

**Course Name :An Overview on Maternal Health Antenatal, Intranatal and Postnatal Care**

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**Week:01**

**Lecture:02**

### **Anatomy of Vulva or pudendum**

Hello students. Welcome you all. Our topic of discussion is an overview of maternal health, the antenatal, intranatal and postnatal care. Myself Dr. Barnali Ghosh, an obstetrician and gynecologist working as an assistant professor at B.C. Roy Medical College and Research Center, IIT Kharagpur. Today, we are going to deal the anatomy of female external genitalia.

So, the concepts to be covered today are the anatomy of vulva, vulva or female external genitalia or pudendum. The parts of vulva, its detailed structure, the development of the different parts, the blood supply, its nerve supply and lymphatic drainage. This is a very important in to know because it will be required in the process of childbirth, in vaginal delivery and all the and a detailed overview of all these structures is required for any type of tear, laceration or injury to the female external genitalia. So, let us come to the proper class.

The keywords are vulva, female pudendum, vagina and external genitalia. This is a picture of the female internal as well as the external genitalia. You can see here this is the internal genitalia portion, the uterus, cervix, upper part of vagina. This is a cross section, transverse cross section of a female and in this cross sectional study we are seeing the internal parts. This is the pelvic floor or the pelvic diaphragm, the muscles which support the internal pelvic organs, bladder and urethra, the uterus and the vagina this one and behind is the rectum and the anal canal.

And the female external genitalia is the vagina, this is the external genitalia. This is also known as vulva or pudendum. Next we will see the structures in the female external genitalia. First is mons pubis number 1. Number 2 is labia majora.

3 labia minora. 4. So this is the labia majora. Inside is the labia minora on both sides and within the labia minora is the vestibule.

5. The clitoris. 6. The openings within the vestibule from anterior to posterior, the urethral opening, the vaginal opening and hymen which covers the vaginal opening. And lastly is the

anus, the anal opening in the posterior. Coming to the boundaries of the vulva.

Posturally it is bounded by the mons pubis. Posteriorly it is bounded by the anal opening. And laterally are the two genitocrural folds. So, this is this part is the vulva. Anteriorly the mons pubis, posteriorly the anal opening and laterally are the two genitocrural folds.

This we will study today. We have another picture. This is showing the anatomy. The anteriorly borders that is the bony prominences, the symphysis pubis, the lateral border anteriorly is the ischiopubic rami and posteriorly is the sacrotuberous ligament and at the posterior end is the coccyx. This is also known as the perineum.

Perineum and vulva these two are different entities. Vulva or the external genitalia what I have told previously is bounded by the mons pubis, then posteriorly is the anal opening and laterally is the genitocrural folds. And perineum is that part which is bounded by the symphysis pubis anteriorly, the ischial tuberosity is laterally and behind is the tip of the coccyx. Coming to individual parts of the vulva, we have told the mons pubis is anteriorly. Then number 2 are the labia majora.

These two structures on both sides are the labia majora. This labia majora actually develops from the ectoderm. This labia majora actually develops from the ectoderm. That means, it is lined by stratified squamous epithelium keratinized. This is homologous to scrotum in males.

Developmentally both develop from genital swelling. In males it develops into scrotum, in females it develops into labia majora. Sorry, that was labia minora, this is labia majora. The labia majora developing from the ectoderm and it is homologous to scrotal swelling in males and actually developing from genital swelling. The meeting point of the labia majora is known as posterior commissure.

Anteriorly there is no such as anterior commissure. Posteriorly the name is posterior commissure and the structures present within the labia majora are hair follicles, sweat glands or apocrine glands, sebaceous glands, there are many hair follicles, fatty tissue and it has an important structure that is the round ligament which ends into the labia majora. The round ligament will be coming through the inguinal canal and it will end at the anterior end of labia majora. These are the structures within labia majora. Next we will go into the labia minora.

So, now this is labia minora. Labia minora is within or medial to the labia majora and labia minora developmentally it is homologous to the penile shaft in males. It actually develops from the genital folds. This is genital folds actually this is the developmental history which we should know because this signifies what contents are within the labia minora, what is the lining epithelium. Here the lining epithelium is squamous epithelium stratified squamous epithelium,

but there is outer part is keratinized and inner part or medial part is non-keratinized.

So, again I repeat labia minora develops from the genital folds. These are the two genital folds from here the labia minora develops from the genital swelling which we have already talked about develops the labia majora and from the genital tubercle will develop the clitoris. So, this is labia majora, this is labia minora and this is the clitoris. Labia majora is homologous to scrotal sac in males, labia minora is homologous to penile shaft in males and clitoris is homologous to the glans penis in males. This labia minora next the anatomy anteriorly anteriorly the labia minora this is the labia minora and anteriorly the labia minora covers the clitoris and this anterior part is known as the prepuce and the posterior layer covering the clitoris is known as the frenulum.

In between in between is the vestibule. So, in between the labia minora this is the vestibule. What are the contents of labia minora? Labia minora contains sebaceous glands, there is no hair follicles, no sweat glands, but it contains sebaceous glands and heart's line is this line which I have already drawn. This is also known as the vestibule of heart which signifies that the epithelium lateral to this line is keratinized stratified squamous and the epithelium medial to this line is non keratinized medial to this line is non keratinized this part is non keratinized. It also contains some glands which is known as the glands of Littre.

So, labia minora completed. Now coming to the clitoris. Clitoris as told it is homologous to glands penis in males, it is the erectile organ of the females, it is highly vascular, very sensitive and the lymphatic drainage of clitoris is directly into the deep inguinal lymph nodes or the glands of Rosenmuller or clock weight. We will come to this lymphatic drainage in the later slides, but all of the vulva drains into the superficial inguinal lymph nodes whereas, the lymphatics of clitoris directly drains into the deep inguinal lymph nodes. Anteriorly the covering of the labia minora covering the clitoris this is known as the prepuce and posteriorly is the frenulum.

This is the prepuce and posteriorly is the frenulum right. Now coming to the vestibule. Vestibule I have already told it is the area within the labia minora. This is the vestibule. So, vestibule is bounded by anteriorly by the clitoris this part is the vestibule.

So, anteriorly is the clitoris, posteriorly this is the meeting point of the two labia minora and laterally are the medial borders of the labia minora on both sides. Now the four openings there are four openings within the vestibule. What are they? Anteriorly this is the urethral opening number 1, number 2 is the vaginal opening, number 3 are the openings of two glands. This is the opening of Bartholin gland. It opens this Bartholin gland are actually present in the labia majora both sides.

These are also known as the greater vestibular glands. They are present in the superficial in superficial perineal pouch and these glands have ducts. This is the duct. This duct will open into the vestibule. It will open in a groove midway between the vagina and the labia minora.

This is number 3 opening of the Bartholin gland and number 4 are again two openings of smaller glands. They are paraurethral glands present just adjacent to the urethra on both sides and the opening they open in the vestibule. So these are the four openings within the vestibule. Now coming to the hymen. Hymen is actually a structure which is your covering of the vestibule.

We will discuss this hymen and its different structures in the subsequent slides and another structure is fossa navicularis. Fossa navicularis is the part present between the vagina and the posterior end of labia minora. This is fourchette. The posterior meeting point of labia minora is known as fourchette. So the space between the vagina and the forchet is fossa navicularis.

This space. This is the labia minora. This is the clitoris. This is the vaginal opening. This is the urethral opening.

I hope you understand. Now this part the space between the posterior this is the fourchette. This part is the fossa navicularis. This can be appreciated at childbirth when the os is fully dilated and it is the second stage of labor this fossa navicularis part can be well appreciated. And there are the lesser and greater vestibular glands. We have already talked about them the Bartholin gland is also known as the greater vestibular gland and the smaller gland is also known as the lesser vestibular gland.

These openings of these glands are in the vestibule. They drain into the vestibule. Types of hymen. Hymen is nothing but a covering of the vestibule and this hymen remains intact at birth but gradually it will undergo wear and tear. There will be openings of the hymen and depending upon the openings on the hymen we name them like this is imperforate hymen.

There is no opening in the hymen. This is not physiological. This is not normal. This is pathological and if there is imperforate hymen then the female will not menstruate. So we have to intervene and we have to make opening in the hymen for the normal flow of menstrual blood.

Coming to number 2 this is the annular hymen. Annular hymen is a single annular opening. This is septate hymen. There is a septa in between. This is the hymenal opening and there is a septa in between.

Cribriform hymen. Small holes on the hymenal region. This is Cribriform hymen and number 5 is parous introitus. This is after childbirth there will be hymenal tear and they present as pares

hymen. So types of hymen covered.

Coming to greater vestibular glands. We will talk about it in a greater detail because it has clinical implications. Greater vestibular glands as I have already told it is also called as Bartholin's gland. Now Bartholin's gland they are actually compound racemose glands right where is their location? They are located at the junction of anterior two third and posterior one third in the labia majora. They are located at the junction of anterior two third and posterior one third. So this junction in the labia majora they are of peanut size very small 1.

5 to 2 centimeter and they are not palpable in normal circumstances. And they open into the vestibule via the duct Bartholin's duct midway between the vagina and the labia minora. This is the opening of the Bartholin's gland. Why it is important? Because sometimes this Bartholin's gland may have swelling there can be blockage in the duct or there can be infection and there is swelling known as Bartholin's cyst. And if it is infected with bacteria it can present with Bartholin's abscess which is very painful and it has to be drained sometimes by incision and drainage and cyst treatment require it requires treatment where we do marsupialization.

We go for excision of the cyst wall ok. Now we need to know the structure the anatomy today we are dealing with the anatomy. So the epithelium of the Bartholin's gland we have told it is a racemose gland. So it has different types of epithelium. The gland has columnar epithelium this is columnar. The duct has 3 types inner portion one third is columnar middle portion is transitional epithelium and at the site of the opening this is the opening of the duct this epithelium is squamous epithelium non-keratinized stratified squamous.

Coming to location, location we have told it is at the junction of anterior two third and posterior one third of labia majora. Duct opens into the vestibule in the groove between the vagina and the labia minora. Bartholin cyst we have discussed mostly cyst becomes palpable and patient comes with a swelling in the vaginal region you have to examine and the swelling will be in the posterior part swelling because the cyst is in the labia majora in the posterior side. So the swelling will be in the posterior part of the vagina you have to differentiate with other structures present there as you know gut nurses or in erectile abscess you have to differentiate and when the diagnosis is confirmed that is a case of Bartholin cyst you have to go for excision of the whole of the cyst together with the cyst wall. So that there is no recurrence and this procedure is known as marsupialization.

If infected mostly infection is with gonorrhoea and then it can form you know abscess which needs to be first treated with antibiotics and then we go for particular specific treatment. It may sometimes require incision and drainage, drainage of the pus and ultimately excision of the cyst. Another important thing to note is recurrent cyst in postmenopausal women is can be suspicion for Bartholin's cancer. So we need to go for biopsy. Coming to the lesser vestibular glands, lesser

vestibular glands are nothing but the glands of skinny.

Another thing is greater vestibular glands are homologous to the Cowper's gland in males. Developmentally we need to know these are developmentally similar to the Cowper's gland. What are greater vestibular glands or the Bartholin glands in females? They are the Cowper's gland in males right and they are present in the superficial perineal pouch. The lesser vestibular glands or the glands of skinny they are homologous to prostate in males nothing but para urethral glands. There are many para urethral glands, but these skinny glands are the most important of them all and they are homologous to prostate in males.

The para urethral glands have duct which we have already seen they open just in the vestibule at both sides of the urethra and when blocked it can be blocked with some you know secretion or with any infection they will form cyst and may present with urethral diverticulum. So, greater and lesser vestibular glands are completed. Now, coming to the developmental history we need we have already talked about them in this chart we will go through you know the as a gist. So, in males and in females genital swelling this is the urogenital sinus, urogenital sinus, urogenital sinus will form the external genitalia of external genitalia. So, it has parts the genital swelling in males it will form scrotum, in females it will form the labia majora, genital folds in males will form the penile shaft, in females it will form the labia minora, genital tubercle in males will form the glands penis and in females they will form the clitoris.

Vestibular glands greater vestibular glands are in males will form the Cowper's gland or they are known as bulbourethral gland and in females they are known as Bartholin's gland. Lesser vestibular gland in males will form the prostate and in females they will form the glands of skinny. Gubernaculum in males the gubernaculum of testis in females it will form the round ligament and the genital ridge in males will lead to formation of testis, in females will lead to formation of ovary right. Now, the blood supply blood supply of vulva is from internal pudendal artery, this is branch of uterine artery. Nerve supply nerve supply there are two important nerves right this is the posterior this is number 1 is the pudendal nerve and number 2 is the posterior cutaneous nerve of thigh posterior cutaneous nerve of thigh and number 1 is the pudendal nerve.

Pudendal nerve it supplies whole of the vulva, the number 1 is the dorsal nerve of clitoris, number B is the perineal branches sorry this is the perineal branches and C is the anal branches supplying the anus and the area around it. Posterior cutaneous nerve of thigh number 2, number 3 is the ilioinguinal nerve ilioinguinal nerve and number 4 is the genital branch of genitofemoral nerve. So, from here we notice that the perineal region or the vulval region is supplied by different nerves of which 1 and 2 are most vital. So, only pudendal nerve block will not anesthetize the whole area because there are overlapping of this nerve supply. So, we after pudendal nerve block which we give during episiotomy we also need to be give local anaesthetic for proper anesthesia before episiotomy given during childbirth.

Lastly coming to the lymphatic drainage lymphatic drainage of vulva it drains into the inguinal lymph nodes that is the superficial inguinal lymph nodes there that are 2 in 2 groups the horizontal group and the vertical group. Horizontal group is just below the inguinal ligament and the vertical group is along the great saphenous vein right. This upper medial group the upper medial group this is the sentinel nodes that means, the first draining nodes of the vulva are the sentinel nodes from them they then go to other nodes these nodes if any cancer if any lesion if any you know tumor of vulva cancer it can metastasize to these nodes and first node to be palpable to swell or to palpate are the sentinel lymph nodes and these after the superficial they will ultimately drain into the deep lymph nodes which are along the femoral vein and then they will go to the pelvic lymph nodes. Sometimes I have already told the lymphatics of the clitoris and Bartholin gland they directly drain into the pelvic nodes via the dorsal vein of the clitoris. Why it is important because any tumor or any cancer of the clitoris can involve the pelvic lymph nodes directly bypassing these inguinal lymph nodes and that will aggravate the disease and will lead to much faster spread.

So, today we have discussed the vulva in the next class we will discuss the anatomy of vagina.