Age Related Fertility Preservation: Should you Consider Multiple Egg Freezing Cycles?

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All what we really know for sure about reproductive competence (ability of eggs and sperm to produce a baby) is thatembryos that has the correct number of chromosomes has a very high chance of implanting and produce healthy babies. In the majority of cases, the egg is the source of abnormal chromosome material: extra or missing chromosomes.

Female age is the most important fertility factor. As age advances, the number of eggs in the ovary decline and the proportion of abnormal eggs increase. This fact underline the need for modern women think about ***reproductive planning*** as early as possible, say age 25 to 30. When do you want to get pregnant for the first time? Is it socially feasible to start now? Do you have enough support around you to have a baby now? how large of a family do you want? do you care about the sex of the baby?

In general the following are available options

Try to get pregnant on your own as early as possibly can

Consider Embryo freezing with partner for later use

Consider using donor sperm to create embryos for storage

Egg freezing is a viable option for fertility extension

Egg Freezing

The ovaries are stimulated to produce multiple eggs. Eggs are retrieved using a simple procedure. Mature eggs are frozen using flash freezing (vitrification). The eggs are stored in a special device in liquid nitrogen, indefinitely. The main aim here is to freeze multiple mature eggs at a younger age that can be used at a later female age when eggs are fewer and less healthy.

The most critical part of counseling women here about ultimate chance of conception using egg freezing is accurate estimation of egg reserve via history, antral follicle count and AMH level.

In general women <38years that produce >8 eggs has a very good chance of conceiving and delivering at least one baby from an egg freezing cycle.

Egg-freezing-study

Women who are older or produce less eggs then would ask do I need more eggs?

Multiple Egg Freezing Cycles

Should you Consider Multiple Egg Freezing Cycles? If you do not produce enough eggs in the first round of egg freezing you can consider another egg freezing cycle. But you now have the advantage of knowing how did you respond the first round. You know a bit more about the quality and maturity of the eggs. You know if the stimulation protocol worked for you and you can discuss with your reproductive endocrinologist methods of improving response. If increasing the number of frozen mature eggs is possible with another cycle of egg freezing, then another cycle should be considered.

On the other hand if the prior response is low, egg quality is low and age is 40 or more, women should consider conceiving as soon as possible.

Fertility in Women Diagnosed with Chronic Myeloid Leukemia

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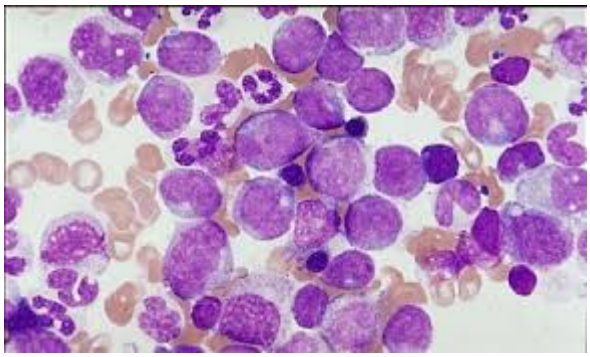
Women and men diagnosed with chronic myeloid leukemia should consider fertility issues and safety of pregnancy while under treatment. Chronic myeloid leukemia (CML) is formed of malignant cells from the bone marrow. It may later spread to the blood stream or other organs. It may also progress to a fast growing stage-acute leukemia. It is diagnosed in 2000 women and 2800 men yearly in The US, mostly during their adult years. Most individuals diagnosed with CML carry an abnormal chromosomal arrangement called Philadelphia chromosome. Many patients do not have any symptoms. CML is suspected from blood counts and confirmed by examining blood smears and bone marrow examination.



Newer drugs like imatinib, dasatinib and nilotinib have changed the treatment of CML dramatically. More than 90% of patients that received these medications survived for 5 years

or more. These belong to a group of medications called tyrosine kinase inhibitors (TKIs). These medication slow the propagation of lymphoma cells. Their side effects are less than standard chemotherapy. Response to treatment is assessed using blood counts, the presence of Philadelphia chromosome and molecular genetics tests for a specific gene. Some individuals require stem cell transplantation. Transplantation requires treatment with high dose chemotherapy and total body irradiation, both are associated with very high risk for ovarian failure.

Effects of TKIs on fertility. *Animal studies* indicate that exposure to TKIs during adult life was not associated with impaired fertility in males and females. Exposure before puberty lead to reduced sperm production in males. There has been few case reports of low sperm count and early ovarian failure after exposure to imatinib in *humans*. This was not reported in large studies. *Because of the possible effects of imatinib on fertility and because all individuals treated for CML are at risk for progressive disease requiring stem cell transplantation, men and women diagnosed with CML should consider fertility preservation. Men should consider sperm freezing. Women should consider embryo cryopreservation (if they have a partner) or egg freezing*.

Effects of leukemia on pregnancy. In general pregnancy itself does not appear to affect the prognosis for leukemia There is no evidence that brief exposure to imatinib in early pregnancy is associated with adverse outcomes or abnormalities in the babies. There are no extensive data, however on the effects of imatinib and data on the effects of newer TKIs dasatinib and nilotinib are very sparse. Women are usually advised to use a birth control method while on these medications. In one study two of 16 babies had minor abnormalities (hypospadias in one baby and rotation of small intestine in one baby) that were surgically repaired. Women who were in remission and chose to stop imatinib during

pregnancy, had 40 to 50% chance of showing evidence of propagation of the leukemia cells. The majority of them though achieved remission again after re-starting treatment.

Children born to men who are actively taking imatinib at the time of conception appear healthy and current advice is not to discontinue treatment. This is based on outcomes of 60 pregnancies reported worldwide in female partners of imatinib-treated men. In contrast the data relating to children born to women exposed to imatinib during pregnancy are less encouraging. Although numbers are small-12 congenital anomalies were found among 125 pregnancies-there has been a cluster of rare congenital malformations such that imatinib cannot be safely recommended, particularly during the period of organ formation in the baby-first 8 to 12 weeks.

Women interested in getting pregnant while on imatinib and other TKIs should co-ordinate their specific care between oncologists and reproductive endocrinologist so that they attempt pregnancy while in remission for ideally 1-2 years and in the same time minimize the period of time while off treatment. Alternative treatments than TKIs can be used during pregnancy. After delivery, TKIs are restarted and breast-feeding is discouraged as the medicine is excreted in milk. Read more at http://nycivf.org

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Melanoma-What Every Woman Need to Know about Fertility and Pregnancy

Women diagnosed with melanoma may require counseling for fertility preservation, fertility treatment and safety of

pregnancy after treatment. Melanoma is one of the most common cancers in young adults in the United States. In the US and worldwide, there is dramatic increase in the incidence of skin melanomas. Approximately 30,000 women are expected to be diagnosed with melanoma in 2010, one third will be in their reproductive years. Its the most common cancer in young adults 25 to 29 year old. Its more common in white women compared to African Americans and Hispanics. Approximately 10% of melanomas run in families or are genetically inherited. Treatment of melanoma requires surgery. In advanced melanoma, chemotherapy is added. Dacarbazine-DTIC is an alkylating agent used for treating melanomas. Immune therapy is also used for advanced melanomas-interferon α or IL-2.

In early stages, surgery is the only required treatment. In advanced stages if chemotherapy is used, ovarian reserve may be diminished and this may reduce woman's ability to get pregnant. The use of immune therapy is not known to affect future fertility. The effects of newer targeted therapies and vaccines on fertility are also unknown.

Melanoma and fertility treatment. The estrogen receptors were found on melanoma cells. Some researchers detected no significant increase in the risk of melanoma after treatment with fertility drugs, except possibly slight increase in risk in women who delivered children before. The relationship between estrogen exposure and melanoma is controversial. Women seeking fertility preservation before exposure to chemotherapy or

melanoma survivors desiring pregnancy after completing treatment should consult with a fertility preservation specialist about the risks and benefits of fertility treatment and the safety of pregnancy. The ovarian stimulation regimen can also be modified to minimize estrogen exposure. It may also be possible for women with inherited predisposition to melanoma to avoid transmission to future children through testing of embryos-PGD.

Melanoma and pregnancy. Ten studies including 5600 women found that pregnancy does not reduce survival in women diagnosed with melanoma. Women treated for melanoma who subsequently became pregnant were not adversely affected compared to women who did not get pregnant after treatment. For thin tumors-<1.5mm most experts do not recommend deferring pregnancy. For thicker tumors, physicians may recommend deferring pregnancy for two years as most recurrences take place during that interval. Read more at http://nycivf.org

What Does Borderline Ovarian Tumor Mean to Your Fertility?

What Does Borderline Ovarian Tumor Mean to Your Fertility?

Fertility in women diagnosed with borderline ovarian tumors can be reduced or lost due to surgical treatment. Counseling regarding fertility preservation shortly after diagnosis can

increase the chance of pregnancy following treatment.

Borderline-low malignant potential ovarian tumors

The cells in borderline tumors, proliferate more than benign ovarian cysts but less than frank malignant ovarian tumors. Multiple layers of these cells are seen on pathology slides, but they do not invade surrounding tissues as in malignant tumors. They are diagnosed in approximately4000 of women each year in the US and are more commonly encountered in reproductive age women. These tumors are usually cystic, sometimes with surrounding implants. Low malignant potential tumors are treated surgically (removal of cyst, removal of the ovary or sometimes removal of both ovaries and the uterus). They generally do not require chemotherapy for treatment. The majority of these tumors are associated with very high survival (10 year survival >90% in stage I and II), although some may recur or turn malignant.

There is no difference in survival if borderline tumors were treated with removal of the cyst, removal of the ovary or removal of the uterus and both ovaries. Recurrence may be lower after hysterectomy (5%) compared to salpingoophorectomy (15%) and cyst excision (30%). The high rate for recurrence after conservative surgery indicates the need for strict and long term follow up (pelvic exams, ultrasound and tumor markers). Some recurrences take place years after initial surgery and are sometimes malignant.

Fertility risks in women diagnosed with borderline tumors

Fertility risks in women diagnosed with low malignant potential ovarian tumors include loss of ovarian tissue and pelvic scarring that can block the fallopian tubes especially if open approach is used for treatment compared to laparoscopy

(minimal acess surgery). Some loss of ovarian tissue does occur even during cyst removal from the ovary. Ovarian reserve can be tested after surgery using transvaginal ultrasound evaluation for ovarian volume and number of antral follicles. Ovarian function can also be assessed using day 2 FSH and estradiol levels and antimullerian hormone (AMH).

Fertility preservation strategies in women diagnosed with borderline ovarian tumors

1. Conservative surgery

Ovarian cystectomy can be considered in reproductive age women, especially in early disease with favorable pathology and absence of implants. Recurrence is relatively high but can be managed with repeat excision if not malignant. If pregnancy is desired following surgery, fertility factors; ovulation, fallopian tubes and sperm factors should be investigated and treated accordingly

2. Embryo and oocyte cryopreservation

Women at risk for diminished fertility due to surgery, especially if requiring removal of the ovaries or repeat excision of cyst, can consider ovarian stimulation, egg retrieval and egg freezing or IVF and embryo freezing. There is no evidence that ovarian stimulation and exposure to high estrogen increases the risk for recurrence. It is not clear if border line cells are sensitive to estrogen increase during ovarian stimulation. Two options are available to reduce estrogen exposure: to perform IVF in a natural cycle (low egg yield) or to modify the stimulation protocol, through adding an aromatase inhibitor, similar to that used for breast cancer. Alternatively, short stimulation followed by retrieval of immature eggs followed by in vitro maturation can be performed.

Women diagnosed with borderline ovarian tumors are at risk for diminished fertility because of surgical treatment(s). This is especially true if repeat surgical excision is required. Collaboration between a gynecologic oncologist and a reproductive endocrinologist enable adequate surgical treatment, strict follow up and preservation of future fertility in reproductive age women.

Thyroid Cancer and Future Fertility

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Thyroid cancer is diagnosed in 45,000 individuals each year in the US. Its treatment may affect future fertility in men and women. It is more common in women with female to male ratio of 3 to 1. It is the most rapidly rising cancer in women living

in the US. Thyroid cancers are commonly diagnosed in young women in their reproductive years. Treatment of thyroid cancer generally yields excellent results, with the majority of women surviving 10 years or more after diagnosis. Some women develop thyroid cancer due to iodine deficiency in diet or prior neck radiation. Some types of thyroid cancers are related to inheriting an abnormal gene.

Several types of thyroid cancer are recognized 1. Papillary cancer 2. Follicular cancer 3. Medullary cancer 4. Anaplastic cancer 5. Thyroid lymphoma. Papillary and follicular cancers are less invasive tumors and are encountered in the majority of women diagnosed with thyroid cancer. They also respond to estrogen as they carry estrogen receptors. Estrogen may promote growth of thyroid cancer cells. Thyroid cancers are usually suspected on neck examination followed by ultrasound or Iodine scan then biopsy. In general, treatment of thyroid cancer require total thyroidectomy-surgical removal of the thyroid gland followed by radioactive iodine to ablate any thyroid remnants. This is followed by long term thyroid hormone replacement. Long term follow up is required after treatment.

Effect of thyroid cancer treatment on the ovary

Thyroidectomy followed by thyroid hormone replacement is not known to affect future fertility in men and women. Radioactive iodine can affect the number and quality of eggs remaining in the ovary. The effect is dependent on the dose of radioactive iodine and the age at treatment. Twenty to 30% of women experience transient amenorrhea or irregular menses starting about 3 months after treatment. Normal menses resume about 6 months later. Permanent ovarian failure is rare but may occur in women at age 40 or older at the time of treatment. Increased incidence of miscarriage is reported in the first year after treatment. With the exception of miscarriages,

there is no evidence that exposure to radioiodine affects the outcome of subsequent pregnancies and health of borne children.

Effects of radioactive iodine treatment on the testes

Effect of radioactive iodine treatment may be more severe in men. and is related to the total dose of radioactive iodine received. Transient reduction in testosterone and sperm count may occur but sometimes permanent reduction in sperm count and testosterone levels. Men who received large total dose sometimes sustain permanent damage to the testes with absence of ejaculated sperm-azospermia. There is no evidence of effects of radioactive iodine on their newborn children, although its advised that men avoid fathering children for 6 months after treatment.

Options for fertility preservation

Men interested in future fertility should consider sperm freezing prior to radioiodine treatment. Women should also consider fertility preservation if they will be treated with radioactive iodine and are older than 35 years. Radioiodine treatment will reduce their ovarian reserve. In addition they will be required to avoid pregnancy for a year or so. Options available for preservation of fertility in women include ovarian stimulation and egg retrieval followed by egg or embryo freezing. Ovarian stimulation can be modified to avoid estrogen exposure during stimulation. Moreover, in familial thyroid cancers, embryos can be genetically tested to avoid transmission of the abnormal gene to children. Men and women diagnosed with thyroid cancer can benefit from consultation with a fertility preservation specialist prior to treatment to discuss effects on gonads and methods to preserve future fertility. Read more at http://nycivf.org

Is it safe for women to get pregnant after breast cancer treatment

Pregnancy after breast cancer treatment

After treatment of breast cancer to the satisfaction of her oncologist, should a woman who desire to get pregnant be discouraged from doing so? A very critical question considering the fact that there are close to half a million breast cancer survivors living in the US and are in the childbearing age.

Is it safe for women to get pregnant after breast cancer treatment?

For a very long time, counseling of women regarding pregnancy was dependent on the fact that estrogen increases during pregnancy and because estrogen has some effects on both estrogen receptor positive and estrogen receptor negative breast cancers, its probably better if women avoid pregnancy-unless of course another woman is carrying for them, a gestational carrier. This recommendation is not based on strong scientific evidence.

Safety of pregnancy after breast cancer treatment. All the published reports included a total of 1417 women who got pregnant after breast cancer treatment and 18059 who survived breast cancer and did not get pregnant. **Women who got pregnant**

following breast cancer diagnosis had significantly better survival compared to women who did not get pregnant. In fact, those who got pregnant were more than 40% less likely to die because of breast cancer.

Pregnancy after breast cancer treatment

Important caveat to these studies is the healthy mother bias- the tendency of healthier women to desire and attempt pregnancy and the less healthy women to avoid pregnancy. This may inflate the safety of becoming pregnant after breast cancer treatment. Studies also largely did not address the chance for recurrence. Nevertheless, no study showed detrimental effect in breast cancer survivors who become pregnant. The largest of these studies published by The Danish Breast Cancer Cooperative Group was a population based study and included over 10,000 women who survived breast cancer and were under the age of 45. Three hundreds and sixty-seventy one women experienced 465 pregnancies and 236 deliveries. Women who got pregnant-full term or spontaneous miscarriage, were at least 30% less likely to die from breast cancer. Women with low risk breast cancers enjoyed 45% higher chance for survival after full term pregnancy than similar women who did not get pregnant.

How long should women wait after breast cancer treatment before attempting pregnancy? The majority of experts recommend waiting for about two years as the majority of recurrences takes place within this period. There are differences in recurrence pattern, however, between estrogen receptor negative and estrogen receptor positive tumors. Estrogen receptor negative tumors are more common in younger women and tend to recur earlier-within 2years after treatment. Recurrence of estrogen receptor positive cancers remain as high as 4-5% per year for about 15 years.

Pregnancy in BRCA1 and BRCA2 mutation carriers. In BRCA1 pregnancy does not seem to increase the risk of early onset breast cancer. In BRCA2 carriers, pregnancy may cause a borderline increase in risk of breast cancer before 50, especially when first pregnancy after age 40.

Pregnancy after breast cancer treatment

Breast feeding is recommended whenever possible in women treated for breast cancer, even if they are BRCA carriers and does not appear to impact breast cancer prognosis and may even be protective in some cases.

Contraception. If pregnancy is not desired as during breast cancer treatment and the follow up period after treatment non

hormonal contraception is recommended such as IUD or barrier method e.g. condom. BRCA1 carriers may show an increased risk for early onset breast cancer if they use oral contraceptive pills before the age of 30 or for more than 5 years.

Young women diagnosed with breast cancer are commonly very concerned about their future fertility and safety of pregnancy after treatment. Proper counseling enables them to make appropriate decisions about future reproduction and fertility preservation. At the end of the day, most of the breast cancer battles will be won, some will be lost, pregnancy does not appear to contribute to that loss.

Fertility in Men Diagnosed with Cancer

Fertility in Men Diagnosed with Cancer

Who needs to consider preservation of Fertility?

a. The American Cancer Society estimates that 760,000 men will be diagnosed with cancer in 2009. Cancer itself (before treatment) is sometimes associated with less sperm production in men. This is specially the case in Hodgkin's lymphoma, testicular cancer, prostate cancer, leukemias and colon cancer. The most harmful factor, however, is cancer treatment. Chemotherapy and radiation significantly impair sperm production. The effect of chemotherapy depends on age, drug

used, dose and duration. Cyclophosphamide appears to be the most harmful agent. Radiation also impairs sperm production especially at doses of 1200cGy or more.

Sperm count sometimes recover to a variable extent years after cancer treatment. This depends on the type of cancer and treatment used. For example 90% of men diagnosed with Hodgkin's lymphoma, treated with MOPP chemotherapy regimen, do not have any sperm in the ejaculate after one year.

b. Bone marrow transplantation for cancer of nonmalignant diseases usually require prior irradiation and chemotherapy. This is associated with high risk (85%) of complete failure of sperm production.

c. Connective tissue / autoimmune diseases as lupus and rheumatoid arthritis requiring treatment with chemotherapy.

d. Genetic abnormalities associated with rapid loss of male germ cells e.g. Kleinefelter syndrome, Y chromosome microdeletion (AZFc).

Methods used for Fertility Preservation

Methods used to preserve fertility in men are generally divided into two categories:

Protection of the testes from damage caused by cancer treatment:

1. Shielding the testes from radiation field.

2. Protection of the testes from the effect of chemotherapy.

GnRH agonists are a group of medications that suppress the master gland in the brain, preventing the release of the hormones that stimulate sperm production in the testes. Although suggested, there is no proof that they actually increase the odds for pregnancy after the use of chemotherapy. Actually, there is no effective protective medication

available for use in men or women.

Low Temperature Storage of Sperm and Testicular Tissue:

a. Sperm Cryopreservation. This is the standard method for preservation of fertility in men. A sperm sample is obtained by masturbation and frozen for later use. If feasible multiple samples are obtained. In the future, sperm sample are used for intrauterine insemination or IVF / intracytoplasmic sperm injection (ICSI). Banking sperm was found to offer not only a chance to father children in the future but also encouragement and improved morale during disease treatment especially if it was initiated by the patient own initiative.

Lack of information and counseling is the most important reason why men diagnosed with cancer do not bank their sperm.

Although freezing may reduce the quality of sperm especially if it was not optimal before freezing, modern reproductive medicine can handle the majority of compromised specimens yielding excellent pregnancy rates, similar to those of fresh sperm.

b. Testicular Sperm Extraction (TESE). This surgical procedure retrieves sperm from inside the testes if no sperm was found in the ejaculate. If this procedure is used before cancer treatment, sperm are retrieved in over 50% of cases. Sperm or testicular biopsies are frozen for later use. ICSI is used for fertilization. In case of testicular cancer, sperm retrieval can be performed at the same time of surgery for cancer.

c. Testicular Tissue or Germ Cell Freezing. This is an experimental technique. Immature germ cells or testicular pieces are frozen for later transplantation. No pregnancy was achieved using this method so far.

In conclusion, fertility-sparing strategy is readily available to the majority of men at risk for diminished fertility through sperm cryopreservation. Men interested in fathering

children in the future should be counseled about this option.

Fertility in Women Carrying BRCA Gene Abnormality

Fertility in women carrying BRCA gene abnormality may be reduced

Women carrying BRCA gene abnormality frequently consult with reproductive endocrinologists for fertility treatment or preservation. Women referred to test the BRCA gene for mutations based on ancestry, family history and type of cancer diagnosed in her family. If a mutation is found the lifetime risk for breast cancer is 70% and ovary cancer is 40%.

Fertility in women with BRCA mutations maybe reduced in reproductive age women because of the mutation itself, procedures used to reduce the risk of cancer or cancer treatment if they develop cancer.

BRCA mutation and Fertility

Ovarian Reserve and Response to Ovarian Stimulation

Women carrying a BRCA mutation may require ovarian stimulation using fertility medications for

1. Preservation of fertility through egg freezing or embryo freezing prior to prophylactic removal of both ovaries,
2. Preservation of fertility after the diagnosis of breast cancer and before chemotherapy or
3. An incidental fertility problem unrelated to BRCA mutation.

Ovarian reserve and response to fertility medication is one of the most determinants of success of fertility treatment or preservation.

Although it was suggested that women with BRCA mutations respond more modestly to fertility medications, this was not proven. When women carrying these mutations were compared to relatives with no mutations, there were no differences in the number of deliveries and the need for fertility treatment.

Also in a study of 260 Ashkenazi Jewish women with ovarian cancer and 331 controls, unselected for age or family history of the disease. Pregnancy success was similar for 96 mutation carrier and 164 non-carrier cases and controls.

Fertility & fertility treatment

Its unlikely that fertility or fertility treatment will increase the risk for breast cancer in women with BRCA mutations. 1380 women diagnosed with breast cancer and carrying BRCA mutations were matched 1380 women without breast cancer and carrying BRCA mutations. 16% reported fertility problems, 4% used fertility medications and 1% used IVF. There was no difference between women who developed breast cancer and those who did not regarding history of infertility and the use of fertility medication. The type of fertility medicine-oral or injection medication also did not change the risk for breast cancer, irrespective if women had children before or not.

Interestingly, there is significant excess of females among the offspring of female carriers of *BRCA1* and *BRCA2* mutations-higher female to male ratio.

Avoiding BRCA transmission to babies (PGD)

Women interested in getting pregnant should be counseled to the *risk of transmission of mutation to future children*. Both men and women carrying the mutation are at a significantly increased risk of cancer. It is very possible to prevent this transmission if the eggs or embryos are tested before replacement into the uterus in women undergoing in vitro fertilization – IVF Eggs are tested by polar body biopsy (this is a small cell attached to the egg and carry chromosomes representative to those of the egg). Embryos are tested by

testing one cell of a 6 to 8 cell embryo. Testing has many medical and ethical dimensions and is better handled by providers specializing in these areas.

Pregnancy

The risk of breast cancer may increase with multiple pregnancies and deliveries in women carrying BRCA2 mutations. In BRCA1 mutation carriers, late menarche and breast feeding reduces the risk for breast cancer. The effect of pregnancy on cancer risk though was not confirmed in multiple studies.

Read more to learn about different methods for preserving fertility after BRCA diagnosis.

Trying to Conceive (TTC): What Does Timed Intercourse Means?

If you are trying to conceive (TTC) there is one thing you need to do as it is very helpful in achieving a pregnancy.

There are also few things that are not very helpful.

Timed Intercourse : How to do it?

The majority of pregnancies take place when intercourse takes place in the six day and especially two day period ending in the day of ovulation (fertile window). Some advice that ovulation should be timed using cervical mucus, basal body temperature or urinary luteinising hormone (LH) kit. Several

factors are against this approach:

1. Timed intercourse is emotionally stressful
2. Sperm survive in the cervix, uterus and fallopian tubes for several days (>3 days, close to 7 days)
3. Studies that evaluated the use of mucus, BBT or LH kits to time intercourse did not report better odds for natural conception.

The best approach to a timed intercourse is not to time it at all provided that sex is frequent enough to maximize the chance for sperm-egg interaction. Intercourse three times a week appears to optimize the chance for natural conception.

It is not true that frequent **intercourse** reduces the pregnancy rate due to reduced sperm count and quality.

Timed Intercourse : How long?

Approximately 85% of women trying to conceive conceive within the first year. The American Society for Reproductive Medicine recommend seeking consultation if pregnancy does not ensue after one year of intercourse in women younger than 35 years and six months in women 35 years and older.

The limited Value of Cervical mucus, BBT and LH kits

Cerivcal mucus, BBT and LH kit are not accurate methods to **time ovulation**. Fluid cervical mucus, rise in temperature and positive urine LH can take place without ovulation or several days before ovulation. Studies evaluating these methods did not find and increased chance for pregnancy. Using a calender or *App* to register symptoms and mucus was not scientifically evaluated.

For a minority of couples that cannot have frequent sex (every 2 to 3 days) the use of LH kits maybe helpful. All the other

methods (mucus, temperature) had less than 50% correlation to ovulation.

Fertility Apps

Fertility Apps

Fertility apps are generally not helpful in enhancing fertility because they are not based on scientific information. The premise that cervical mucus character, urine LH kit and BBT charts are better than frequent intercourse is not scientifically correct. Thus apps based on tracking ovulation cannot contribute to your fertility beyond intercourse three times a week. No app so far was scientifically tested and was shown to enhance fertility in women or men.

Conclusion: Do have intercourse three times per week after the end of bleeding days. Do not time intercourse. If you must use urine LH kit. If you do not conceive in 6 months (≥35y) or a year (<35y) consult with a reproductive endocrinologist. Throw

your iphone or keep it and delete the app (till a truly helpful app is available).