella

[Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: a double-blind, randomised, phase 1 trial](#)

Lancet Infect Dis (2021)

Z.B. Gurtin

[Fertility treatment delays during COVID-19: Profiles, feelings and concerns of impacted patients](#)

Reprod Biomed Soc Online (2022)

D.R. Feikin

[Duration of effectiveness of vaccines against SARS-CoV-2 infection and COVID-19 disease: results of a systematic review and meta-regression](#)

Lancet (2022)

O.P. Hamidi

[Adverse perinatal outcomes in pregnancies affected by severe COVID-19 infection](#)

AJOG Glob Rep (2022)

I. Henarejos-Castillo *et al.*

[SARS-CoV-2 infection risk assessment in the endometrium: viral infection-related gene expression across the menstrual cycle](#)

Fertil Steril (2020)

G.G.G. Donders

[Sperm quality and absence of SARS-CoV-2 RNA in semen after COVID-19 infection: a prospective, observational study and validation of the SpermCOVID test](#)

Fertil Steril (2022)

T.S. Chillon

[Detection of antibodies to SARS-CoV-2 after vaccination in seminal plasma and their association to sperm parameters](#)

Int J Infect Dis (2023)

G.Y. Oudit *et al.*

[Angiotensin-converting enzyme 2-at the heart of the COVID-19 pandemic](#)

Cell (2023)

N. Holtmann

[Assessment of SARS-CoV-2 in human semen-a cohort study](#)

Fertil Steril (2020)

J. Croda *et al.*

[Booster doses for inactivated COVID-19 vaccines: if, when, and for whom](#)

Lancet Infect Dis (2022)



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Cited by (0)

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