

## **Session Objectives and Keywords for Clinical Presentation Week: Infertility (Male and Female Reproductive Endocrinology)**

### **1) SCHEME – Infertility (1 hour, Lecture)**

Keywords: Clinical Presentation

*Every student should be able to:*

- Define primary and secondary infertility and list the most common causes of primary and secondary infertility .
- Interpret a semen analysis.
- Differentiate between pre-testicular, testicular and post-testicular causes of infertility.
- List and interpret clinical and laboratory findings which are key in the processes of exclusion, differentiation and diagnosis of the uterine causes of infertility.
- List and interpret clinical and laboratory findings which are key to the exclusion, differentiation and diagnosis of the anovulatory causes of infertility.
- List and interpret clinical and laboratory findings which are key to the exclusion, differentiation and diagnosis of the cervical causes of infertility.
- List and interpret clinical and laboratory findings which are key in the processes of exclusion, differentiation and diagnosis of the ovarian or tubal causes of infertility.

### **2) Pre-Lab: Male and Female Reproductive (1 hour, Independent Learning)**

**(\*objectives for a subsequent 2-hour Laboratory session are identical)**

Keywords: Anatomy; Biostatistics

*Every student should be able to:*

- Trace the skeletal and ligamentous boundaries of the perineum, and define the anal and urogenital triangles.
- Identify the superficial features of the external genitalia in the female.
- Describe the structure, contents, and course of the pudendal canal.
- Trace the branching pattern of the internal pudendal vessels and the pudendal nerve.
- Identify the components of the external genital organs and give the homologues in each of both sexes.
- Describe structure and function of the erectile bodies.
- Identify the muscles and fasciae of the perineum and their functions.
- Trace the nerve and blood supply to the external genital organs and the muscles of the perineum.
- Trace the lymphatic drainage of the perineum.
- Trace the continuity of the abdominal peritoneum with that of the pelvic cavity, and identify the peritoneal pouches of the pelvic floor in both sexes.

- Describe the relationships of the bladder to other pelvic organs in both sexes.
- Describe the normal position and relationships of the organs of the female reproductive tract and the role of each in reproductive processes.
- Describe the broad ligament and differentiate its parts.
- Identify the ovary and discuss the functional significance of its ligaments.
- Demonstrate the uterine tube and its subdivisions.
- Identify the uterus and its subdivisions and demonstrate the continuity of its lumen with that of the uterine tubes and the vagina.
- Differentiate between the internal and external os of the cervix.
- Identify the vagina, and note the angle formed at its junction with the uterus.
- Describe the support mechanisms for the uterus which act to prevent uterine prolapse.
- Describe the formation of the two sciatic foramina. List the muscles, nerves, and vessels which pass through each.
- Describe the general gross features of the breast and its blood supply, innervation, and lymphatic drainage.
- Identify the testis, its coverings, and tubules, and account for the difference in location between gonads in the two sexes.
- Trace the entire course of the ductus deferens from the epididymis to its ampulla; note its relationship to the ureter.
- Identify the seminal vesicle and demonstrate the formation and course of the ejaculatory duct.
- Identify the prostate gland and describe the special features of the prostatic urethral wall.
- Identify the parts of the male urethra.
- Describe the relationships of the bladder to other pelvic organs.
- Identify the superficial features of the external genitalia in the male.

### **3) Reproductive System Development (1 hour, Independent Learning)**

Keywords: Embryology

*Every student should be able to:*

- Demonstrate an understanding of how the hindgut is divided into anorectal and urogenital parts and how errors can lead to developmental defects such as fistulas involving the rectum, urinary system, reproductive system, and the urachus.
- Demonstrate an understanding of the normal development of the gonads, the internal reproductive glands and ducts, and the external genitalia of males and females; including an understanding of the role of the SRY gene and the sources and actions of anti-Mullerian Hormone (AMH), testosterone (T) and dihydrotestosterone (DHT); and apply this knowledge to an ability to predict phenotypes caused by the lack of SRY, AMH, T or DHT.
- Describe and discuss normal and abnormal descent of the testis, formation of the spermatic cord, and formation of the tunica vaginalis from the processus vaginalis.

#### 4) Histology of Reproduction (2 hours, Lecture)

Keywords: Histology

*Every student should be able to:*

- Know the organization and histology of the ovaries.
- Know the histology of follicular development and degeneration.
- Know the organization and histology of the fallopian tubes.
- Know the dynamic histological changes the endometrium undergoes during the menstrual, proliferative and secretory phases.
- Know the organization and histology of the uterus, cervix and vagina.
- Know the general organization of the male reproductive system.
- Know the histological organization and function of the seminiferous tubules.
- Know the major steps of male spermatogenesis.
- Know the major steps of spermiogenesis.
- Know the function and ultrastructure of the Sertoli cell.
- Know the function and ultrastructure of the Leydig cell.
- Know the basic endocrine circuitry for Leydig and Sertoli cell function.
- Know the function and histology of the epididymis.
- Know the function and histology of the ductus (or vas) deferens.
- Know the function and histology of the seminal vesicle.
- Know the function and histology of the prostate gland.
- Know the function and histology of the penis.
- Know the histological organization and function of the testes

#### 5) Physiology of Menstrual Cycle (1 hour, Large Group Discussion)

Keywords: Physiology

*Every student should be able to:*

- Describe the hypothalamic-pituitary axis in the control of the female reproductive cycle.
- Describe the events leading up to the release of the ovum from the ovary.
- Explain the normal trip of the ovum after ovulation has occurred and what can happen if this movement is interrupted.
- Explain the “trigger” hormone for ovulation and how this hormone can alter fertility.
- Construct a drawing illustrating the hormonal levels during the menstrual cycle.
- Explain the significance of the rise and fall in GnRH, FSH, LH, estrogen and progesterone during the menstrual cycle.
- Describe the events that follow fertilization and implantation of the ovum.
- Describe the events that occur if the ovum is not fertilized and implantation does not occur.
- Explain the physical and hormonal changes in the female body that lead to menarche, the changes that continue during the reproductive years, and the events that occur after menopause.

- Explain the events that can lead to disruption of the normal menstrual cycle.
- Describe the age-related changes in the male and female reproductive systems, including the mechanisms responsible for these changes.

## **6) Sex Determination, Sex Differentiation, and Gametogenesis (1 hour, Independent Learning)**

Keywords: Medical Genetics

*Every student should be able to:*

- Define chromosomal sex, gonadal sex and phenotypic sex
- Describe sex determination in human
- Describe sexual differentiation in male and female
- Compare and contrast oogenesis and spermatogenesis
- Explain how chromosomal abnormalities affect sexual development
- Describe disorders of sexual development presenting with ambiguous genitalias

## **7) Immunologic Causes of Infertility (1 hour, Independent Learning)**

Keywords: Gendered Health (Women/Men's Health); Immunology; Reproductive Systems

*Every student should be able to:*

- Explain immune privilege as it relates to the testis
- Describe the distribution of antisperm antibodies in infertile couples and in fertile men and women
- Discuss autoimmune polyendocrine disease as a cause of gonadal failure

## **8) Genetics and Infertility (1 hour, Lecture)**

Keywords: Medical Genetics

*Every student should be able to:*

- List and explain genetic causes of male and female infertility.

## **9) Pathology – Uterine, Tubal, and Ovarian Causes of Infertility (1 hour, Lecture)**

Keywords: Pathology

*Every student should be able to:*

- Describe the causes, clinical features, and microscopic findings of acute and chronic endometritis.
- Define dysfunctional uterine bleeding and describe its common causes and their pathogenesis.

- Describe the genetics and clinical features of Turner syndrome and Klinefelter syndrome.
- Describe and identify the various types of mullerian anomalies affecting the uterus.
- Describe the proposed pathogenesis, clinical features including most common sites of involvement, and morphologic features of endometriosis.
- Define adenomyosis and describe its clinical features and microscopic findings.
- Describe the clinical and morphologic (gross and microscopic) features of endometrial polyps and leiomyomas.
- Describe the pathogenesis and imaging findings of Asherman syndrome.
- Describe the clinical and morphologic (gross) features of polycystic ovarian disease.
- Define pelvic inflammatory disease and describe its pathogenesis, clinical features, morphologic features, and complications.

#### **10) Drugs for Infertility (1 hour, Lecture)**

Keywords: Pharmacology

*Every student should be able to:*

- Explain the role, mechanism, and risks associated with pharmacological induction of ovulation with clomiphene and/or gonadotropins
- Propose rational treatment for infertility secondary to hyperprolactinemia
- Propose rational treatment for infertility secondary to hypothyroidism

#### **11) Medical Jurisprudence (1 hour, Large Group Discussion)**

Keywords: Costs of care; Health care financing; Health Policy; Medical Jurisprudence; Medical Record Keeping (documentation)

*Every student should be able to:*

- Understanding general legal requirements of HIPAA
- Identify medical billing issues and physician-related fraud and abuse laws
- Examine telemedicine issues and state law requirements
- Understand basic physician advertising regulations
- Outline strategies to avoid malpractice and best practices for responding to malpractice suits
- Understand legal parameters for patient medical decision making
- Outline a few key physician reporting responsibilities

### **12) Medical Spanish – Week 14 (1 hour, Small Group Discussion)**

Keywords: Communication/Interpersonal Skills; Spanish

*Every student should be able to:*

- Demonstrate levels of competency/proficiency in spoken conversational and medical Spanish that are sufficient to allow you to converse in limited but useful ways with Spanish speakers.

### **13) Female Reproductive System Physical Exam / Infertility (2 hours, Simulation)**

Keywords: Clinical Reasoning; Clinical Skills; Obstetrics and Gynecology; Reproductive Systems

*Every student should be able to:*

- Perform accurate breast examination in a sensitive manner, ensuring the patient's comfort, proper draping, and the extent of palpation pressure that can be used without discomfort.
- Understand female anatomy assessed during pelvic exam.
- Perform accurate and complete pelvic examination in a sensitive manner including general speculum exam for intravaginal and cervical assessment and collection of pap smear, wet mount, endocervical culture and HPV testing.
- Identify and describe a breast mass.
- Communicate the relevant results and prepare well-organized oral and written report.
- Know how to perform rectal and rectovaginal exam.
- Understand the different stages of menstrual cycle.
- Identify the different components of the Hypothalamus-pituitary-ovarian axis and understand their function.
- Identify female anatomy assessed during female genital exam.

### **14) Reproductive Endocrinology/Infertility WCE session (2 hours, Case-Based Instruction/Learning)**

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- List and interpret clinical and laboratory findings which are key to the exclusion, differentiation and diagnosis of the anovulatory causes of infertility.
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- List and interpret clinical and laboratory findings which are key in the processes of exclusion, differentiation and diagnosis of the ovarian or tubal causes of infertility.

### **15) Reproductive Ethics (2 hours, Large Group Discussion)**

Keywords: Communication/Interpersonal Skills; Gendered Health (Women/Men's Health); Medical Ethics; Obstetrics and Gynecology; Professionalism; Reproductive Systems; Research Methods; Teamwork

*Every student should be able to:*

- Recognize the growing number of ethical issues posed by evolving reproductive technologies
- Explain how a female patient's values might differ from your own and support her perspective and values
- Propose how ethical dilemmas in obstetrics and gynecology may be particularly controversial
- Prepare a presentation as a team where each team member makes meaningful contributions to the topic while collaborating with other team members in a respectful manner
- Relate knowledge of the topic that reflects research and depth in thinking
- Produce a presentation that is well organized and easy to follow
- Compose a presentation that is original and creative that maximizes on-topic group discussion while respecting their peers' opinions
- Demonstrate a positive attitude toward the assignment while being very respectful of others