Certified Fertility Counselor Course-Session 8- Infertility and What Can Compromise it, and Blood tests

Infertility Facts

Infertility affects approximately 7.3 million couples in the United States (basically that's 1 in every 8 couples are affected). Infertility is the inability to conceive after a year of trying. For couples over 35, it decreases to six months. Infertility is a disease of the reproductive system.

- 30% associated with male factor infertility
- 30% associated with female infertility
- 20% of infertility diagnosis is 'unexplained'
- 10% is a combination of both male and female infertility

Infertility affects all races, ages, sizes, shapes, and sex. According to the CDC (center of disease control) in a July 2012 survey, 6.7 million women ages 15-44 have impaired fertility. 1.5 million Married women ages 15-44 are infertile and 7.4 million have used infertility services.

According to Discovery Health, Fallopian tube blockage, or peritoneal factors account for 35% of all female infertility problems. Irregular or abnormal ovulation is about 25% of female infertility cases. Endometriosis is found in around 35% of infertile women. About 30% of couples will be diagnosed with 'unexplained infertility'. More than 70,000 babies have been born in the United States as a result of assisted reproductive technologies, including 45,000 as a result of in vitro fertilization.

Primary Infertility applies to those who have never conceived, whereas secondary infertility is defined as the inability to become pregnant, or carry a pregnancy to term following the birth of one or more biological children. More than 1 million couples have secondary infertility, according to the National Survey of Family Growth.

Couples often think they are fertile just because they conceived once before, however this sometimes is not the case. Some couples even though they conceived prior, may experience secondary infertility.

Infertility is becoming a nationwide global problem, affecting countries like Japan, India, Canada, Australia, Germany, Greece, and China. More or less because of health factors from processed foods, lack of proper nutrients, or environmental pollutants and chemicals in the air.

However some issues lie with age especially is some couples decide to prolong their family planning until after careers, marriage, or finding the right partner.

Infertility affects anyone from 18 or older that are trying to conceive, either with certain health issues, or other endocrine factors.

Infertility barriers

Certain types of endocrine disorders, health factors, or disease can cause barriers to anyone's fertility. Unfortunately infertility has many causes.

Age- Both men and women are affected.
Endometriosis- Endometriosis is a female health disorder that occurs when cells from the lining of the womb (uterus) grow in other areas of the body. This can lead to pain, irregular bleeding, and problems getting pregnant (infertility).
Uterine Fibroids- Uterine fibroids are benign growths of the muscle inside the uterus. They are not cancerous. Fibroids can cause a wide variety of symptoms, including heavy menstrual bleeding and pressure on the pelvis. Fibroids could distort or block fallopian tubes, or interfere with the passage of sperm from the cervix to the fallopian tubes. Sub mucosal fibroids may prevent implantation and growth of an embryo, and in these cases, doctors often recommend removing these fibroids before attempting pregnancy.
Uterine Polyp- Uterine polyps, also called endometrial polyps, are usually small, bulb-shaped masses of endometrial tissue, attached to the uterus by a stalk. They are soft, as opposed to uterine fibroids, which can grow much bigger and are made of hard muscle. Uterine polyps can act like a natural intrauterine device (IUD), preventing a fertilized egg from implanting in the uterine wall. They can also block the area where the fallopian tube connects to the uterine cavity, preventing sperm from traveling into the tube to meet the egg. Similarly, they can block the canal of the cervix, which would prevent sperm from entering the uterus at all.
Scarring- can limit the interaction between the tubes and ovaries and/or block the fallopian tubes, making it difficult or impossible to get pregnant. Women with tubal damage who do conceive are at increased risk of ectopic pregnancy. Scarring inside the uterus causes infertility by limiting the healthy surface area in the uterine lining where an embryo can implant.
Polycystic Ovarian Syndrome (PCOS) - a condition in which a woman has an imbalance of female sex hormones. This may lead to menstrual cycle changes, cysts in the ovaries, trouble getting pregnant and other health changes.
Anovulation- is a menstrual cycle during which the ovaries do not release an oocyte. Therefore, ovulation does not take place. Chronic anovulation is a common cause of infertility. In addition to the alteration of menstrual periods and infertility, chronic anovulation can cause or exacerbate other long term problems, such as hyperandrogenism or osteopenia. It plays a central role in the multiple imbalances and dysfunctions of polycystic ovary syndrome.
Sperm Abnormalities- (decreased count, motility, morphology)
Blocked Fallopian Tubes- is a major cause of female infertility. Blocked fallopian tubes are unable to let the ovum and the sperm converge, thus making fertilization impossible. About 20% of female infertility can be attributed to tubal causes. Most commonly a tube may be obstructed due to infection such as pelvic inflammatory disease (PID). The rate of tubal infertility has been reported to be 12% after one, 23% after two, and 53% after three episodes of PID. The Fallopian tubes may also be occluded or disabled by endometritis, infections after childbirth and intraabdominal infections including appendicitis and peritonitis.

Sexually Transmitted Disease- According to the CDC 24,000 women become infertile each year due to sexually transmitted diseases that go undiagnosed. Americans ages 15 to 24 account for 70% of the 820,000 gonorrhea infections among all ages; 63% of the 2.9 million chlamydia infections among all ages; 49% of the 14.1 million HPV infections among all ages; 45% of the 776,000 genital herpes infections among all ages; and 20% of the 55,400 syphilis infections among all ages. Finally, Americans ages 13 to 24 accounts for 26% of the 47,500 HIV infections among all ages.
Pelvic Inflammatory Disease (PID) - refers to infection of the uterus, fallopian tubes and other reproductive organs that causes symptoms such as lower abdominal pain. It is a serious complication of some sexually transmitted diseases, especially chlamydia and gonorrhea. PID can damage the fallopian tubes and tissues in and near the uterus and ovaries. PID can lead to serious consequences including infertility, ectopic pregnancy, abscess formation, and chronic pelvic pain. Each year in the United States, it is estimated that more than 750,000 women experience an episode of acute PID. Up to 10-15% of these women may become infertile as a result of PID. A large proportion of the ectopic pregnancies occurring every year are due to the consequences of PID.

Listed above are just some of the infertility barriers. Between health, genetic conditions, and endocrine disorders infertility is growing rapidly causing more couples to experience infertility complications.

In 30 percent of infertility issues can be contributed to male factor infertility, generally related to low sperm counts. Only a small percentage of male infertility is caused by hormone problems. There are some factors that can affect male fertility.

Smoking--significantly decreases both sperm count and sperm cell motility.
Prolonged use of marijuana and other recreational drugs.
Chronic alcohol abuse.
Anabolic steroid use--causes testicular shrinkage and infertility.
Overly intense exercise--produces high levels of adrenal steroid hormones which cause testosterone deficiency resulting in infertility
Inadequate vitamin C and Zinc in the diet.
Tight underwear--increases scrotal temperature which results in decreased sperm production.
Exposure to environmental hazards and toxins such as pesticides, lead, paint, radiation, radioactive substances, mercury, benzene, boron, and heavy metals
Malnutrition and anemia. (this also affects female)
Excessive stress on a continuous basis

However, hormonal problems can occur, among other issues in male fertility. Such as the following:

Hyperprolactinemia:
Elevated prolactin--a hormone associated with nursing mothers, is found in 10 to 40 percent of infertile males. Mild elevation of prolactin levels produces no symptoms, but greater elevation of the hormone reduces sperm production, reduces libido and may cause impotence. This condition responds well to the drug Parlodel (bromocriptine).
Hypothyroidism:
Low thyroid hormone levels--can cause poor semen quality, poor testicular function and may disturb libido. May be caused by a diet high in iodine. Reducing iodine intake or beginning thyroid hormone replacement therapy can elevate sperm count. This condition is found in only 1 percent of infertile men.
Congenital Adrenal Hyperplasia:
Occurs when the pituitary is suppressed by increased levels of adrenal androgens. Symptoms include low sperm count, an increased number of immature sperm cells, and low sperm cell motility. Is treated with cortisone replacement therapy. This condition is found in only 1 percent of infertile men.
Hypogonadotropic Hypopituitarism:
Low pituitary gland output of LH and FSH. This condition arrests sperm development and causes the progressive loss of germ cells from the testes and causes the seminiferous tubules and Leydig (testosterone producing) cells to deteriorate. May be treated with the drug Serophene. However, if all germ cells are destroyed before treatment commences, the male may be permanently infertile.
Panhypopituitafism:
Complete pituitary gland failure--lowers growth hormone, thyroid-stimulating hormone, and LH and FSH levels. Symptoms include: lethargy, impotence, decreased libido, loss of secondary sex characteristics, and normal or undersized testicles. Supplementing the missing pituitary hormones may restore vigor and a hormone called hCG may stimulate testosterone and sperm production.

There are a variety of physical problems that can contribute to male infertility. These problems either interfere with sperm production, or disrupt the pathway down which sperm travel from the testes to the tip of the penis. Usually these problems are characterized by a low sperm count or abnormal sperm morphology. The most common physical problems that cause male infertility are:

Variocoele:

A varicocele is an enlargement of the internal spermatic veins that drain blood from the testicle to the abdomen (back to the heart) and are present in 15% of the general male population and 40% of infertile men. A varicocele develops when the one way valves in these spermatic veins are damaged causing an abnormal back flow of blood from the abdomen into the scrotum creating a hostile environment for sperm development. Varicocoeles may cause reduced sperm count and abnormal sperm morphology which cause infertility. Variococles can usually be diagnosed by a physical examination of the scrotum which can be aided by the Doppler stethoscope and scrotal ultrasound.

Damaged Sperm Ducts:

7 percent of infertile men cannot transport sperm from their testicles to out of their penis. This pathway may be blocked by a number of conditions:

- A genetic or developmental mistake may block or cause the absence of one or both tubes (which transport the sperm from the testes to the penis).
- Scarring from tuberculosis or some STDs may block the epididymis or tubes.
- An elective or accidental vasectomy may interrupt tube continuity.

Torsion:

Is a common problem affecting fertility that is caused by a supportive tissue abnormality which allows the testes to twist inside the scrotum which is characterized by extreme swelling. Torsion pinches the blood vessels that feed the testes shut which causes testicular damage. If emergency surgery is not performed to untwist the testes, torsion can seriously impair fertility and cause permanent infertility if both testes twist.

Infection and Disease:

Mumps, tuberculosis, brucellosis, gonorrhea, typhoid, influenza, smallpox, and syphilis can cause testicular atrophy. A low sperm count and low sperm motility are indicators of this condition. Also, elevated FSH levels and other hormonal problems are indicative of testicular damage. Some STDs like gonorrhea and chlamydia can cause infertility by blocking the epididimis or tubes. These conditions are usually treated by hormonal replacement therapy and surgery in the case of tubular blockage.

Klinefelter's Syndrome:

Is a genetic condition in which each cell in the human body has an additional X chromosome--men with Klinefelter's Syndrome have one Y and two X chromosomes. Physical symptoms include peanut-sized testicles and enlarged breasts. A chromosome analysis is used to confirm this analysis. If this condition is treated in its early stages (with the drug hCG), sperm production may commence and/or improve. However, Klinefelter's Syndrome eventually causes all active testicular structures to atrophy. Once testicular failure has occurred, improving fertility is impossible.

Retrograde Ejaculation:

Is a condition in which semen is ejaculated into the bladder rather than out through the urethra because the bladder sphincter does not close during ejaculation. If this disorder is present, ejaculate volume is small and urine may be cloudy after ejaculation. This condition affects 1.5 percent of infertile men and may be controlled by medications like decongestants.

Several sexual problems exist that can affect male fertility. These problems are most often both psychological and physical in nature and consist of the following:

Erectile Dysfunction (ED): Also known as impotence, this condition is common and affects 20 million American men. ED is the result of a single, or more commonly a combination of multiple factors. In the past, ED was thought to be the result of psychological problems, but new research indicates that 90 percent of cases are organic in nature. However, most men who suffer from ED have a secondary psychological problem that can worsen the situation like performance anxiety, guilt, and low self-esteem. Many of the common causes of impotence include: diabetes, high blood pressure, heart and vascular disease, stress, hormone problems, pelvic surgery, trauma, venous leak, and the side effects of frequently prescribed medications (i.e. Prozac and other SSRIs, Propecia).
Premature Ejaculation: Is defined as an inability to control the ejaculatory response for at least thirty seconds following penetration. Premature ejaculation becomes a fertility problem when ejaculation occurs before a man is able to fully insert his penis into his partner's vagina. Premature ejaculation can be overcome by artificial insemination or by using a behavioral modification technique called the "squeeze technique" which desensitizes the penis.
Ejaculatory Incompetence: This rare psychological condition prevents men from ejaculating during sexual intercourse even though they can ejaculate normally through masturbation. This condition sometimes responds well to behavioral therapy; if this technique does not work, artificial insemination can be employed using an ejaculate from masturbation.

There are several procedures and invasive testing reproductive endocrinologists will go through to determine if their patient has Infertility, or unexplained infertility. Once a diagnosis is determined, patients are given certain infertility medications known as A.R.T.'s, which are Artificial Reproductive Technologies. With each medication, there are known side effects to consider as well. Couples who have age factor infertility may use a surrogate, donor sperm, or In Vitro Fertilization.

Autoimmune disorders such as diabetes, lupus, and thyroiditis, are linked to infertility, or rather a decrease in fertility. Premature ovarian insufficiency, endometriosis, and polycystic ovarian syndrome include autoimmune components. There are many unexplained cases of infertility, inflammatory processes or antibodies may be directed against hormones, clotting factors, or reproductive tissues as the ovaries or testes. The biological factors involved in autoimmune infertility are various. These include a multitude of cellular and inflammatory changes.

What is an autoimmune disease? The term autoimmune disease refers to a varied group of more than 80 serious, chronic illnesses that involve almost every human organ system. In all of these diseases, the body's immune system becomes misdirected, attacking the very organs it was designed to protect. About 75% of autoimmune diseases occur in women, most frequently during the childbearing years. Autoimmune diseases can affect connective tissue. It can also affect the nerves, muscles, endocrine system, and gastrointestinal system.

Several types of autoimmune diseases are: (affecting fertility)

Affects Nervous System:

- Multiple sclerosis
- Myasthenia Gravis
- Autoimmune Neuropathies
- Guillain-Barre
- Autoimmune Ureitis

Affects Gastrointestinal tract:

- Crohn's Disease
- Ulcerative Colitis
- Primary Biliary Cirrhosis
- Autoimmune Hepatitis

Blood-Related autoimmune conditions:

- Autoimmune Hemolytic Anemia
- Pernicious Anemia
- Autoimmune Thrombocytopenia

Affecting endocrine glands:

- Type 1/Immune Mediated Diabetes Mellitus
- Grave's Disease
- Hashimoto's Thyroiditis
- Autoimmune Oophoritis/Orchiti
- Autoimmune Adrenal Diseases

Affecting Blood vessels:

- Temporal Artertis
- Anti-Phospholipid Antibody Syndrome
- Vasculitides
- Wegener's Granulomatosis
- Behcet's Disease

Autoimmune disease of the skin:

- Psoriasis
- Dermatitis Herpetiformis
- Pemphigus Vulgaris
- Vitiligo

Connective tissues diseases affecting organs:

- Rheumatoid Arthritis
- Systemic Lupus Erythematosus
- Polymyositis
- Dermatomyositis Scleroderma
- Spondyloarthropathies
- Sjögren’s Syndrome

Antinuclear antibodies (ANAs) which have been associated with infertility can be present in conditions such as SLE, Sjögren's syndrome, Raynaud's syndrome, and can also be detected in women with a history of exposure to chemicals such as Bisphenol-A.

Addison's disease is associated with anti-ovarian antibodies which can reduce ovulatory function and cause premature ovarian failure in severe cases.

Women with celiac disease may have multiple nutritional deficiencies that can lead to infertility. Celiac disease has been linked to recurrent miscarriage, pregnancy complication and infertility. A 2010 study found that between 5-10% of women with a history of stillbirth, recurrent miscarriage, intrauterine growth restriction, and infertility were seropositive for transglutaminase IgA compared to 1% of the control group. Latent celiac disease may be a major cause of unexplained infertility.

In approximately 20% of women with premature ovarian insufficiency (POI), autoimmune factors can be found. POI can be linked to autoimmune thyroid disease, Addison's disease, or SLE or may have unknown etiology. Women may have antibodies against the ovarian tissues, or reproductive hormones such as FSH.

Antisperm antibodies are another cause of infertility. These can be present in either male or female. They are commonly found in males after vasectomy procedures, and their presence can make vasectomy difficult to reverse. Antisperm antibodies affect the ability of the sperm to penetrate the egg or reduce motility by attaching to the tail of the sperm. They have also been associated with antiphospholipid antibodies. Antisperm antibodies are generally produced by CD19+/5+ B cells and are associated with elevated natural killer cells and anti-DNA antibodies.

Blood clotting disorders are disorders with increased antiphospholipid antibodies (APAs) including anti-cardiolipin antibodies cause a hypercoagulatory state in the blood and can be associated with reproductive failure and recurrent miscarriage. These antibodies can be found in systemic diseases such as SLE, or on their own.

Folate deficiency and hyperhomocysteinemia are known to be risk factors for infertility and pregnancy complications. Folate metabolism disorders can lead to reduced cell division, inflammatory cytokine production, altered nitric oxide metabolism, increased oxidative stress, abnormal methylation reactions and thrombosis. This causes problems with folliculogenesis and implanting or maintaining a healthy pregnancy. In males, defects in this pathway can impair spermatogenesis.

Testing and Procedures for Infertility

When couples seek more help by consulting a (RE) Reproductive Endocrinologist, their first meeting will consist of a series of questions asked by both Endocrinologist and patient. It's best to have a list of questions written down to ask the endocrinologist. Some questions include the following:

- Will I see the same doctor at all times?
- If multiple doctors are involved in my treatment, how will I be reassured that I am receiving the proper treatment?
- Can medications be purchased outside the United States, if the cost in the United States is too much?
- What pharmacy do you go through?
- What is the procedure for treatments?
- How much does the total cost of medications equal to?
- What kind of testing is required prior to IVF?
- How often are these test repeated?
- Is the facility open 7 days a week for monitoring?
- If not, where is monitoring done at?
- What treatment combos are done for egg production?
- What kind of "financial programs" are offered to patients?
- Are these programs offered to every patient? No coverage patients? Limited coverage patients?
- If not are there programs for patients with limited insurance coverage?
- Where are prescriptions filled for your patients?
- What are "typical" medication costs for your patients that pay out of pocket?
- What are your success rates?
- Will results be emailed to me, or who will let me know results of my tests?
- Will I speak to the nurse or my doctor when I call?
- What are your criteria for canceling a patient’s cycle?
- Are you board certified?
- Do you have a specific expertise, such as endometriosis, or polycystic ovarian syndrome?
- How would you recommend I start treatment?
- Why types of protocols do you use?
- What time of day are phone calls returned?
- Are you available through fax, phone, and email?
- How much time on average do you allocate to your appointments with patients? How strictly do you follow this schedule?

If a patient comes up with additional questions, it's best to write them down prior to seeing the RE. The main questions are listed above. Being prepared when patients go into their RE for the first time will show the RE that the patient is serious about their own reproductive care.

Reproductive Endocrinologists will want to make sure tubes are clear by performing a procedure called hysterosalpingogram (HSG), which is a “fertility x-ray”. This is where a tube is inserted through the vagina and cervix and into the uterus. Dye is then injected and is then released into the uterus, where it flows into each fallopian tube. During this time, various x-ray pictures are taken of the pattern made by moving the dye. When this is preformed, RE's are looking for:

- Structural abnormalities in uterus (Fibroids or polyps)
- Adhesion’s or scar tissue
- Shape and size of uterus
- Tubal abnormalities, and blockage

Fact: As many as 1 in 4 women will have tubal blockage.

Blood testing
There are several types of blood testing that an RE will require. Both partners will be going through several bouts of testing. Starting with the following:

FSH (follicle stimulating hormone) - Blood test performed on day 3 of the menstrual cycle in women. This test is used to determine egg supply. In men FSH generally remains the same; however this test is used to determine sperm count. Normal levels of FSH depend upon age and sex. For menstruating women a normal amount of FSH in the blood should be less than 12 mIU/mL (usually between 5-12). For menopausal or post-menopausal women a normal amount of FSH ranges from 30 to 100 mIU/mL. For men levels of FSH in the blood range from 5 to 20 mIU/mL.

Estradiol is a form of estrogen. An estradiol test is used to measure a woman’s ovarian function and to evaluate the quality of the eggs. Like FSH, it is done on the third day of a woman’s menstrual cycle. Normal day 3 testing estradiol levels are around 80pg/mL or lower. If levels are higher than 80pg/mL, this could indicate an issue with ovulation, or it is possible to be further in the follicular phase as estradiol tends to raise the closer to ovulation. Or there very well could be a masking problem with the FSH levels. (Around the time of ovulation estradiol levels should rise about 200pg/mL per mature follicle)

Luteinizing Hormone (LH) is used to detect ovarian production and egg maturation in women. In men, it stimulates the hormone testosterone which affects sperm production. This test is also tested on day 3 of the menstrual cycle, ordered along with the Estradiol and FSH tests. A normal LH level is similar to FSH. An LH that is higher than FSH is one indication of PCOS. On Day 3, normal LH levels are between 3 and 10 mIU/mL. 3 for women is considered normal. Low levels of LH (less than 2 mIU/ml) are found in a condition called hypogonadotropic hypogonadism. Women on birth control pills as well as pregnant women also have low levels of FSH. . In adult men, levels are 1.8-8.6 IU/L.

Progesterone P4 test - There are two different kinds of P4 tests drawn. The first is on day 3 of the menstrual cycle, which under 1ng is considered normal range. A day 3 test is to check to see if there was an underdeveloped corpus luteum cyst. Most of the time a P4 blood test is performed 7 days past ovulation, which is to test for the amount of progesterone the corpus luteum is secreting if any ovulation took place. A normal level in women on 7 days past ovulation is over 15ngm/mL, however over 5 may indicate a very weak ovulation but not enough, under 5 is no ovulation. In men levels are less than 1ng.

Prolactin test - This hormone is produced by the pituitary gland, and causes milk production. There are several reasons why this test is ordered for both men and women. In women, this test is done to find out why they aren't menstruating; having infertility issues, or have abnormal nipple discharge. In men, when there is a lack of sexual desire, difficulty getting an erection, or issues with the pituitary gland, this test is performed. This test normally in women is ordered on day 3 of their menstrual cycle. Normal levels in women on day 3 should be less than 24ng/m. In men, 2 to18 ng/mL is considered normal.

Androgen (Testosterone) testing - because levels vary by age and by lab results with androgen testing, it is difficult to determine and pinpoint an exact level. However the following chart may help:

In women-

- 14 to 17 years = 8-53 ng/dL (0.28-1.84 nmol/L)
- Pre-menopausal = 10-70 ng/dL (0.35-2.43 nmol/L)
- Post-menopausal = 7-40 ng/dL (0.24-1.39 nmol/L)

In Men-

- 16 to 19 years = 2.00-9.70 ng/mL (2000-9700 pg/mL)
- 20 to 39 years = 2.70-10.80 ng/mL (2700-10800 pg/mL)
- 40 to 59 years = 3.50-8.90 ng/mL (3500-8900 pg/mL)
- 60 years and older = 3.50-7.20 ng/mL (3500-7200 pg/mL)

In men, an androgen test is used to find the cause of a low sex drive, and the inability to achieve an erection, or infertility. In women, it is used to determine the cause of irregular periods or a low sex drive.

The above blood tests are standard for anyone going through any fertility testing with a reproductive endocrinologist. However there are other tests as well that are also sometimes performed.

Hysteroscopy - There are times where polyps and fibroids are hard to see on an HSG because they are smaller, so for a closer look inside the uterus this test can be offered. This can be done as an outpatient procedure, and involves a small telescope with fiber optic light being guided through the cervix into the uterus. The uterus is distended, usually with a carbon dioxide gas or neutral solution.

Laparoscopy - This test involves inserting a thin telescope with a fiber-optic light at the end into the abdomen through a tiny cut made just below the navel. The incisions made are very small, about ½ inch or less, and the procedure usually involves one to three incisions. Carbon dioxide gas is used to separate the organs inside the pelvic cavity making it easier to see the uterus, ovaries and tubes. This is usually done as an impatient procedure in a hospital.

Post-coital tests - (PCT) is a test performed after sex. This test measures the sperms' ability to penetrate the cervical mucus. (This is why proper pH balance is so crucial). This test might have to be asked for by the patient. In addition to checking out the sperm, the mucus is also testing, and quality of. This test is done around the time of ovulation (Fertile period) after a positive LH surge at least 4 to 12 hours after the positive test/sex. It is best not to use any lubricants (even sperm friendly ones), not to shower, douche or anything else. This test is a great way of determining if the cervical mucus is to blame because it's too hostile.

Thyroid testing - Since the thyroid gland is the peacemaker that helps all the rest of the endocrine hormones function, issues can be very common with one out of eight women diagnosed with a thyroid problem at some point in their lives which can affect fertility, but can be controlled. Men can also have thyroid disorders, but women are five to eight times more likely to be affected. An Underactive Thyroid (Hypothyroidism) is a thyroid that is hypoactive usually causing fatigue, dry skin, and weight gain. It can also cause a raised FSH level. It can also be blamed for an increase of prolactin. Overactive thyroid (Hyperthyroidism) is a thyroid that causes rapid heart rate, anxiousness, and weight loss. Both under and overactive can be associated with miscarriage and infertility.

Diabetes - Unfortunately this affects about 6 percent of the population. But there are certain types of this disease. Testing for this prior to pregnancy is important.

Type 1 - this condition usually develops before puberty but it can develop at any age. Five to ten percent of diabetics have type 1, which is an autoimmune disease. In type 1, the beta cells of the pancreas stop making insulin altogether, so usually with this people must take injections of insulin each day.

Type 2 - this condition usually develops in people over 40 years, but it can develop earlier. It is often associated with being overweight and diet. 80 percent of type 2 are overweight, this condition more slowly than type 1 and can be controlled with diet changes, rather than pills and injections.

Men with diabetes often have issues with erection and ejaculation. About 40 percent of male diabetics have retrograde ejaculation which is a condition in which sperm backs up into the bladder, or problems with erectile dysfunction.

Lupus - is primarily a disease of women, although a small percentage of men can develop it. One of the symptoms is facial rash, but it can affect every organ in the body. 50 percent of women with lupus can have normal pregnancies and deliveries, 35 percent deliver prematurely, and 25 percent experience miscarriage or stillbirth.

Treatments and Infertility Medications

There are many treatments for infertility, although treatment varies depending on the cause of infertility. Not all types of infertility respond to medication.

- Ovulation Induction - (using Clomid, Femara, or injections) stimulates egg development and release
- IU - (intrauterine insemination) - Process of preparing and delivering a highly concentrated amount of active motile sperm, through the cervix and into the uterus.
- IVF - In vitro Fertilization- fertilization of an egg outside the body in an artificial environment
- ICSI - Intracytplasmic Sperm Injection- the injection of a single live sperm directly into the center of a human egg.

Unfortunately with infertility, comes a lot of drugs, here are a few:

Clomiphene Citrate (Clomid) - interacts with estrogen-receptor-containing tissues. It competes with estrogen for the estrogen receptor binding sites creating a series of endocrine events. The pituitary gland releases gonadotropins which stimulates the ovary to mature follicles and release eggs. Clomid is typically used to treat anovulation and is the first line treatment after a diagnosis of anovulation. Clomid is also used in ovulatory women when multiple follicle maturation is desired for ovulation. In some ovulatory women, Clomid can actually stop ovulation. This drug needs to be monitored by a doctor due to OHSS (Ovarian hyperstimulation syndrome).

Letrozole (Femara) - this drug is actually used as an adjuvant therapy of hormone receptor positive breast cancer. However it was found to have the side effect of ovulation induction and works similar to the way Clomid does. It's also used for anovulation and ovulation induction and should also be used with monitoring.

Menopur - is the injectable form of FSH (Follicle stimulating hormone). It is used in low doses as part of ovulation induction protocols with or without IUI, but with higher doses in IVF.

Bravelle - a highly purified form of FSH derived from the uterine of postmenopausal women. It's available and taken as an injection used in low doses as a part of ovulation induction, and higher doses for IVF.

Gonal-F - is an injectable FSH preparation of recombinant DNA origin. Used for ovulation induction and IVF

Follistim - man made form of FSH. Used apart of ovulation induction and IVF, can also be used in men to promote sperm production.

HCG (human chorionic gonadotropin - Known as the trigger shot. Some brand names of HCG are: Pregnyl, Novarel, or Ovidrel. HCG is an analog of LH and when injected to the body it binds the lH receptor sites, triggering the mature follicle to release an egg. Used for ovulation induction and IVF.

Progesterone - Brand names: Procheive, Prometrium, Crinone or Progesterone in Oil. Progesterone supplementation is used to treat luteal phase defects, provides support to the corpus luteum and sustains a pregnancy in women who have low progesterone.

Generally **Clomid or Femara** are usually the first line of drugs to treat for infertility. They are the most effective in women who are annovulatory but can be used in ovulatory women who are either in the unexplained category or with MFI to increase the number of eggs giving more targets for the sperm. Clomid and Femara are usually taken for 5 days in the beginning of the menstrual cycle. Some doctors will do Cycle day 2 through 6, some do day 3 through 7 and some do 5 through 7. All are acceptable, however the later in the cycle sometimes the later of ovulation. Most doctors will start at 50mg of Clomid and increase it by 50mg each cycle until the effect is achieved.

Both drugs can be used with injectable drugs. If people do not respond to Clomid or Femara, the next step is usually OI (ovulation induction), which is used in conjunction with IUI, or IVF in higher doses.

Unfortunately when taking Ovulation Induction drugs risks are involved. One common risk is OHSS (ovarian hyperstimulation syndrome). This is just one of the side effects from any infertility drug. Clomid and Femara have a lower risk than the injectable drugs. This is why frequent monitoring is crucial when taking any form of ARTS. OHSS is treatable, but when signs go unrecognized the risk of ovarian torsion and subsequent loss of the ovary, possibility of fallopian tube are high. Risk factors of OHSS include women over 35, women with very high estrogen levels, and women with PCOS.

CERTIFIED FERTILITY COUNSELOR COURSE SESSION 8 – QUESTION & ANSWERS
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Please be sure to fill out the information above, complete the test and email it back to us at myeggandme@amandabears.com. We will grade your question & answer session and will let you know if we have any questions or concerns.

1. Infertility affects _____ million people in the United States. With ____ being male factor infertility and ____ being female factor infertility.
2. ____ of infertility is diagnosed 'unexplained'.
3. What percent of female infertility is due to blockage of the fallopian tubes?
4. Abnormal ovulation effects about what percentage of female infertile patients?
5. How many babies have been born in the United States because of artificial reproductive technologies?
6. Define secondary infertility, and how many couples suffer from it?
7. Name six infertility barriers and define what they are, how they affect the reproductive system.
8. What five hormonal issues can have a barrier on male infertility?
9. What are the most common physical problems that cause male infertility?
10. What is an autoimmune disease, and how does it affect fertility?
11. There are several types of autoimmune diseases that affect fertility, name three and what parts it effects.
12. What are ANA's?
13. Define antisperm antibodies, and how it affects the male and female fertility.
14. What is an HSG?
15. T/F as many as 1 and 7 women will have tubal blockage
16. Name six required blood tests performed during a routine reproductive endocrinologist visit, and please name the “normal” and “not normal” blood results.
17. What is a PCT test?
18. What is hysteroscopy?
19. What is laparoscopy?
20. What are some medical treatments for infertility?
21. Name and define each fertility medication associated with ARTS (artificial reproductive technologies)
22. What is OHSS?