

Reproduction Module-I

2nd Year MBBS(LGIS)



(Development of Uterine tubes, Uterus and Vagina



Presenter: Prof. Dr. Ifra Saeed

Date: 00-00-25

First Ten Minutes

Prof. Umar's Model of Teaching Strategy Self Directed Learning Assessment Program

Objectives : To cultivate critical thinking, analytical reasoning, and problemsolving competencies.

To instill a culture of self-directed learning, fostering lifelong learning habits and autonomy.

How to Assess?

- Ten randomly selected students will be evaluated within the first 10 minutes of the lecture through 10 multiple-choice questions (MCQs) based on the PowerPoint presentation shared on Students Official WhatsApp group, one day before the teaching session.
- The number of MCQs from the components of the lecture will follow the guidelines outlined in the **Prof. Umar model of Integrated Lecture**.

Component	Core	Horizontal	Vertical	Spiral
of LGIS	Knowledge	Integration	Integration	Integration
No of MCQs	6-7	1-2	1	1

Professor Umar Model of Integrated Lecture



Early Development of female genital Ducts

- During the fifth and sixth weeks, the genital system is in an indifferent state, and two pairs of genital ducts are present.
- The Mesonephric ducts (Wolffian ducts)
- The Paramesonephric Ducts
 (Mullerian Duct



Development of the Female Genital Ducts and Glands

- In female embryos, the mesonephric ducts regress because of the absence of testosterone and only a few nonfunctional remnants persist
- The paramesonephric ducts develop because of the absence of MIS
- Female sexual development does not depend on the presence of ovaries or hormones.
- The paramesonephric ducts form most of the female genital tract.
 Core Concept

Development Of Paramesonephric Ducts

- The paramesonephric ducts develop lateral to the gonads and mesonephric ducts on each side from longitudinal invaginations of the mesothelium on the lateral aspects of the mesonephroi
 - The edges of these paramesonephric grooves approach each other and fuse to form the paramesonephric ducts



Paramesonephric ducts

- The funnel-shaped cranial ends of these ducts open into the peritoneal cavity
- Caudally, the paramesonephric ducts run parallel to the mesonephric ducts until they reach the future pelvic region of the embryo.
- Here they cross ventral to the mesonephric ducts, approach each other in the median plane, and fuse to form a Y-shaped **uterovaginal primordium**.



Development of Uterus

 This tubular structure projects into the dorsal wall of the urogenital sinus and produces an elevation-the sinus tubercle







Uterovaginal primordium.

- The uterine tubes develop from the unfused cranial parts of these ducts
- The caudal fused portions of these ducts form the uterovaginal primordium.
- The endometrial stroma and myometrium are derived from splanchnic mesenchyme.



Development of Uterus



Sinovaginal Bulb

- The sinovaginal bulb is a transitional structure in the development of female genitalia, and is one of a pair of endodermal outgrowths of the urogenital sinus, which later fuse to form the lower part of the vagina
- The lower third of the vagina is derived from the urogenital sinus.







Parametrium

Along the sides of the uterus, between the layers of the broad ligament, the mesenchyme proliferates and differentiates into cellular tissue-the parametrium,-which is composed of loose connective tissue and smooth muscle.



Auxiliary Genital Glands in Females

- Buds grow from the urethra into the surrounding mesenchyme and form the bilateral mucus secreting urethral glands and paraurethral glands. These glands correspond to the prostate in the male.
- Outgrowths from the urogenital sinus form the Greater Vestibular Glands
- These tubuloalveolar glands also secrete mucus and are homologous to the bulbourethral glands in the male.



Paramesonephric duct remnants in males

- Cranial end = appendix testis
- Sinus tubercle = seminal colliculus



Mesonephric duct remnants in males

- Cranial end may persist = appendix of epididymis
- Caudal to efferent ductules paradidymis
- Mesonephric duct remnants in female
- Epoophoron = corresponds to efferent ductules and duct of epididymis
- Paroophoron = Close to the uterus some tubules persists
- Gartner's cyst = Parts corresponding to ductus deferense and ejaculatory ducts



Physiological/Biochemical Aspects

The uterus carries out many functions:

- Implantation site of the blastocyst
- Provides protection and support for the fetus to grow
- Site of menstruation

Reproductive Cycle

The reproductive cycle can subdivide into

- the menstrual phase,
- preovulatory phase,
- ovulation, and
- postovulatory phase. The function of the uterus in each of these phases follows:
- In the menstrual phase, a decline in estrogen and progesterone levels stimulates the release of prostaglandins, which results in vasoconstriction of arterioles within the uterus.
- The vasoconstriction eventually leads to hypoperfusion of these cells, which results in cell death. This process initiates the sloughing off of blood, fluid, and epithelial cells from the endometrial walls into the cervix and out through the vagina.

Horizontal Integration

Menstrual Cycle

- In the preovulatory phase, estrogen is released into the blood, which repairs the endometrium. The endometrium undergoes other changes and doubles in thickness.
- During ovulation, the follicle ruptures and releases an oocyte that enters the uterine tube.
- In the postovulatory phase, progesterone and estrogen stimulate further growth of endometrial glands and thickening of the endometrium in preparation for the implantation of a fertilized ovum.

Horizontal Integration

Menstrual Cycle



Uterine and Vaginal Defects



Vertical Integration

Hermaphroditism (intersexuality)

True Hermaphroditism 46,XX 70%

- 20% XY/46,XX Mosaicism
- Extremely rare condition
- Have both testicular and ovarian tissue)OVOTESTIS
- Both cortex and medulla develops
- External genitalia is ambiguous

Male Psudohermaphroditism

- 46,XY Configuration
- External genitalia as well as internal genitalia are variable due to varying degree of paramesonephric duct development
- Causes are inadequate production of testosterone and MIS

Vertical Integration

Female Psudohermaphroditism

- 46XX chromosome
- Common cause is CAH
- There is variable degree of masculinization of external genitalia

Androgen Insensitivity Syndrome

- Are normal appearing females
- But there is presence of testis and 46XY
- External genitalia is female
- Uterus is absent
- There is development of breast but no menstruation
- Testis are in abdomen
- Cause is resistance to testosterone at cellular level

Vertical Integration Approach to diagnosis and management of abnormal uterine bleeding

Primary care approach to evaluating and managing abnormal uterine bleeding.

Premenopausal abnormal uterine bleeding can be ovulatory, anovulatory, or anatomic. A variety of hormonal and nonhormonal treatments are available. Patients' preferences, side effects, and physicians' comfort should be considered when making treatment decisions. One in 4 cases of endometrial carcinoma occur in premenopausal women, so it is important to investigate women with risk factors.

While postmenopausal bleeding is most commonly caused by atrophic vaginitis, bleeding should be investigated to rule out endometrial and cervical carcinoma.

Spiral Integration

Family Medicine

Suggested Research Article

TITLE: Diagnosis of Congenital Uterine Abnormalities: Practical Considerations

Authors: Kanna Jayaprakasan 1,* and Kamal Ojha 2J.

Clin. Med. 2022, 11, 1251. https://doi.org/10.3390/jcm11051251

Abstract Evaluation of the internal and external contours of the uterus is the key in making a diagnosis and correctly classifying a uterine anomaly. Considering this, the gold standard test has been the combined laparoscopy and hysteroscopy historically, albeit invasive. However, 3D ultrasound has now become the diagnostic modality of choice for uterine anomalies due to its high degree of diagnostic accuracy, less invasive nature and it being comparatively less expensive. While 2D ultrasound and HSG are adequate for screening for uterine anomalies, MRI and combined laparoscopy and hysteroscopy are reserved for diagnosing complex Mullerian anomalies. Imaging for renal anomalies is recommended if a uterine anomaly is diagnosed.

Spiral Integration Gynaecological Artificial Intelligence Diagnostics (GAID) GAID and Its Performance as a Tool for the Specialist Doctor

Human-centric artificial intelligence (HCAI) aims to provide support systems that can act as peer companions to an expert in a specific domain, by simulating their way of thinking and decision-making in solving real-life problems.

The gynaecological artificial intelligence diagnostics (GAID) assistant is such a system. Based on artificial intelligence (AI) argumentation technology, it was developed to incorporate, as much as possible, a complete representation of the medical knowledge in gynaecology and to become a real-life tool that will practically enhance the quality of healthcare services and reduce stress for the clinician.

Reference:12(2), 223; Health care 2024 https://doi.org/10.3390/healthcare12020223

Spiral Integration

Artificial Intelligence

Learning Resources

- KLM Embryology Developing Human 11th Edition Clinically oriented embryology by Keith Moore, T. V. N. Persaud, Mark Torchia
- Langman's Medical Embryology 15th Edition by Dr. T.W. Sadler PhD
- Google scholar
- Google images