What if You Have Dual Infertility Factor

Many Times You Do

Infertility factors are generally classified into tubal factor (blocked fallopian tubes), male factor (abnormal sperm concentration, movement or shape) and ovarian factor (no ovulation). In the majority of situations though multiple factors exist. If you partner has low sperm count, you also may have a blocked tube. Women who do not ovulate can also have endometriosis. Some men think that their female partners are infertile due to a female factor while they also have subtle sperm abnormality that prevents fertilization. Women sometimes think their male partners sperm is abnormal while they also have low egg reserve and low egg quality. Couples potentially have a dual infertility factor, most of the time. Most notably, low egg number and quality should be considered in any couple seeking fertility evaluation and treatment. Even young women with good egg reserve have abnormal eggs.

Irrespective of infertility factors, consideration of other general factors e.g genetic screening results can have a significant impact on choice of fertility treatment modality. If both partners are carriers for cystic fibrosis, they may require embryo testing (PGD) in the setting of IVF as opposed to similar couples without this genetic risk factor.

Do not Accept Treatment Before a Complete Workup. Do not Accept Empiric Treatments

For that reason, no assumptions about fertility factors and treatment should be made before a completed workup for sperm, ovulation, ovarian reserve, Fallopian tubes and general
factors (genetic and preconception screening). This careful and deliberate testing is unfortunately not always followed. In many cases, couples are treated with empiric treatments. Here are two very common empiric treatments commonly prescribed

a. **Clomid used for everyone.** Clomiphene is suitable as initial treatment for women who do not ovulate due to polycystic ovary syndrome (PCOS), have open tubes and normal sperm analysis. In modern reproductive medicine, clomid should not be used without testing of male and tubal factor. Clomid also should not be used in older women that ovulate regularly. The majority of these women are older and do not get pregnant because of lower egg quality. They require superovulation (more than one eggs) to compensate for lower egg quality.

b. **Progesterone supplementation.** Low progesterone can cause early miscarriage (not infertility) in a small percentage of women. Women that yield low progesterone after ovulation do so because of abnormal development of follicles. They are better served by induction of ovulation to produce better follicles, rather than progesterone supplementation. During fertility treatment, progesterone levels are monitored and maybe supplemented if low. Progesterone treatment in itself is not a treatment for any form of infertility.

c. **Laparoscopic surgery for endometriosis.** The magnitude of benefit for surgical treatment of infertility associated with endometriosis is limited and maybe harmful. Laparoscopic surgery for severe endometriosis is risky e.g bowel injury. Resection of endometrioma can reduce ovarian reserve. IVF is a better than laparoscopic surgery in treating infertility due to moderate and severe endometriosis. The increase in pregnancy rate after excision of mild endometriosis is limited (probably 30 surgeries are needed to produce one newborn).

d. **Varicocele repair for male factor infertility.** Although sperm parameters may improve after varicocele repair, there is
no conclusive evidence that it will translate into higher odds of pregnancy in female partners. There is a limited indication for varicocele repair aiming at improving fertility in males.

Many of these empiric treatments and prescribed with no or limited scientific basis and represent bias and expertise of the prescriber.

Ovarian Reserve Revisited-Do You Have Enough Good Eggs?

Trying to conceive over age 35 is generally not easy

I know because I tried for years to have a baby without success. While there are many factors which impact conception, one of the first concerns for women over 35 is if they have enough healthy eggs to get pregnant. Research has shown that women carry a reserve of eggs throughout their lives and that reserve diminishes over time. There are several tests which help to determine ovarian reserve including antral follicle testing, the clomid challenge and the AMH test which is relatively new.
The antral follicle test

Uses vaginal ultrasound to count and measure the small follicles, antral follicles, on the ovary. The higher the number of antral follicles, the better ovarian reserve and better odds for conception.

The AMH Test

Anti-mullerian hormone test, measures the levels of AMH in a woman’s blood. Since this hormone remains relatively constant over the menstrual cycle, it can be tested at any point in the month. Women with higher AMH levels tend to have a better ovarian reserve and a better chance at conception.

When I decided to try to conceive one last time at age 44

My reproductive endocrinologist began by ordering the Clomid Challenge Test. For the test, I took clomid, a fertility drug used to induce ovulation, for 5 days. Generally speaking, the procedure works like this:

- On Day 3 of your menstrual cycle, a blood test is given to measure your FSH, LH, and estradiol levels.
- On Day 5 of your cycle, you begin to take a 5-day supply of clomiphene citrate, 100 mg of clomiphene each day for five days.
- On Day 10, you will have another blood draw to check FSH, LH, and estradiol levels again.

Normal results include low FSH values on both Day 3 and Day 10, and low estradiol values on Day 3. Results are abnormal if your FSH values are elevated. Your doctor may decide to re-test if your results are abnormal.

My results were normal but that is a fraction of the total conception story and half of the ovarian reserve story.
Ovarian reserve consists not only of the quantity of eggs but also the quality of eggs. Research tells us that while tests like the clomid challenge check for the quantity of eggs, the quality of eggs is generally determined better by age. This is an unfortunate fact for those of us over 35.

According to Dr. James Toner in his paper “Ovarian Reserve, Female Age and the Chance for Successful Pregnancy”, once women reach their mid thirties, specifically 37, their egg quantity begins to diminish at a faster rate. Toner also reports that even if egg quantity is good, chances of a viable pregnancy drop due to the diminishing quality of eggs as women age.

Based on the research, it is clear that the averages do not look promising for women over age 35 trying to have a baby. There is, however, other information to consider. Let’s take a look at the bell curve. Basically, about 2/3 of the cases for a given situation fall in the fat part of the curve meaning that averages generally apply to most people. However, there are still one third of the people who fall outside of the fat part of the bell curve and averages do not generally apply to them. As you look at your individual situation, it is your lab work, anatomy and physiology that matter. I am a classic example of defying the odds. My ovarian reserve quantity was good but that wasn’t what was preventing me from conceiving a child. It took many more tests to determine that a badly placed uterine tumor was most likely preventing implantation. At age 44, the research showed that an average woman in my situation had only a 3% chance of having a healthy baby. Yet, I was able to conceive in two of 4 IUI treatments and gave birth to a healthy little girl 9 months ago at the age of 45.

There are many components to conceiving a
Ovarian reserve is one of them. There are also many medical interventions to boost the odds of conception. Medical research provides us with excellent information about infertility and age including work on ovarian reserve. While the research tells us that the odds of getting pregnant in late 30’s and 40’s diminishes, one needs to remember that each woman is unique and she needs to work with her doctor to explore all options in her quest for pregnancy.

About the Author: Deborah Lynn is the creator/owner of Over 35 New Moms and a former corporate vice president. She holds degrees in Education, Kinesiology and pursued doctoral study in Physiology. She spent over 17 years working in the corporate environment and now focuses her time on raising her daughter and helping other women over 35 in their journey to have a baby. For more information, visit The Resource Guide for Pregnancy over 40 at http://www.selfgrowth.com

Should you Consider Fertility Assessment when you do not Intend to Get Pregnant Soon?

Should you Consider Fertility Assessment when you do not Intend
to Get Pregnant Soon?

If you do not intend to become pregnant in the near future, do you need to assess your fertility? It is very possible that many women and men will be screened for relatively a small number of individuals that will show abnormalities. From the individual point of view, however, there are two distinct potential benefits:

Detection of abnormalities related to fertility and reproduction:

- **Screening for fertility problems**
  - Ovary: Diminished ovarian reserve and anovulation
  - Fallopian Tubes: tubal block
  - Male factor: abnormal sperm analysis
  - Other factors: abnormalities of the uterus or cervix

Detection of abnormalities related to the safety of getting pregnant:

- Screening for genetic abnormalities: carrier screening
- Screening for other medical disorders and infectious diseases
The decision to consult with a reproductive endocrinologist to assess your fertility is individual. One would be more interested in fertility consultation in the presence of

1. Known Fertility Issue: PCOS, absence of menses, endometriosis, fibroids, PID, abdominal surgery, prior chemotherapy for cancer or lupus

2. Risk factor for low fertility: 35 years or older and intend to delay pregnancy

3. Genetic or medical risk factor: genetic screening especially in certain ethnic groups e.g. Ashkenazi Jewish individuals

Informed about your fertility potential you may elect to either do nothing or respond to the abnormal results. If diagnosed with lower ovarian reserve you may elect to attempt pregnancy sooner or freeze your eggs. If a genetic abnormality is found in both partners you may consider testing of embryos to avoid transmission to the babies. If an abnormal sperm parameters were found, a referral to a urologist and / or sperm freezing could be considered.

There are no clear cut recommendation for fertility screening in men and women not intending pregnancy in the near future. Women intending to delay getting pregnant or with a known fertility issue and certain ethnic groups should consider screening for fertility and genetic problems.

Preconception Checklist
Preconception Checklist

What should you do if you decided to get pregnant?

Start prenatal vitamins: one tablet per day. Make sure that it contains 1mg of folic acid and has 5000 units (not more) of vitamin A

Visit your gynecologist: for history, exam, pap test and vaccination history.

Preconception labs: to assess the safety of pregnancy. Tests should include hepatitis B surface antigen, hepatitis C antibody, HIV, blood type, blood count, prolactin, TSH (thyroid function), cultures for gonorrhea and Chlamydia.

Genetic screening: to assess the carrier state of the parents for common genetic diseases and the risk for transmission to children. Basic tests include common mutation for cystic fibrosis, spinal muscular atrophy and fragile X syndrome. Additional tests are related to ethnicity: hemoglobin abnormalities in blacks, Mediterraneans and Asians, Ashkenazi profile for European Jews, Tay Sach disease for Jews and French Canadians. Another approach is to apply a ‘universal genetic test’ that encompasses a large number of genetic mutations for many diseases irrespective of ethnicity to allow for detection of rarer genetic diseases or even to sequence the whole genes related to theses diseases.

Lifestyle factors: better nutrition e.g one serving of small fish per week, stop smoking, avoid alcohol and reduce exercise if doing strenuous training

Worried? have a risk factor? or wants a more proactive approach?: Obtain a sperm analysis, HSG to test if the tubes are open and ovarian reserve tests to investigate the function
of the ovaries (vaginal ultrasound and blood work).

Intercourse: have regular intercourse three times a week without attempting to monitor or to time ovulation.

**For How Long should you try to conceive before moving to the next step?**

a. If a fertility factor known or detected e.g abnormal sperm analysis, blocked fallopian tube, no ovulation, low ovarian reserve, carrier of genetic mutation... you should seek consultation with a reproductive endocrinologist

b. If no fertility factor is known:

1. Female age < 35 years try to conceive for one year before seeking consultation with a reproductive endocrinologist

2. Female age ≥ 35 years seek consultation within 6 months if not pregnant

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**Sperm Analysis in Natural and Assisted Conception**

Sperm analysis is the initial test for evaluation of male fertility. Components of *sperm analysis* include volume, count (concentration), movement and shape of sperm cells.

**Normal Sperm Analysis**

Sperm volume: the total amount of fluid produced. Commonly 1.5 mL or more.
Sperm count: number of sperm in each mL of fluid. Normal concentration is 15 to 20 million per mL. Total count = volume × concentration (count).

Sperm motility: % of sperm with vigorous or moderate movement. Total motile sperm count = volume × concentration × % motility.

Sperm morphology: Shape of sperm using strict (Tygerberg, Kruger) criteria 4% normal or more.

**Strict Sperm Morphology**

Lower reference limits for men whose partner conceived within 12 months after stopping use of contraception had the following parameters (WHO manual, 5th ed.) are:

- Semen volume (ml) 1.5 (1.4–1.7)
- Total sperm number \(10^6\) per ejaculate) 39 (33–46)
- Sperm concentration \(10^6\) per ml 15 (12–16)
- Total motility (PR + NP, %) 40 (38–42)
- Progressive motility (PR, %) 32 (31–34)
- Vitality (live spermatozoa, %) 58 (55–63)
Sperm morphology (normal forms, %) 4 (3.0–4.0)

All parameters should be interpreted in conjunction with clinical information. If abnormal it can be repeated in 2 to 3 months.

**How much sperm is enough?**

Evaluation of male fertility through sperm analysis is complex. Clinical factors in history and examination should be considered. Total sperm count in the specimen is an important factor e.g. low sperm morphology in specimen of 200 million sperm may have a different effect than low morphology in a specimen of 30 million sperm. Although there are notable variations in a sperm sample of the same man over time, there is no evidence that repeat evaluation of semen is helpful in managing infertility in a female partner.

Since we have very limited tools (medications, supplements, surgery) to meaningfully improve sperm parameters and fertility, a practical management of fertility due to male factor is:

>10 million motile sperm: suitable for natural conception and IUI

2-10 million motile sperm: suitable for IVF

<2 million motile sperm or strict morphology <2% suitable for IVF with ICSI (intracytoplasmic sperm injection)

IVF + ICSI is indicated if surgical sperm harvest is needed and some cases or retrograde ejaculation and anti-sperm antibodies.

**Can the sperm analysis be improved?**

The count, motility and morphology can sometimes be improved (lifestyle modifications, medicine, surgery). Two important tips to consider though
a. In the majority of cases, there is no evidence that this improvement increases the odds of a pregnancy in female partner

b. The delay in treatment is sometimes critical for women with low egg reserve while they wait for their partners to improve there sperm parameters

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**Ovarian Cysts and Fertility**

Ovarian cysts are very common during reproductive age women. The cyst has a wall and is full of fluid. Very few of ovarian cysts are cancer after puberty and before menopause. The two most common types are **follicular cysts** and **corpus luteum cysts**. These are the result of follicle growth in the ovary (the sac that contains the egg) that either a. does not release the egg and continue to grow or b. releases the egg then the follicle wall now called the corpus luteum closes and reform a cyst. The vast majority of these cysts require just observation as they resolve on their own.

The other two common benign cysts are dermoid cysts and endometriomas. **Dermoid cyst** is a developmental cyst that are commonly found in young women. It is very rare for them to become cancer. Larger cysts can twist and become painful as they twist the blood vessels of the ovary. This needs prompt medical attention. **Endometriomas** are benign cysts full of old
blood. The wall of endometrioms is similar to the lining of the uterus-endometrium. They sometimes cause pelvic pain.

Benign tumors of the ovary can also include *serous or mucinous cysts*, they contain thin or thick fluid, respectively. They rarely become malignant. *Border-line ovarian cysts* exhibit more activity of the cells lining the cyst wall but lack the invasion seen in cancer. *Malignant cysts* do exist but are not common before the age of 40.

Evaluation of ovarian cysts include clinical history, pelvic exam, careful ultrasound, color doppler to study blood flow into the cyst and blood work to assay tumor markers. Vaginal ultrasound, can in expert hands, delineate the characteristic appearance of the cyst and can reach an accurate diagnosis in 90% of dermoid cysts and endoemtrioms. Sometimes a follow up of six to eight weeks is needed as the majority of follicular and corpus luteum cysts will disappear during this period. Larger cysts that do not appear during that period may require surgical evaluation, usually using minimally acess surgery-laparoscopy.

**Fertility preservation in women diagnosed with ovarian cysts.** The most important initial task is to exclude malignancy in an ovarian cyst.

**Benign cysts**— can be managed using *observation* every 6 months or ovarian *cystectomy*. Ovarian cystectomy entails making a cut in the ovary and removal of the cyst and the cyst wall. *Removal of the cyst wall, inadvertently remove some of the adjacent ovarian tissue*. Sometimes that impairs the future function of the ovary and reduces ovarian reserve and possibly the chance of future pregnancy. This is especially true if the surgery has to be repeated in the future or needs to be done on both sides. If the type of cyst is known with high degree or certainty as in the case of dermoid cysts and endometriomas, the cysts are small and not causing any complaints, young women can elect to observe them until they
complete their family. If ovarian cystectomy is planned, discussion of the effects on ovarian function should be initiated as well as evaluation of ovarian reserve before and after surgery. Ovarian stimulation and egg or embryo freezing can be accomplished prior to surgery. For some women, ovarian tissue freezing can also be performed at the time of surgery.

**Borderline ovarian cysts.** Borderline ovarian cysts can be treated with cystectomy-removal of the cyst, oophorectomy-removal of the whole ovary or hysterectomy with removal of both ovaries. There is no evidence that one treatment is better than the other in terms of survival. For women who desire future fertility removal of the cyst only is a viable option. If the ovary need to be removed, ovarian stimulation, egg retrieval and embryo or egg freezing can be performed prior to surgery.

**Malignant ovarian cysts.** Malignant ovarian tumors limited to one ovary, can be treated by removal of that ovary with preservation of the uterus and the other ovary. Unfortunately, those that spread beyond the ovary may require hysterectomy and removal of both ovaries.

If you have an ovarian cyst and surgery was recommended, consultation with a reproductive endocrinologist and oncologist or gynecologist can clarify possible effects of surgery on future fertility. Women then will have the opportunity to understand fertility preservation options available for them.

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**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.
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

It's 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

Cervical 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 an 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 ($\geq 35y$) 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).
Egg Reserve and Infertility

Egg reserve means the number and quality of eggs remaining in the ovaries at a given age. It reflects the fertility potential of a woman irrespective of the cause of infertility, even male factor.

Benefits of Testing for Egg Reserve

Testing for egg reserve results should be interpreted with caution. Abnormal values should not be a cause for denying fertility treatment because the predictive power for pregnancy with own eggs is modest. For women, ovarian reserve tests give women insight into the chance of pregnancy with their own eggs. It also may indicate the need to promptly avoid delay in seeking fertility treatment. For reproductive endocrinologists, the tests have value in designing fertility treatment and selecting the most appropriate fertility treatment protocol. They predict response to fertility medications and allow infertility specialists to select treatment protocol and gonadotropin dose. Egg reserve also predicts the number of eggs retrieved for IVF or egg freezing.

Egg Reserve: Egg Number

Although the number of eggs in the ovaries decrease with age there is significant individual variation in initial number endowed in the ovaries and the rate of decrease. Some young women has low egg number and older with large number of eggs. Ovarian reserve tests are used to estimate this number.
Egge reserve: the number of eggs in the ovaries drops with age

History

Medical history may indicate low egg reserve in women with prior excision of ovarian cysts, endometriosis of the ovaries, women who smoke and with family history of early menopause

Antral follicle count

The number of antral follicles in the ovaries (the structures that contain the eggs) can be seen and counted using vaginal ultrasound. Performed by an experienced reproductive endocrinologist, it can accurately estimate ovarian reserve. Low count e.g <10 in both ovaries points to low reserve.

Day 3 FSH, Estradiol

FSH is produced by the master gland in the base of the brain. Estradiol is made by the follicles themselves. Measured in the second or third day of menstrual cycle, high FSH (>12) of high
estradiol (>75) points to low egg reserve.

**Antimullerian Hormone (AMH)**

AMH is produced by the cells surrounding the eggs in small follicles and is a more direct measure of egg reserve than FSH. It can be accurately measured any day in the cycle with little variations in between cycles. Levels <1.5 ng/dL generally indicates low egg reserve. It correlates well with antral follicle count.

**Genetic Screening**

Low egg reserve in few women is due to a genetic cause. Fragile X syndrome is a genetic disease that causes low egg reserve and mental deficiency in newborn males. Chromosomal abnormalities e.g Turner syndrome, translocations are also associated with low egg reserve. Genetic screening is performed using a simple blood test before starting fertility treatment.

**Egg Reserve: Egg Quality**

**What does egg quality means ?**

Good quality eggs are chromosomally normal (has 23 chromosomes). The most important factor that prevents the achievement of pregnancy or leads to early miscarriage is an abnormal egg (has extra or missing chromosome or piece of a chromosome). Many eggs at any age in any woman are abnormal and the normal eggs are the ones that are successful in being fertilized with sperm, implant and achieve a pregnancy. These errors takes place when the original cell that produce the eggs divide to reduce the number of chromosomes to half. The division (meiosis) is many times unequal leading to an egg with an extra or missing chromosome.
Age and egg quality

The ovary releases better quality age earlier in life and lower quality age later, for unknown reason. Female age is the most important indicator for egg quality, chance for spontaneous pregnancy and after fertility treatment. Older women need to try longer to achieve pregnancy and at an increased risk for miscarriage, ectopic pregnancy and delivering a baby with chromosomal abnormalities e.g Down Syndrome. This effect of age becomes clinically evident at age 30 or even earlier. Age is more important than the number of eggs in the ovaries. Young women with few eggs in the ovary are more successful in getting pregnant than older women with many eggs in the ovary.

Meiosis
Testing for egg quality: PGD

Age is the only available noninvasive method to estimate egg quality. Healthy eggs cannot be identified using any noninvasive method. It is possible to identify chromosomal errors in the egg during IVF fertility treatment after biopsy of the first polar body of unfertilized egg or after removing one cell from an embryo after the egg is fertilized then test this material for chromosomal abnormality. This process is called PGD or preimplantation genetic diagnosis. It is important to remember that PGD is not proven so far as method of enhancing fertility potential. It simply detects if the egg or embryo is chromosomally normal or not but will not make an unhealthy egg healthy.

Read more about ovarian reserve and low response to ovarian stimulation in my review here.

Endometriosis & Infertility

Endometriosis & infertility commonly coexist. Endometriosis can have profound effects on woman’s fertility and the ability to conceive in the future, either by virtue of the disease itself or its treatment. Endometriosis means that the tissue that lines the uterus is found in other areas, most notably the ovaries and the lining of the pelvis, frequently causing pelvic pain and infertility. In early stages of endometriosis, the implants in the pelvis may chemically affect various stages of reproduction including fertilization and implantation. In later stages, endometriosis incites scarring that can block the fallopian tubes and can produce cysts in the ovaries called endomertiomas. Experienced reproductive endocrinologist can diagnose endomertiomas with high degree of
accuracy using ultrasound. In other areas the diagnosis of endometriosis may require laparoscopy.

Treatment of Endometriosis

Women seek treatment for endometriosis because of pain or infertility. Treatment for endometriosis is either medical or surgical.

Medical treatment For Endometriosis

It entails suppression of ovulation and estrogen production. Estrogen stimulates the growth of endometriosis. Medical treatment has side effects and is not suitable for women seeking pregnancy now. It, however, does not have a long lasting effects on fertility. Medications used include oral contraceptive pills, androgenic medications or gonadotropin releasing hormone agonists as depot leuprolide. Women on these medications does not need to consider fertility preservation strategies because of treatment.

Surgical Treatment For Endometriosis

Surgery aims at removal of endometriosis spots in the pelvis or excising endometrioma cysts from the ovary. Cutting the ovary and stripping the wall of the endometriomas is associated with loss of eggs during the procedure. The ovary, where the procedure is done commonly have less reserve and may show lower response to fertility medication. The risk for decreased fertility is higher if the procedure is done on both ovaries. It is also higher after extensive surgery, commonly associated severe disease in the pelvis. Sometimes the ovary need to be completely removed. Removal of endometriosis deposits in the pelvis-usually burning them using cautery-can also incite scarring that can block the fallopian tubes. Women undergoing surgery for endometriosis should consider fertility preservation. Aspiration of endometriomas is generally not a
recommended treatment as they tend to recur and can cause infection.

**Fertility Treatment in Women with Endometriosis**

Severe Endometriosis mechanically blocks the fallopian tubes due to scarring. IVF appears to be the best treatment option. Although endometriosis reduces the response to ovarian stimulation, it does not appear to reduce the pregnancy rates.

Mild endometriosis does not distort the fallopian tubes. Two treatment options are available: laparoscopy with excision or burning of endometriosis or ovarian stimulation + IUI. Both can increase the chance for pregnancy but IUI is less invasive.

**Fertility Preservation strategies in women with endometriosis**

Reproductive age women diagnosed with endometriosis and advised to undergo surgery by their physicians should inquire about the possible effects of surgery on future fertility and consider fertility preservation strategies. Strategies include embryo cryopreservation, egg freezing or ovarian tissue freezing.

**Embryo cryopreservation**

It's the standard method for preservation of fertility. It requires stimulation of the ovaries using fertility medication for approximately 10 to 12 days, followed by egg retrieval. Eggs are fertilized using partner or husband sperm. The resulting embryos can be frozen indefinitely. One risk is that endometrioma cysts can get infected at the time of egg retrieval.
Egg freezing

It can be used in women not in stable relationship and declining the used of donor sperm. It require ovarian stimulation. This is followed by retrieval and freezing. Eggs are frozen using \textit{vitrification}. Vitrification is associated with better survival after thawing than slow freezing. When desired, the eggs are thawed and fertilized using intracytoplasmic sperm injection-ICSI and the resulting embryos are transferred to the uterus.

Endometriosis and Ovarian Cancer

It was noticed that women diagnosed with endometriosis has a small increase in the risk for certain rare types of ovarian cancer. Its essential that endometriomas in the ovary be thoroughly investigated using ultrasound and other imaging modalities and sometimes blood tests. Surgery may be needed to remove the cyst and submit it for pathological examination to exclude cancer.