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**MLS514 QUIZ**

**1.)**

The anterior pituitary gland produces six hormones namely:

1. Growth hormone- Promotes growth of body tissues
2. Prolactin- Promotes milk production from mammary glands
3. Thyroid stimulating hormone- Stimulates thyroid hormone release from thyroid
4. Adrenocorticotropic hormone- Stimulates hormone release by adrenal cortex
5. Follicle stimulating hormone- Stimulates gamete production in gonads
6. Luteinizing hormone- Stimulates androgen production by gonads

B)

**Principle of letrozole**: Letrozole is an aromatase inhibitor whose primary action is suppression of estrogen production, thereby decreasing the negative feedback of estrogens in the hypothalamus leading to increased GnRH production and FSH secretion and subsequent ovarian follicular development. It is the principal drug used in the treatment of postmenopausal patients with both early- and advanced-stage endocrine-responsive breast cancer (BC).

Alternative uses include: The antiestrogen action of letrozole has been shown to be useful in pretreatment for termination of pregnancy, in combination with misoprostol. It can be used in place of mifepristone, which is expensive and unavailable in many countries.

Letrozole is sometimes used as a treatment for gynecomastia, although it is probably most effective at this if caught in an early stage (such as in users of anabolic steroids).

Some studies have shown that letrozole can be used to promote spermatogenesis in male patients suffering from non-obstructive azoospermia.

**Principle of clomiphene:**

Clomiphene is a selective oestrogen receptor modulator that has both oestrogenic and antioestrogenic properties. It is an antagonist at hypothalamic oestrogen receptors and inhibits the negative feedback of oestrogen on gonadotropin release. It is used to stimulate ovulation in anovulatory infertility. It works by causing the release of GnRH by the hypothalamus, and subsequently gonadotropin from the anterior pituitary.

Alternative uses: Clomiphene has also been used with other assisted reproductive technology to increase success rates of these other modalities.

Clomiphene is sometimes used in the treatment of male hypogonadism as an alternative to testosterone replacement therapy.

Clomiphene has been used in the treatment of gynecomastia.

**Principle of menotropin/gonadotropin:**

Menotropin (also called human menopausal gonadotropin or hMG) is a hormonally active medication for the treatment of fertility disturbances. It provides follicle stimulating hormone (FSH) and luteinizing hormone (LH) that help stimulate healthy ovaries to make eggs. This medication is usually used in combination with another hormone (human chorionic gonadotropin-hCG) to help you become pregnant by bringing about the growth and release of a mature egg (ovulation).

**2)**

a. The woman is suffering from secondary amenorrhea and this could be as a result of :

**Hormonal imbalances**

A hormonal imbalance is the most common cause of secondary amenorrhea. A hormonal imbalance can occur as a result of:

-Tumors on the pituitary gland

-An overactive thyroid gland

-Low estrogen levels

-High testosterone levels

Hormonal birth control can also contribute to secondary amenorrhea. Depo-Provera, a hormonal birth control shot, and hormonal birth control pills, may cause you to miss menstrual periods. Certain medical treatments and medications, such as chemotherapy and antipsychotic drugs, can also trigger amenorrhea.

**Structural issues**

Conditions such as polycystic ovary syndrome (PCOS) can cause hormonal imbalances that lead to the growth of ovarian cysts. Ovarian cysts are benign, or noncancerous, masses that develop in the ovaries. PCOS can also cause amenorrhea.

Scar tissue that forms due to pelvic infections or multiple dilation and curettage (D and C) procedures can also prevent menstruation.

D and C involves dilating the cervix and scraping the uterine lining with a spoon-shaped instrument called a curette. This surgical procedure is often used to remove excess tissue from the uterus. It’s also used to diagnose and treat abnormal uterine bleeding.

**Lifestyle factors**

Body weight can affect menstruation. Women who are overweight or who have less than 15 percent body fat may stop getting menstrual periods. This is especially true for athletes who train extensively or excessively.

Emotional stress is another possible cause of secondary amenorrhea. Your body may respond to extreme stress by disrupting your normal menstrual cycle. Your menstrual periods will most likely resume once you work through your tension and anxiety.

**LABORATORY FINDINGS IN SECONDARY AMENORRHEA**

Urinary or serum beta hCG to exclude pregnancy

* If negative pregnancy test, measure prolactin, LH/FSH, TSH
* Abnormal TSH – thyroid disease
* Normal prolactin, low/normal LH/FSH, normal TSH, no hirsutism
	+ Order serum estradiol
		- Normal – hypothalamic dysfunction; consider testing for fragile X syndrome
		- Low – pituitary or hypothalamic abnormality
	+ Consider eating disorder, excessive exercise
* Normal prolactin, high LH, normal/low FSH, hirsutism, virilization, acne
	+ Order free testosterone, DHEA-S
		- Elevated free testosterone (high) – rule out tumor with pelvic ultrasound or abdominal CT
		- Elevated free testosterone (moderate) – ovarian hyperandrogenism (PCOS) confirmed
		- Elevated DHEA-S (high) – rule out adrenal tumor with adrenal CT
		- Elevated DHEA-S (moderate) – adrenal hyperandrogenism or PCOS
* Normal prolactin, high LH/FSH – ovarian failure (may represent menopause); consider chromosome analysis for X chromosome abnormalities
* High prolactin, normal LH/FSH
	+ Order TSH
		- Normal – evaluate medication history
			* Negative – CT/MRI, sella turcica
			* Positive – discontinue medication
		- High TSH – primary hypothyroidism confirmed

**2B)**

The woman has reached the age of menopause.

 **3A)**

During the course of investigating the cause of infertility in a couple, one has to first take note that there are three factors that could cause infertility in the couple which are:

* Infertility from the Male (Male Infertility)
* Infertility from the female (Female Infertility)
* Infertility from both

**DIAGNOSIS OF MALE INFERTILITY**

Diagnosing male infertility problems usually involves:

* **General physical examination and medical history.** This includes examining your genitals and asking questions about any inherited conditions, chronic health problems, illnesses, injuries or surgeries that could affect fertility. Your doctor might also ask about your sexual habits and about your sexual development during puberty.
* **Semen analysis.** Semen samples can be obtained in a couple of different ways. You can provide a sample by masturbating and ejaculating into a special container at the doctor's office. Because of religious or cultural beliefs, some men prefer an alternative method of semen collection. In such cases, semen can be collected by using a special condom during intercourse.

Your semen is then sent to a laboratory to measure the number of sperm present and look for any abnormalities in the shape (morphology) and movement (motility) of the sperm. The lab will also check your semen for signs of problems such as infections.

Often sperm counts fluctuate significantly from one specimen to the next. In most cases, several semen analysis tests are done over a period of time to ensure accurate results. If your sperm analysis is normal, your doctor will likely recommend thorough testing of your female partner before conducting any more male infertility tests.

Your doctor might recommend additional tests to help identify the cause of your infertility. These can include:

* **Scrotal ultrasound.** This test uses high-frequency sound waves to produce images inside your body. A scrotal ultrasound can help your doctor see if there is a varicocele or other problems in the testicles and supporting structures.
* **Hormone testing.** Hormones produced by the pituitary gland, hypothalamus and testicles play a key role in sexual development and sperm production. Abnormalities in other hormonal or organ systems also might contribute to infertility. A blood test measures the level of testosterone and other hormones.
* **Post-ejaculation urinalysis.** Sperm in your urine can indicate your sperm are traveling backward into the bladder instead of out your penis during ejaculation (retrograde ejaculation).
* **Genetic tests.** When sperm concentration is extremely low, there could be a genetic cause. A blood test can reveal whether there are subtle changes in the Y chromosome — signs of a genetic abnormality. Genetic testing might be ordered to diagnose various congenital or inherited syndromes.
* **Testicular biopsy.** This test involves removing samples from the testicle with a needle. If the results of the testicular biopsy show that sperm production is normal, your problem is likely caused by a blockage or another problem with sperm transport.
* **Specialized sperm function tests.** A number of tests can be used to check how well your sperm survive after ejaculation, how well they can penetrate an egg and whether there's any problem attaching to the egg. Generally, these tests are rarely performed and often do not significantly change recommendations for treatment.
* **Transrectal ultrasound.** A small, lubricated wand is inserted into your rectum. It allows your doctor to check your prostate and look for blockages of the tubes that carry semen (ejaculatory ducts and seminal vesicles).

**DIAGNOSIS OF FEMALE INFERTILITY**

Diagnosing male infertility problems usually involves:

* **Ovulation testing.** An at-home, over-the-counter ovulation prediction kit detects the surge in luteinizing hormone (LH) that occurs before ovulation. A blood test for progesterone — a hormone produced after ovulation — can also document that you're ovulating. Other hormone levels, such as prolactin, also may be checked.
* **Hysterosalpingography.** During hysterosalpingography (his-tur-o-sal-ping-GOG-ruh-fee), X-ray contrast is injected into your uterus and an X-ray is taken to detect abnormalities in the uterine cavity. The test also determines whether the fluid passes out of the uterus and spills out of your fallopian tubes. If abnormalities are found, you'll likely need further evaluation. In a few women, the test itself can improve fertility, possibly by flushing out and opening the fallopian tubes.
* **Ovarian reserve testing.** This testing helps determine the quality and quantity of eggs available for ovulation. Women at risk of a depleted egg supply — including women older than 35 — may have this series of blood and imaging tests.
* **Other hormone testing.** Other hormone tests check levels of ovulatory hormones as well as thyroid and pituitary hormones that control reproductive processes.
* **Imaging tests.** A pelvic ultrasound looks for uterine or fallopian tube disease. Sometimes a sonohysterogram, also called a saline infusion sonogram, is used to see details inside the uterus that can't be seen on a regular ultrasound.

Depending on your situation, rarely your testing may include:

* **Other imaging tests.** Depending on your symptoms, your doctor may request a hysteroscopy to look for uterine or fallopian tube disease.
* **Laparoscopy.** This minimally invasive surgery involves making a small incision beneath your navel and inserting a thin viewing device to examine your fallopian tubes, ovaries and uterus. A laparoscopy may identify endometriosis, scarring, blockages or irregularities of the fallopian tubes, and problems with the ovaries and uterus.
* **Genetic testing.** Genetic testing helps determine whether there's a genetic defect causing infertility.

**3B)**

In order to help such couple achieve conception, the root cause of the problem must be solved. In cases of male infertility;

* **Surgery.** For example, a varicocele can often be surgically corrected or an obstructed vas deferens repaired. Prior vasectomies can be reversed. In cases where no sperm are present in the ejaculate, sperm can often be retrieved directly from the testicles or epididymis using sperm-retrieval techniques.
* **Treating infections.** Antibiotic treatment might cure an infection of the reproductive tract, but doesn't always restore fertility.
* **Treatments for sexual intercourse problems.** Medication or counseling can help improve fertility in conditions such as erectile dysfunction or premature ejaculation.
* **Hormone treatments and medications.** Your doctor might recommend hormone replacement or medications in cases where infertility is caused by high or low levels of certain hormones or problems with the way the body uses hormones.
* **Assisted reproductive technology (ART).** ART treatments involve obtaining sperm through normal ejaculation, surgical extraction or from donor individuals, depending on your specific case and wishes. The sperm are then inserted into the female genital tract, or used to perform in vitro fertilization or intracytoplasmic sperm injection.

In cases of female infertility;

 **Fertility restoration: Stimulating ovulation with fertility drugs**

Fertility drugs regulate or stimulate ovulation. Fertility drugs are the main treatment for women who are infertile due to ovulation disorders.

Fertility drugs generally work like the natural hormones — follicle-stimulating hormone (FSH) and luteinizing hormone (LH) — to trigger ovulation. They're also used in women who ovulate to try to stimulate a better egg or an extra egg or eggs. Fertility drugs may include:

* **Clomiphene citrate.** Clomiphene citrate is taken by mouth and stimulates ovulation by causing the pituitary gland to release more FSH and LH, which stimulate the growth of an ovarian follicle containing an egg.
* **Gonadotropins.** Instead of stimulating the pituitary gland to release more hormones, these injected treatments stimulate the ovary directly to produce multiple eggs. Gonadotropin medications include human menopausal gonadotropin or hMG (Menopur) and FSH (Gonal-F, Follistim AQ, Bravelle). Another gonadotropin, human chorionic gonadotropin (Ovidrel, Pregnyl), is used to mature the eggs and trigger their release at the time of ovulation. Concerns exist that there's a higher risk of conceiving multiples and having a premature delivery with gonadotropin use.
* **Metformin.** Metformin is used when insulin resistance is a known or suspected cause of infertility, usually in women with a diagnosis of PCOS. Metformin helps improve insulin resistance, which can improve the likelihood of ovulation.
* **Letrozole.** Letrozole (Femara) belongs to a class of drugs known as aromatase inhibitors and works in a similar fashion to clomiphene. Letrozole may induce ovulation. However, the effect this medication has on early pregnancy isn't yet known, so it isn't used for ovulation induction as frequently as others.
* **Bromocriptine.** Bromocriptine (Cycloset), a dopamine agonist, may be used when ovulation problems are caused by excess production of prolactin (hyperprolactinemia) by the pituitary gland.

**Fertility restoration: Surgery**

Several surgical procedures can correct problems or otherwise improve female fertility. However, surgical treatments for fertility are rare these days due to the success of other treatments. They include:

* **Laparoscopic or hysteroscopic surgery.** These surgeries can remove or correct abnormalities to help improve your chances of getting pregnant. Surgery might involve correcting an abnormal uterine shape, removing endometrial polyps and some types of fibroids that misshape the uterine cavity, or removing pelvic or uterine adhesions.
* **Tubal surgeries.** If your fallopian tubes are blocked or filled with fluid (hydrosalpinx), your doctor may recommend laparoscopic surgery to remove adhesions, dilate a tube or create a new tubal opening. This surgery is rare, as pregnancy rates are usually better with IVF. For hydrosalpinx, removal of your tubes (salpingectomy) or blocking the tubes close to the uterus can improve your chances of pregnancy with IVF.

**Reproductive assistance**

The most commonly used methods of reproductive assistance include:

* **Intrauterine insemination (IUI).** During IUI, millions of healthy sperm are placed inside the uterus close to the time of ovulation.
* **Assisted reproductive technology.** This involves retrieving mature eggs from a woman, fertilizing them with a man's sperm in a dish in a lab, then transferring the embryos into the uterus after fertilization. IVF is the most effective assisted reproductive technology. An IVF cycle takes several weeks and requires frequent blood tests and daily hormone injections.

But in the rare case where the infertility is irreversible for the male, he could find a sperm donor, and if the infertility is irreversible for the female, she could find a surrogate egg donor, and if the both of them are permanently infertile, they could consider adoption.