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Does vitrification cryopreservation of embryos for more than 5 years affect the pregnancy outcomes after frozen embryo transfer (FET)?

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What is known already?

Although some clinical studies have evaluated the impact of the duration of embryo vitrification cryopreservation on results of frozen embryo transfer (FET), most have focused on embryos stored for < 5 years [1].

Some studies have shown that the duration of embryo cryopreservation does not affect the pregnancy outcome [2-3]; however, other studies have shown that prolonging the vitrification preservation duration has a negative impact on pregnancy outcomes [4-6]

A small-sample propensity score matching study suggested that if the duration of embryo cryopreservation is more than 5 years, the implantation rate and live birth rate may be significantly reduced with the extension of freezing time [7]

Nearly all studies with a storage duration exceeding 5 years have small sample sizes or are case reports, which limits the availability of data on the efficiency and safety of long-term embryo preservation.

The lack of clinical evidence and exact guidelines makes the issue of embryo vitrification preservation extremely controversial.

What is New?

A recent retrospective study in China involved 36 665 eligible vitrified-thawed embryo transfer fertility cycles analysis was conducted to investigate the effect of cryopreservation time on pregnancy outcomes [8] This recent study reported that:

1-Multivariate stratified analysis showed that the prolonging the cryopreservation time of blastocysts (>5 years) reduced the implantation rate (aOR 0.78, 95% CI 0.62–0.98, P¼0.033) and LBR (aOR 0.68, 95% CI 0.53–0.87, P¼0.002) but no negative effect on cleavage embryos was observed (P>0.05).

2-The conducted stratified analyses based on the number and quality of frozen blastocysts transferred showed that the frozen embryo transfer results after transfers of good-quality blastocysts in the >5 years storage group were negatively affected. However, the storage time of non-good-quality blastocysts was not significantly associated with pregnancy outcomes.

3- Regarding the neonatal outcomes (of singletons), embryo vitrification preservation time had no effect on preterm birth rates, fetal birth weight, or neonatal sex ratios.

However, as the storage time increased, rates of small for gestational age (5.60%, 4.10%, and 1.18%) decreased, while rates of large for gestational age (5.22%, 6.75%, and 9.47%) increased (P<0.05). After adjusting for confounding factors, the increase in LGA and the decrease in SGA were significantly correlated with the duration of storage time.

Clinical Implications

Patients should be aware that the implantation rate and live birth rate of blastocysts are negatively affected with cryopreservation time > 5 years.

Couples may therefore consider shortening the time until frozen embryo transfer treatment.

References

1- Jianghui Li , Mingru Yin , Bian Wang, Jiaying Lin , Qiuju Chen, Ningling Wang, Qifeng Lyu , Yun Wang 1, Yanping Kuang , Qianqian Zhu .. The effect of storage time after vitrification on pregnancy and neonatal outcomes among 24 698 patients following the first embryo transfer cycles. Hum Reprod. ;35:1675–84, 2020

2- Li W, Zhao W, Xue X, Zhang S, Zhang X, Shi J. Influence of storage time on vitrified human cleavage-stage embryos froze in open system. Gynecol Endocrinol;33:96–99, 2017.

3-Ueno S, Uchiyama K, Kuroda T, Yabuuchi A, Ezoe K, Okimura T, Okuno T, Kobayashi T, Kato K. Cryostorage duration does not affect pregnancy and neonatal outcomes: a retrospective singlecentre cohort study of vitrified-warmed blastocysts. Reprod Biomed Online;36:614–619. 2018

4-Li J, Yin M, Wang B, Lin J, Chen Q, Wang N, Lyu Q, Wang Y, Kuang Y, Zhu Q. The effect of storage time after vitrification on pregnancy and neonatal outcomes among 24 698 patients following the first embryo transfer cycles. Hum Reprod,35:1675–1684. 2020

5-Zhang X, Wu S, Hao G, Wu X, Ren H, Zhang Y, Yang A, Bi X, Bai L,Zhang Y et al. Prolonged cryopreservation negatively affects embryo transfer outcomes following the elective freeze-all strategy:a multicenter retrospective study. Front Endocrinol (Lausanne);12:709648. 2021

6- Mao Y, Tang N, Luo Y, Yin P, Li L. Effects of vitrified cryopreservation duration on IVF and neonatal outcomes. J Ovarian Res;15:101. 2022

7-Cui M, Dong X, Lyu S, Zheng Y, Ai J. The impact of embryo storage time on pregnancy and perinatal outcomes and the time limit of vitrification: a retrospective cohort study. Front Endocrinol (Lausanne);12:724853, 2021

8-Shaoquan Zhan, Chenxing Lin, Qiwang Lin1, Jiayu Gan, Chunyan Wang, Yang Luo1, Jianqiao Liu 1, Vitrification preservation of good-quality blastocysts for more than 5 years reduces implantation and live birth rates Human Reproduction, , 00(0), 1, 2024