

Peer Review File

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Reviewer A

Comment 1: First, English language of this paper needs professional editing after revisions.

Reply 1: Thank you very much for your advice. The revised manuscript has been reviewed by a professional editor whose native language is English.

Changes in the text: Please see full text with revised language, Page24,line458-459.

Comment 2: Second, the title is unclear, which should indicate the research design.

Reply 2: Thank you very much for your comment. We changed the title to “Effects of donor sperm on perinatal and neonatal outcomes resulting from in vitro fertilization-intracytoplasmic sperm injection and embryo transfer cycles: A retrospective cohort study”.

Changes in the text: We have modified our title as advised (see title,Page 1).

Comment 3: Third, the abstract is not adequate. Please indicate why there is a need for this research topic in the background part. In the part of methods, please specify the inclusion of eligible subjects, the assessment of efficacy and safety outcomes, and how the comparison group was generated. In the part of results, the authors described that “The incidence of preterm births was lower in the donor sperm group than in the husband sperm group” but the corresponding OR was higher than 1. In this part, please use detailed statistics to support the main findings. The conclusion should be made with cautions, given the potential selection bias in the study samples.

Reply 3: Thank you for your careful review and valuable suggestions. We have carefully revised the background, methods, results, and conclusions of the abstract. Due to the numerical limitation of the abstract, I explained the matching process in detail in the Study design section. Thank you for pointing out our negligence. We provided the matching ratio and re-analyzed the matched data. The corresponding statistical results are described in detail in the Results section. We apologize for the mistake we had made.

Changes in the text: We have modified our abstract as advised (see Abstract, Page 3 and 4, line28-58,Page8 and 9,line125-134).

Comment 4: Fourth, in the introduction part, the authors should provide insights on the potential clinical significance of the research topic. The authors also should have comments on the limitations of previous studies, for example, the reference group is related to the relative risk of pregnancy, perinatal, and neonatal outcomes because the intervention in ART can not be provided in a random manner. The authors may consider to have comments on their statistical adjustment methods.

Reply 4: Thank you very much for your comment. Following your advice, we have revised the Introduction section in detail. We hope that our revisions meet your

expectations.

Changes in the text: We have modified our Introduction as advised (see Page 6,7 and 8,line71-114)

Comment 5: Fifth, the methodology of this study is problematic, because the authors must first consider whether a case-control or comparative study can answer the research question, the efficacy and safety of donor sperm. In general, such question can only be answered in RCT studies. The authors should indicate the research design at the beginning of this part. Please also specify how the two groups were matched. It is also problematic to not match causes of infertility because they are also a source of confounding, resulting unreliable findings.

Reply 5: Thank you very much for your valuable comments. According to your suggestion, we have reviewed a large number of relevant literatures and found that most of them are retrospective studies (Yu B, Fritz R, Xie X, et al. The impact of using donor sperm in assisted reproductive technology cycles on perinatal outcomes. *Fertil Steril* 2018;110:1285–9; Kamath MS, Antonisamy B, Selliah HY, et al. Perinatal outcomes following IVF with use of donor versus partner sperm. *Reprod Biomed Online* 2018;36:705–10; Gerkowicz SA, Crawford SB, Hipp HS, et al. Assisted reproductive technology with donor sperm: national trends and perinatal outcomes. *Am J Obstet Gynecol* 2018;218:421). In our follow-up studies, we need to design better prospective or case-control studies to compensate for the inherent defects of retrospective studies. Additionally, we indicated in the title that the study was retrospective. In the Methods section of the text, the matching criteria for the study and control groups are explained in detail. We included the cause of infertility in the matching conditions, re-screened and matched the experimental group and the control group, re-performed statistical data, and explained the statistical results of this work in detail.

Changes in the text: We added data as advised (seePage8 and 9,line125-134,Page 12-18,line214-328,Table1,2,3,4,5,6,7)

Comment 6: Finally, in the statistics part, please indicate whether $P < 0.05$ is two-sided. Binary logistic regression is not adequate for adjusting the unmatched variables in the two groups, including causes of infertility. In fact, I think the two groups can not be directly compared. Please consider PSM. The methodology is problematic, I do not think the current data can answer the research question.

Reply 6: Thank you for pointing out this important issue. We have added a description to the statistics and indicated that $P < 0.05$ was two-sided. We reincorporated the cause of infertility into the matching conditions and used R Studio to PSM the experimental group and the control group. We reviewed the research methodology of a large number of related articles and found that other articles also used logistic regression analysis to adjust for confounders (Yu B, Fritz R, Xie X, et al. The impact of using donor sperm in assisted reproductive technology cycles on perinatal outcomes. *Fertil Steril* 2018;110:1285–9; Kamath MS, Antonisamy B, Selliah HY, et al. Perinatal outcomes following IVF with use of donor

versus partner sperm. *Reprod Biomed Online* 2018;36:705–10; Gerkowicz SA, Crawford SB, Hipp HS, et al. Assisted reproductive technology with donor sperm: national trends and perinatal outcomes. *Am J Obstet Gynecol* 2018;218:421). Finally, we provided details of the statistical results in the Results section.

Changes in the text: See the Statistical analysis and Results section (Page12,line197-198,Page 12-18,line214-328)

Reviewer B

Comment 1: In this study, authors reported that the embryo development, live birth, implantation and clinical pregnancy rates of the donor sperm group was better than that of the partner's group. Furthermore, no statistically significant between-group differences were observed in the neonatal outcomes. According to the results of this study, there are some questions that need to be clarified.

Reply 1: We would like to thank the editor and reviewers for the time and effort in reviewing our manuscript and providing comments and suggestions, which have considerably helped us improve our manuscript. We have answered each of your points and hope that our responses and revisions address all your comments.

Abstract

Comment 2: Line 30-31. This sentence should clearly explain donor sperm is associated with what....(eg. good or poor)?

Reply 2: Thank you very much for your constructive comments. We have modified our text accordingly (see Page 3, lines 37–41).

Comment 3: Line 57-58. Does "improve" mean that replacing partner's sperm with donor sperm can improve clinical outcomes? It does not seem to be the conclusion of this study.

Reply 3: After careful consideration, we have made suitable revisions to our conclusions (see Page 4, lines 66-68)

Materials and Methods

Comment 4: Line 155-157. Please describe the embryo scoring criteria used to assess high quality embryos.

Reply 4: Thank you for pointing out our omission. We have added this section to the COH, IVF, ICSI, and embryo transfer sections (see Page 8, lines 160–169)

Discussion

Comment 5: Line 368-369. "Increased" means that donor sperm improves the clinical outcomes, and this study may need use a more appropriate statement.

Reply 5: Thank you very much for your comment. What we want to express is that it is safe to use donor sperm and donor sperm does not reduce the live birth rate. So, we have made the appropriate changes to this sentence (see Page 19, lines 389-391)

Comment 6: Line 381-385. The results showed that the embryo quality of the donor sperm group was significantly higher than that of the partner sperm group. However, the results did not show whether the quality of the transferred embryos differed between the two groups. The results should be added in Table 2. In addition, transferred embryo quality and sperm parameters should also be used as adjusted factors for regression analysis to see if the donor sperm group still has better clinical outcomes than control group.

Reply 6: Based on your comment, we have added the comparison on sperm quality and transferred embryo quality between the two groups in Tables 1 and 2, respectively. In addition, sperm quality and transferred embryo quality were added as confounding factors, and the confounding factors were readjusted for clinical pregnancy outcomes and neonatal outcomes. The results are shown in Tables 3 and 6. The corresponding values have also been corrected in the text.(see Table 1,2,3,and 6,Page 13,line262-266)

Tables

Comment 7: Please describe the characters and differences in sperm parameters between donor sperm and partner sperm. This study discusses differences in embryo quality due to sperm quality of two groups.

Reply 7: As per your suggestion,we increased the comparison of sperm quality before IVF / ICSI between the two groups(see Table 1).

Comment 8: In addition, the range of partner's sperm quality was including normal and OAT, please explain why the selected sperm parameters of control group was not as similar as donor sperm group when comparison of the embryo development was analysis.

Reply 8: Our inclusion and exclusion criteria were established in reference to the many relevant studies on donor sperm, and none of these previous articles excluded patients with OAT; therefore, we did not set this as an exclusion criterion. (Yu B, Fritz R, Xie X, et al. The impact of using donor sperm in assisted reproductive technology cycles on perinatal outcomes. Fertil Steril 2018;110:1285-9;Kamath MS, Antonisamy B, Selliah HY, et al. Perinatal outcomes following IVF with use of donor versus partner sperm. Reprod Biomed Online 2018;36:705-10)

Comment 9: In table 2, the ratio of ICSI or IVF insemination methods in these groups should be presented in the table and described in the manuscript. Does the method of insemination affect the fertilization rates in this study?

Reply 9: As per your suggestion, we increased the rate of treatment with IVF or ICSI in both groups.In this paper, it is possible that more patients in the partner sperm group use ICSI than in the donor sperm group, resulting in a high fertilization rate in the partner sperm group. (see Table 1,see Page 18,line 373-379).

Comment 10: The table text is not orderly, please modify it to the correct version.

Reply 10: We have carefully edited all tables as per journal guidelines (see Tables).

Comment 11: The selection criteria of sperm parameters of the control group may need further clarification. This is because the donor sperm in this study are frozen sperm, while the control group is fresh sperm, which will affect the quality of the embryo.

Reply 11: Thank you very much for your suggestion. In our hospital, fresh sperm is collected on the day the oocytes were retrieved for patients who use husband sperm for IVF / ICSI treatment. Therefore, the husband sperm group is all fresh sperm