FEMALE PELVIC VISCERA

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RESOURCES

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VISCERA

PELVIC COLON (SIGMOID COLON)
It lies in the upper and posterior part of the pelvic cavity.

RECTUM & ANAL CANAL
Rectum lies in the lower and posterior part of the pelvic cavity while anal canal begins at the lower end of the rectum, directed downward and backward.

UTERUS
It projects between rectum and urinary bladder. Its free end (fundus) overhangs the urinary bladder. Its lower end (cervix) opens into the vagina.

VAGINA
It descends between the bladder and urethra anteriorly and the rectum and anal canal posteriorly.

URINARY BLADDER
It lies in the lower and anterior part of the pelvic cavity, behind the symphysis pubis.

URETHRA
 Begins at neck of bladder close to the anterior wall of vagina.
Introduction

- The pelvis is inferior most part of the trunk.
- It consists of the pelvic girdle and perineum, and it supports the urinary and reproductive organs.
- The female pelvis is broader and larger than the male pelvis to provide a comfortable environment for fetus development.
Pelvic Peritoneum

- The peritoneum is a connective tissue membrane which lines the abdominal cavity and covers the abdominal organs (viscera).
- It acts to support the viscera and provides a pathway for blood vessels and lymph.
- It consists of two layers which are continuous with each other:
  - **Parietal peritoneum**
    - lines the internal surface of the abdominopelvic wall.
  - **Visceral peritoneum**
    - covers the majority of the abdominal viscera.
- They both consist of a layer of simple squamous epithelial cells, called mesothelium.
Pelvic Peritoneum

- **RECTOUTERINE (DOUGLAS) POUCH:**
  - Reflection of peritoneum from rectum to upper part of posterior surface of vagina.

- **UTEROVESICAL (VESICOUTERINE) POUCH:**
  - Reflection of peritoneum from uterus to upper surface of urinary bladder.

- **BROAD LIGAMENT OF UTERUS:**
  - Extension of peritoneum from lateral wall of uterus to lateral wall of pelvis, encloses the uterine tubes.
Sigmoid Colon

- It is the continuation of the descending colon at pelvic brim.
- It ends at middle piece of sacrum continuous with the rectum.
Rectum

- It is a continuation of the sigmoid colon and ends at recto anal angle to be continuous with anal canal.

- Related anteriorly to recto-vaginal pouch (recto-uterine pouch) and posterior wall of vagina, and posteriorly to sacrum, sacral vessels and sympathetic trunks.

- The rectum begins at the level of the S3 (as a continuation of the sigmoid colon).

- It is macroscopically distinct from the colon, with an absence of taenia coli, haustra, and omental appendices.

- The course of the rectum is marked by two major flexures:
  - Sacral flexure: anteroposterior curve with concavity anteriorly (follows the curve of the sacrum and coccyx).
  - Anorectal flexure: anteroposterior curve with convexity anteriorly.

- The final segment of the rectum, the ampulla, relaxes to accumulate its fecal content.

- It is continuous with the anal canal; which passes through the pelvic floor to end as the anus.
Anal Canal

- The anal canal is the final segment of the gastrointestinal tract, around 4cm in length.
- It is located within the anal triangle of the perineum between the right and left ischioanal fossae.
- The canal begins as a continuation of the rectum and passes inferoposteriorly to terminate at the anus.
- The anal canal is surrounded by internal and external anal sphincters.
  - **Internal anal sphincter** surrounds the upper 2/3 of the anal canal. It is formed from a thickening of the involuntary circular smooth muscle in the bowel wall.
  - **External anal sphincter** voluntary muscle that surrounds the lower 2/3 of the anal canal (and so overlaps with the internal sphincter). It blends superiorly with the puborectalis muscle of the pelvic floor.
- At the junction of the rectum and the anal canal, there is a muscular ring known as the **anorectal ring**.
- It is formed by the fusion of the internal anal sphincter, external anal sphincter and puborectalis muscle, and is palpable on digital rectal examination.
Uterus

- The uterus is a hollow, thick-walled, muscular organ.
- The uterus is a secondary sex organ.
  - Secondary sex organs are components of the reproductive tract that mature during puberty under the influence of sex hormones produced from primary sex organs (the ovaries in females and the testes in males).
- Situated deeply in the pelvic cavity between the bladder and rectum.
- Into its upper part, the uterine tubes open, one on either side.
- Below, its cavity communicates with that of the vagina.
- In the virgin state, the uterus is flattened and is pyriform in shape.
- The apex directed downward and backward.
- Its upper part is suspended by the broad and the round ligaments.
- Its lower portion is imbedded in the fibrous tissue of the pelvis.
Anatomical Position

- The exact anatomical location of the uterus varies with the degree of distension of the bladder.
- In the normal adult uterus, it can be described as anteverted with respect to the vagina, and anteflexed with respect to the cervix:
  - Anteverted: Rotated forward, towards the anterior surface of the body.
  - Anteflexed: Flexed, towards the anterior surface of the body.
- Thus, the uterus normally lies immediately posterosuperior to the bladder, and anterior to the rectum.
- In the erect position and with empty bladder the uterus lies in almost horizontal position.
Support

- The uterus is supported by tone of levator ani muscle and condensation of pelvic fascia that form three important ligaments:
  - Transverse cervical (cardinal) ligament.
  - Pubocervical ligaments.
  - Sacrocervical ligament.
Isthmus

- It is a slight constriction, corresponding to the internal os, divides the uterus into:
  - The portion above the isthmus is the BODY, and that below it is the CERVIX.
  - The part of the body which lies above a plane passing through the points of entrance of the uterine tubes is known as the FUNDUS.

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Fundus

- It is convex in all directions.
- It is covered by peritoneum continuous with that on the vesical and intestinal surfaces.
- It is related to some coils of small intestine, and occasionally the distended sigmoid colon.
Gradually narrows from the fundus to the isthmus.

- The vesical or anterior surface is flattened and covered by peritoneum, which is reflected on to the bladder to form the vesicouterine pouch.
- The intestinal or posterior surface is convex transversely and is covered by peritoneum, which is continued down on to the cervix and vagina.
- The lateral margins are slightly convex.
- The uterine tube pierces the uterine wall, at the upper end of each margin.
- Below and in front of this point the round ligament of the uterus is fixed, while behind it is the attachment of the ligament of the ovary.
- These three structures lie within the two layers of the broad ligament.
- Internal OS: opening between cavity of body of uterus & cavity of cervix (cervical canal)
- External OS: opening between cervical canal & cavity of vagina
Cervix

- It is the lower constricted segment of the uterus.
- It is conical in shape, with its truncated apex directed downward and backward, but is slightly wider in the middle.
- It is less freely movable than the body.
- It projects through the anterior wall of the vagina, which divides it into an upper, supravaginal portion, and a lower, vaginal portion.
- It communicates above with the cavity of the body, and below with the vaginal cavity.
- The total length of the uterine cavity from the external orifice to the fundus is about 6.25 cm.
Ligaments

- **Broad Ligament**
  - The broad ligament of the uterus is the wide fold of peritoneum that connects the sides of the uterus to the walls and floor of the pelvis.
  - Serves as a mesentery for the uterus, ovaries, and the uterine tubes. And helps in maintaining the uterus in its position.

- **Round Ligament**
  - The Round ligaments are two flattened bands situated between the layers of the broad ligament in front of and below the uterine tubes.

- **Uterosacral Ligament**
  - Paired ligament runs between the uterus and the sacrum, assisting in holding the uterus in place in the pelvic cavity.
Uterine Tube

- One on each side of the uterus, run in the free border of the broad ligament.
- Its medial end opens into the superior angle of the uterine cavity.
- The lateral end opens into the peritoneal cavity close to the ovaries, surrounded by fimbriae.
- It is divided into; infundibulum, ampulla, and isthmus.
Ovaries

- Each one of the ovary is whitish in color and located alongside the lateral wall of the uterus in a region called the **ovarian fossa**.
- It is attached to uterus via a fibrous cord called the **ovarian ligament**.
- This ligament should not be confused with the **suspensory ligament** of the ovary, which extends from the ovary to the wall of pelvis.
- They are paired, oval organs attached to the posterior surface of the broad ligament of the uterus by the **mesovarium**.
- Neurovascular structures enter the hilum of the ovary via the mesovarium.
Vagina

- Strong muscular canal, (7.5cm length)
- It connects the uterus with the vestibule of the external genitalia,
- Its long axis is almost parallel with that of the lower part of the sacrum.
- Its anterior wall is 1.5 - 2cm shorter than the posterior wall.
- Relations;
  - Anterior wall directly related to the bladder base.
  - Posterior wall is related to rectovaginal pouch, rectum, its lower part separated from the anal canal by the perineal body.
  - Laterally related to ureters and uterine vessels.
Urinary Bladder

- It lies in the lower and anterior part of the pelvis.
- It is a three-sided pyramid.
  - **Apex** is directed anteriorly.
  - **Base** lies posteriorly, directly related to the cervix and anterior wall of vagina.
  - It rests on its **neck** inferiorly, where it is continuous with the urethra.
- It has three surfaces; superior and two inferolateral.
- **Superior** surface is related to anterior wall of uterus.
- **Inferolateral surfaces** are related to retro-pubic fat which separates them from pubis, muscle wall, obturator vessels and nerve.
- The **neck** is directly continuous with urethra and related to anterior wall of vagina.
Roles

- It plays two main roles:
- Temporary storage of urine: the bladder is a hollow organ with distensible walls. It has a folded internal lining (known as rugae), which allows it to accommodate up to 400-600 ml of urine in healthy adults.
- Assists in the expulsion of urine: the musculature of the bladder contracts during micturition, with concomitant relaxation of the sphincters.
Musculature

- The musculature of the bladder plays a key role in the storage and emptying of urine.
- In order to contract during micturition, the bladder wall contains specialized smooth muscle known as **detrusor muscle**.
- Its fibers are orientated in multiple directions, thus retaining structural integrity when stretched.
- It receives innervation from both the sympathetic and parasympathetic nervous systems.
Sphincters

- There are also two muscular sphincters located in the urethra:
  - **Internal urethral sphincter** thought to be a functional sphincter (i.e., no sphincteric muscle present). It is formed by the anatomy of the bladder neck and proximal urethra.
  - **External urethral sphincter** is skeletal muscle, and under voluntary control.
Pelvic Part of Ureter

- The ureters are two thick tubes which act to transport urine from the kidney to the bladder.
- They are approximately 25cm long and are situated bilaterally, with each ureter draining one kidney.
- The ureters arise in the abdomen as a continuation of the renal pelvis and terminate in the pelvic cavity where they empty into the bladder.
- The anatomical course of the ureters can therefore be divided into abdominal and pelvic components.
- It enters the pelvis by crossing the ends of common iliac arteries.
- It passes below the broad ligament on reaching the bladder.
Urethra

- It is 4 cm long,
- Begins at neck of bladder close to the anterior wall of vagina.
- It opens into the vestibule in front of vaginal orifice.
- It is imbedded in the anterior wall of the vagina, directed obliquely downward and forward; slightly curved with the concavity directed forward.
- It begins at the neck of the bladder and passes inferiorly through the perineal membrane and muscular pelvic floor, opens directly onto the perineum, in the vestibule.
- Within the vestibule, the urethral orifice is located anteriorly to the vaginal opening, and 2-3 cm posteriorly to the clitoris.
- The distal end of the urethra is marked by the presence of two mucous glands that lie either side of the urethra; paraurethral glands; Skene’s glands.
BLOOD CIRCULATION
Blood Supply

- Abdominal Aorta
  - Inferior Mesenteric Artery
    - The sigmoid colon
    - Several sigmoid arteries
    - Upper part of the rectum
    - Superior rectal artery
  - Common Iliac Artery
    - Internal Iliac Artery
      - Middle rectal artery
      - Inferior rectal artery
      - Superior vesical artery
      - Inferior vesical artery
        - Urinary Bladder
      - Uterine artery
      - Vaginal artery
    - External Iliac Artery
      - Femoral artery
Venous Drainage

- **Portal Vein**
  - Inferior mesenteric vein

- **Common Iliac Vein**
  - Internal iliac vein
INNERVATION
Innervation

- **Sympathetic**
  - Greater splanchnic nerve (T5-9)
  - Lesser splanchnic nerve (T9-10)
  - Lowest (least) splanchnic nerve (T12)
  - Lumbar splanchnic nerves (L1-3)
  - Sacral splanchnic nerves

- **Parasympathetic**
  - Vagus nerve
  - Pelvic splanchnic nerve (S2-4)
PATHOLOGY & DISEASES
Ovarian Cyst

- An ovarian cyst is fluid-filled masses that may develop in the ovary.
- They are most derived from ovarian follicles, reaching approximately 2-2.5 cm.
- Most ovarian cysts are benign and develop during a woman’s childbearing years, however, some larger cysts may cause problems such as bleeding and pain, and they may require surgical removal.
- Diagnosis is by pelvic examination, ultrasonography and laparoscopy or as an incidental finding during another procedure.
Uterine Leiomyoma

- A uterine leiomyoma (plural: leiomyomata) is the most common benign tumor in women, with around 20% of women developing one in their lifetime.
- It occurs in the smooth muscle of the uterus.
- The cause is unknown, but it is thought that it may be due to an increase in oestrogen and growth hormone.
- Leiomyomata are harmless in themselves but can cause complications such as infertility, anaemia, intestinal obstruction.
- In pregnancy, they may result in spontaneous abortion, premature labor or dystocia.
- Diagnosis is by blood studies, ultrasound examination, submucosal hysterosalpingography or laparoscopy.
Carcinoma of Cervix

- Carcinoma of the cervix is a progressive tumor that begins as dysplasia of cervical cells which, without treatment, will become an invasive carcinoma.
- It is often associated with the presence of human papillomavirus.
- Cervical cancer is usually asymptomatic in its early stages but is easily detected by a Pap smear.
- If diagnosed early, it is curable.
Carcinoma of Ovary

- Carcinoma of the ovary is a malignant tumor of ovarian tissue.
- It is sometimes called the “silent killer” because it is asymptomatic in its early stages and has often metastasized to the liver, pelvis and lungs before any symptoms are experienced.
- When symptoms occur, they are non-specific, such as fatigue, lethargy and bloating.
- Diagnosis is by ultrasound and biopsy of any lesion found.
A **cystocele** is a herniation of the urinary bladder into the vagina as a result of trauma or lax pelvic floor muscles and ligaments.

- Symptoms include urinary frequency, incontinence and pelvic pressure.
Rectocele

- A **rectocele** is a herniation of the rectum into the vagina as a result of a weak vaginal wall after pregnancy and childbirth.
- Symptoms include dyspareunia and difficult defecation.
Ectopic Pregnancy

- Sometimes it is called TUBAL PREGNANCY
- A complication of pregnancy in which the embryo attaches outside the uterus.
- Signs and symptoms classically include abdominal pain and vaginal bleeding.
- Less than 50 percent of affected women have both of these symptoms.
- Pain may also spread to the shoulder if bleeding into the abdomen has occurred.
- Severe bleeding may result in a fast heart rate, fainting, or shock.
- With very rare exceptions the fetus is unable to survive.
QUESTIONS?

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