Oocyte Cryopreservation for Fertility Preservation

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What is oocyte cryopreservation?

Freezing human eggs with the goal of preserving the reproductive ability in women of childbearing age.

Why consider oocyte cryopreservation?

Women are born with a fixed number of *oocytes* and there is a natural decline in fertility throughout a woman's life. Treatment with chemotherapeutic drugs and pelvic radiation for cancer has the potential to accelerate the loss of oocytes, putting women at risk of *premature ovarian insufficiency*. Additionally, women who inherit mutations in the BRCA gene may consider prophylactic surgeries including bilateral *salpingo-oophorectomy* before childbearing has been initiated or completed, thereby inducing a *surgical menopause*. Some women, after appropriate counselling, may choose oocyte cryopreservation prior to undergoing cancer treatment or prevention.

What does oocyte cryopreservation involve?

Mature oocyte cryopreservation is no longer considered experimental. In brief, a woman must undergo ovarian hyperstimulation requiring hormone injections over a 10 to 14-day period to stimulate the ovaries to produce multiple oocytes. Oocytes are then retrieved by aspiration under ultrasound guidance. There are different techniques used to freeze (vitrify) eggs. When a patient is ready, the oocyte is injected with sperm to create an *embryo*, which is then transferred into the female patient.

What are the outcomes of oocyte cryopreservation?

Studies have shown similar clinical pregnancy rates per cycle using fresh or frozen oocytes. There are no differences in oocyte survival or clinical and ongoing pregnancy rates between storage of less than 6 months to over 5 years. Pregnancy rates are dependent on the women's age at which oocytes are frozen (live birth rates decline with increasing age of the woman at time of freezing).

What are the risks of oocyte cryopreservation?

There are theoretical risks of damaging parts of the cell structure required for cell division, leading to an increased risk of *aneuploidy*. However, studies have shown reassuring outcomes with respect to both aneuploidy and congenital anomalies. There is a lack of long term data in children born from frozen eggs.

What is the cost associated with oocyte cryopreservation?

There are costs associated with hormonal medications, oocyte freezing, sperm injection and embryo transfer. Although some medications may be covered by insurance, *assisted reproductive technologies* are not currently subsidized in Canada, except for Ontario. Contact your local fertility center for pricing information as this can differ based on site of treatment.

Glossary

***Oocytes*:** Immature eggs
***Premature ovarian insufficiency*:** Loss of ovarian function before age 40
***Salpingo-oophorectomy*:** Removal of fallopian tubes and ovaries
***Surgical menopause*:** Cessation in a woman's menstrual period caused by surgery to remove her ovaries
Embryo: The product of a fertilized egg
***Aneuploidy*:** Presence of an abnormal number of chromosomes
Assisted reproductive technology: Includes all treatments in which eggs and sperm are handled

References

1. Mature Oocyte Cryopreservation: A Guideline. ASRM. January 2013.
2. ACOG Committee Opinion: Oocyte Cryopreservation. January 2014.
3. Mature Oocyte Cryopreservation for Fertility Preservation. Liang and Motan. 2016.
4. National Cancer Institute: Surgery to Reduce the Risk of Breast Cancer. August 2013.