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Committee on Gynecologic Practice

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Oocyte Cryopreservation

ABSTRACT: In 2013, the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology published a joint document, *Mature Oocyte Cryopreservation: A Guideline*, which addresses advances in techniques to freeze human eggs that have resulted in significant recent improvements in pregnancy success. Based on the current state of evidence, modern procedures to cryopreserve oocytes should no longer be considered experimental. The American College of Obstetricians and Gynecologists' Committee on Gynecologic Practice endorses the joint document and encourages its use by Fellows. There are not yet sufficient data to recommend oocyte cryopreservation for the sole purpose of circumventing reproductive aging in healthy women.

In 2013, the American Society for Reproductive Medicine (ASRM) and the Society for Assisted Reproductive Technology (SART) published a joint document, *Mature Oocyte Cryopreservation: A Guideline*, which addresses advances in techniques to freeze human eggs that have resulted in significant recent improvements in pregnancy success (1). Based on the current state of evidence, modern procedures to cryopreserve oocytes should no longer be considered experimental. The American College of Obstetricians and Gynecologists' Committee on Gynecologic Practice endorses the ASRM–SART document and encourages its use by Fellows.

A woman's reproductive life span is finite and depends on the number of oocytes with which she is born (2, 3). Treatment with chemotherapeutic drugs and pelvic radiotherapy for cancer or other serious medical illnesses has the potential to markedly accelerate follicular atresia, placing women who require these treatments at risk of primary ovarian insufficiency (3). Likewise, genetic conditions such as fragile X premutation and mosaicism for monosomy X also predispose women to primary ovarian insufficiency (4). Women with these risk factors and others may be candidates for fertility preservation before ovarian failure ensues. However, as stated in the ASRM–SART guideline, "there are not yet sufficient data to recommend oocyte cryopreservation for the sole purpose of circumventing reproductive aging in healthy women because there are no data to support the safety, efficacy, ethics, emotional risks, and cost-effectiveness of oocyte cryopreservation for this indication" (1).

Mature oocyte cryopreservation is a currently available method of fertility preservation in women of reproductive age. Although in vitro fertilization (IVF) with cryopreservation of embryos is an established method of fertility preservation, it requires that the patient have a male partner or be willing to use donor sperm. Women who either cannot or wish not to cryopreserve embryos may consider banking mature oocytes as a reasonable fertility-preserving alternative. In the past 10 years, methods for ultrarapid freezing (vitrification) of oocytes have been refined that optimize oocyte survival after cryopreservation (1, 5–7).

Both clinical trials and observational studies have compared reproductive outcomes after IVF and intracytoplasmic sperm injection (ICSI) with cryopreserved oocytes to IVF and ICSI with fresh oocytes. Outcomes of four published randomized controlled trials demonstrated that fresh and frozen oocytes yield similar pregnancy rates in IVF cycles, supporting the use of these technologies in well-selected patients aged 35 years and younger (8–11). In the two studies conducted in infertile couples (two trials were conducted in egg donors), implantation rates ranged between 17% and 41% and clinical pregnancy rates per transfer ranged from 36% to 65% (9, 11). These data, the data in egg donors, and data from a recent meta-analysis (12) suggest that specific outcomes of IVF and ICSI (fertilization and pregnancy rates) are similar between fresh oocytes and vitrified oocytes. An important clinical predictor of outcomes in the observational studies of oocyte cryopreservation and IVF is

the age of the oocyte when frozen or vitrified (13–16). Several studies have indicated that a more advanced age of the oocyte when frozen or vitrified reduces the odds of success when vitrified oocytes are used for IVF or ICSI. Collectively, studies provide good evidence that fertilization and pregnancy rates using vitrified oocytes are similar to fresh IVF cycles or fresh ICSI cycles and are consistent with clinical experience with respect to the effect of the age of the oocyte when frozen or vitrified.

Although the number of pregnancies conceived from IVF or ICSI with vitrified oocytes is small relative to fresh oocyte IVF or ICSI and frozen embryo transfer cycles, there currently is no evidence of increased neonatal risk from this treatment compared with other assisted reproductive technologies (17–19). Additional follow-up of diverse patient populations is warranted to confirm these early reassuring outcomes.

In addition to utilization in women with serious medical conditions, oocyte cryopreservation represents an appealing option for those women who wish to defer childbearing until later in life. However, there are no published data on the efficacy of elective oocyte cryopreservation in this population. Oocyte cryopreservation, with appropriate counseling, is recommended for patients facing infertility due to chemotherapy or other gonadotoxic therapies. There are not yet sufficient data to recommend oocyte cryopreservation for the sole purpose of circumventing reproductive aging in healthy women. It is recommended that patients be thoroughly counseled about the current lack of data on efficacy, as well as the risks, costs, and alternatives to elective oocyte cryopreservation (1).

References

1. Mature oocyte cryopreservation: a guideline. Practice Committees of American Society for Reproductive Medicine, Society for Assisted Reproductive Technology. Fertil Steril 2013;99:37–43. [PubMed] [Full Text] ⇦
2. Welt CK. Primary ovarian insufficiency: a more accurate term for premature ovarian failure. Clin Endocrinol 2008;68:499–509. [PubMed] ⇦
3. Age-related fertility decline. ACOG Committee Opinion No. 413. American College of Obstetricians and Gynecologists, American Society for Reproductive Medicine. Obstet Gynecol 2008;112:409–11. [PubMed] [*Obstetrics & Gynecology*] ⇦
4. Nelson LM. Clinical practice. Primary ovarian insufficiency. N Engl J Med 2009;360:606–14. [PubMed] [Full Text] ⇦
5. Oktay K, Cil AP, Bang H. Efficiency of oocyte cryopreservation: a meta-analysis. Fertil Steril 2006;86:70–80. [PubMed] [Full Text] ⇦
6. Gook DA, Edgar DH. Human oocyte cryopreservation. Hum Reprod Update 2007;13:591–605. [PubMed] [Full Text] ⇦
7. Smith GD, Serafini PC, Fioravanti J, Yadid I, Coslovsky M, Hassun P, et al. Prospective randomized comparison of human oocyte cryopreservation with slow-rate freezing or vitrification. Fertil Steril 2010;94:2088–95. [PubMed] [Full Text] ⇦
8. Cobo A, Kuwayama M, Perez S, Ruiz A, Pellicer A, Remohi J. Comparison of concomitant outcome achieved with fresh and cryopreserved donor oocytes vitrified by the Cryotop method. Fertil Steril 2008;89:1657–64. [PubMed] [Full Text] ⇦
9. Cobo A, Meseguer M, Remohi J, Pellicer A. Use of cryobanked oocytes in an ovum donation programme: a prospective, randomized, controlled, clinical trial. Hum Reprod 2010;25:2239–46. [PubMed] [Full Text] ⇦
10. Rienzi L, Romano S, Albricci L, Maggiulli R, Capalbo A, Baroni E, et al. Embryo development of fresh 'versus' vitrified metaphase II oocytes after ICSI: a prospective randomized sibling-oocyte study. Hum Reprod 2010;25:66–73. [PubMed] [Full Text] ⇦
11. Parmegiani L, Cognigni GE, Bernardi S, Cuomo S, Ciampaglia W, Infante FE, et al. Efficiency of aseptic open vitrification and hermetical cryostorage of human oocytes. Reprod Biomed Online 2011;23:505–12. [PubMed] ⇦
12. Cobo A, Diaz C. Clinical application of oocyte vitrification: a systematic review and meta-analysis of randomized controlled trials. Fertil Steril 2011;96:277–85. [PubMed] [Full Text] ⇦
13. Bianchi V, Lappi M, Bonu MA, Borini A. Oocyte slow freezing using a 0.2–0.3 M sucrose concentration protocol: is it really the time to trash the cryopreservation machine? Fertil Steril 2012;97:1101–7. [PubMed] [Full Text] ⇦
14. Borini A, Levi Setti PE, Anserini P, De Luca R, De Santis L, Porcu E, et al. Multicenter observational study on slow-cooling oocyte cryopreservation: clinical outcome. Fertil Steril 2010;94:1662–8. [PubMed] [Full Text] ⇦
15. Rienzi L, Cobo A, Paffoni A, Scarduelli C, Capalbo A, Vajta G, et al. Consistent and predictable delivery rates after oocyte vitrification: an observational longitudinal cohort multicentric study. Hum Reprod 2012;27:1606–12. [PubMed] [Full Text] ⇦
16. Ubaldi F, Anniballo R, Romano S, Baroni E, Albricci L, Colamaria S, et al. Cumulative ongoing pregnancy rate achieved with oocyte vitrification and cleavage stage transfer without embryo selection in a standard infertility program. Hum Reprod 2010;25:1199–205. [PubMed] [Full Text] ⇦
17. Cobo A, Rubio C, Gerli S, Ruiz A, Pellicer A, Remohi J. Use of fluorescence in situ hybridization to assess the chromosomal status of embryos obtained from cryopreserved oocytes. Fertil Steril 2001;75:354–60. [PubMed] [Full Text] ⇦
18. Noyes N, Porcu E, Borini A. Over 900 oocyte cryopreservation babies born with no apparent increase in congenital anomalies. Reprod Biomed Online 2009;18:769–76. [PubMed] ⇦
19. Chian RC, Huang JY, Gilbert L, Son WY, Holzer H, Cui SJ, et al. Obstetric outcomes following vitrification of in vitro and in vivo matured oocytes. Fertil Steril 2009;91:2391–8. [PubMed] [Full Text] ⇦

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