

**Human Physiology**  
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**Week - 10**  
**Lecture - 04**

Hello everyone, welcome to another new class on human physiology. In these classes, we will discuss male reproductive health and also various diseases that can be associated with the male reproductive system. And we will also discuss whether some disease occurs, and what different therapeutic options can be. So, let us stick with it. So, what content will be mostly covered for this class? We will discuss male reproductive health. We'll discuss different male reproductive diseases, such as some sexually transmitted infections or STIs.

We'll discuss men's infertility and different prevention strategies. So basically, the male reproductive system is, as you know, responsible for sperm production, and eventually, during the fertilization process, sperm gets fused and mixed with the female egg, which eventually leads to embryo formation and the development of a baby. So, basically, what is male reproductive health? It refers to the proper development, function, and maintenance of the male reproductive system throughout life. It can involve sexual health, maintaining proper hormonal balance, maintaining fertility, or preventing any type of reproductive diseases.

And why it is so important is that it is, first of all, important for individual well-being and also for proper family planning. But of course, like in cases of certain STI diseases, it can transmit from the parents to the kids. So, eventually in certain cases, some of these male reproductive diseases can be highly transmitted from the male to the female partner, and sometimes it can also be transmitted to the baby. So, we will start with different conditions and we will see what the symptoms are, what the different types of diagnoses would be, and what the different treatment options can be. So, this class will be somewhat straightforward.

So, let us try to pay attention and see what the different conditions associated with male reproductive disorders are. The first one we will discuss is erectile dysfunction. So, basically, erectile dysfunction is the inability to keep an erection, right? So, in terms of male pennies or the male reproductive organ in cases of inability to maintain an erectile condition, we referred to it as an erectile dysfunction situation. It can cause many issues; for example, it can lead to obesity, heart-related diseases, diabetes, high blood pressure, excessive stress, anxiety, and depression. The symptoms include trouble getting an erection, trouble maintaining an erection, and reduced sexual desire.

Diagnosis can be made by monitoring medical history, conducting a physical examination, performing blood tests, using ultrasound, along with a psychological evaluation. And then there are certain treatment options, of course, like maintaining a healthy diet, doing regular exercise, and weight management. There are also different oral medications, for example, Sildenafil and Tadalafil, and there are also different injectable medicines. Apart from that, vascular or vacuum erection devices can also be surgically implanted. Then the next condition we will discuss is about BPH, which stands for benign prostatic hyperplasia.

So, basically, benign prostatic hyperplasia (BPH) is the enlargement of the prostate gland. Basically, as we age, the prostate can grow bigger and larger. But if it happens at the wrong age

and in an abnormal manner, cases of benign prostatic hyperplasia or BPH can actually occur. What are the causes? Basically, the exact cause is unknown, but sometimes it can be related to different hormonal changes. There are risk factors such as age, family history, obesity, or type 1 and type 2 diabetes.

There are symptoms like frequent urination, and sometimes there can be highly difficult conditions that make it even hard to urinate. Diagnosis can be done by monitoring medical history and performing ultrasounds or different types of sonodynamic and urodynamic tests to measure the condition of the prostate. There are medications, for example, like alpha blockers, which basically help in terms of relaxing the smooth muscle of the prostate, or a prostatectomy can also be done to completely remove the prostate from the male. So as you see in this chart, as the males grow, the size of the prostate also grows. For example, in cases of males around 20 to 25 years of age, the prostate size is about the size of a walnut, right? So as the male grows from about 35 to 50, the prostate is about the size of a golf ball.

As males grow to about 70 years of age, their prostate becomes about the size of a tennis ball. So this condition of BPH is generally very common in older men, and as you can see, this is a prostate gland. So in between, this is a bladder and this is a urethra. So you can imagine if the prostate gland is getting bigger and larger, what it will cause is basically a pressure in the urethra. Right, there would be a constriction of this urethral channel, and as it creates pressure and kind of a constriction situation in this urethral channel, it will be difficult to urinate; in fact, it will be highly difficult to urinate.

So, as you can understand, an increase in prostate size can cause this type of benign hyperplasia, leading to a constriction of the urethra, resulting in difficulty urinating. Then prostatitis can also happen, which is basically an infection or inflammatory condition of the prostate gland. A bacterial infection can occur, and a bacterial infection can also cause inflammation, which can enlarge the prostate. Symptoms may cause pain or a burning sensation during urination, difficulty in urination, increased frequency of urination, especially at night. Diagnosis can be done by physical examination, including a digital rectal exam.

Also, urine tests and blood tests can be done; specifically, a prostate-specific antigen test can also be done. Treatment is mostly related to bacterial infections, so antibiotics, alpha blockers, or anti-inflammatory drugs can be prescribed to treat this condition of prostatitis. Then, prostate cancer can develop, as we already know that cancer can develop in various parts of the organ. This can also develop in the prostate. So, in the case of stage 1, you can see that it can develop on one side of the prostate.

In the case of stage 2, it can basically spread to both the prostate and another area. And eventually, in cases of stage 3 prostate cancer, the cancer cells can become somewhat distributed to the seminal vesicles, which are adjacent to the prostate. And eventually, in the fourth stage, the cancer cells can metastasize, and they can go to the nearest lymphatic drain, and from the lymphatic drain, it will eventually go into the blood circulation. And those cancerous cells can distribute to various parts and create a kind of secondary cancer in other organs as well; that is basically like a stage four metastatic condition. The exact cause of prostate cancer is, of course, not well known, but genetic factors are involved.

Including different types of smoking habits, environmental pollution, obesity, and lack of exercise can contribute to prostate cancer. Prostate cancer is mostly observed in older males, typically those over the age of 50. Genetic analysis has been done and has found that these two

genes, BRCA1 and BRCA2, are mostly responsible for the mutations that occurred, which are correlated with prostate cancer. Diagnosis can be done with a prostate-specific antigen test. It basically measures the level of PSA or prostate-specific antigen in the body.

So, an elevated level of PSA can signal that there might be a situation of cancer. Apart from that, as you know, for all cancers, a biopsy can be done, followed by the histology. Apart from the different types of imaging, such as MRI, a CT scan can be done to identify the tumor mass. Treatments can include radiotherapy, chemotherapy, hormonal therapy, and more commonly in recent days, immunotherapy, cell therapy, and genetic therapy; these types of treatments can be given. The next condition of male reproductive health is called epididymitis.

This is also basically like an inflammation that can happen to the back of the testes where the sperm is basically being stored. So, in this kind of epididymis area where the sperm is stored, inflammation can occur and can be caused by different types of bacterial infections, including chlamydia, which is basically an STI or sexually transmitted disease. So, this type of STI-related disease can also cause inflammation. The symptom can cause severe testicular pain, especially redness and warmth in the scrotum, painful urination, and sometimes discharge or blood may also be seen.

Diagnosis can be done by urine test, blood test, ultrasound, and also for different types of STIs. And treatment can be given because these are mostly affected by bacterial infections. Antibiotics can be given to treat different types of bacteria, including STIs. Apart from that, pain management, such as anti-inflammatory drugs or painkillers, can be given. Andropause, which is like a kind of male menopause, basically involves hormonal changes or a lack of proper testosterone, causing men to suffer from inadequate sperm release or production.

So, what has mainly been seen is that it is mainly due to the age-related decline of testosterone produced in the testes. It can be observed that this is mainly due to a lack of testosterone production in the male body, and there can be different reasons as well; for example, diabetes, obesity, or hypertension can be a cause. Apart from that, a different lifestyle can also be a cause. So different types of symptoms can be seen, for example, erectile problems, lack of sperm production, and decreased libido. So all these, even decreased bone density and sleep irregularities, can indicate the andropause condition.

And in these cases, as we said, testosterone depletion mostly happens in the body; testosterone replacement therapy, or TRT, can be prescribed. Then we also have to discuss different sexually transmitted infections or diseases; mostly, these are caused by different bacteria or viruses, and as the name suggests, these are sexually transmitted. So, if the precautions are not properly taken, these infections, including bacterial viruses, can be transmitted from the male to the female, and eventually, they can also be transmitted from the female to the newborn baby. Prevention can be done very easily by using condoms. Apart from that, limiting the sexual partners significantly reduces the risk of STIs.

Sometimes vaccinations, especially for HPV and hepatitis B, are available. So, vaccination can also prevent the effect of this virus or bacteria. And it is always recommended that a person, especially those with multiple sexual partners, frequently get tested for STIs. So few of those will discuss, for example, chlamydia, which is caused by the bacterium *Chlamydia trachomatis*, which is the most common and dangerous form of STIs. Different types of symptoms can be observed, for example, abnormal vaginal discharge in women.

It can also kind of cause painful urination. There can be pelvic pain and abnormal urethral discharge. Complications can happen; for example, pelvic inflammatory disease, or PID, can cause infertility, and there can be a risk of epididymitis in cases of men. Antibiotics, for example, azithromycin or doxycycline, can be prescribed to treat this kind of bacterial infection. Then gonorrhea, which is another kind of bacterial infection or sexually transmitted disease, can occur.

Again, different types of symptoms, including genital discharge, mostly a thick and yellow-green discharge, painful urination, and sore throat, can also be observed in the case of pharyngeal gonorrhea. Then rectal pain, different types of discharge, and bleeding can be observed. Complications can include infertility, increased risk of HIV acquisition and transmission, and different types of painful inflammatory conditions. Treatment can be given with antibiotics; apart from that, pain management treatments or anti-inflammatory drugs can also be prescribed. Syphilis is also caused by the bacterial strain *Treponema pallidum*, and in these cases, what has been observed is sore formation, which is mostly in the initial primary cases, the sores or blisters that will be observed on top of the genitals.

These sores or blisters can initially be painless. But as in the latent or initial stages of the sore slowly progress in cases of secondary latent and tertiary cases, the sores become more painful and severe complications can also be observed, especially in cases involving the heart, brain, and nerves. So mostly in the initial stages, painless sores, rashes, or fever can be observed along with fatigue and hair loss. But in cases of tertiary stages or in progressive stages of syphilis bacterial infection, neurological problems, including tertiary syphilis, can be observed. Mostly, treatment can be given with penicillin.

Then HPV, which is the human papillomavirus, and by the name, you can understand this is an STI caused by the virus. This is the most common form of HPV, and the symptoms are basically genital warts, which are small warts shaped like cauliflower that can be observed on or near the genital area. These are, most of the time, painless warts, right? But there are several kinds of strains of the HPV virus. The majority of the strains of the HPV virus cause genital warts that are cauliflower-shaped. However, in certain cases of the HPV virus, they can also lead to cervical cancer and different types of oral or rectal cancers.

So, those few strains of the HPV virus are highly risky and dangerous. So, of course, the virus cannot be treated; no virus can be treated, but sometimes antiviral drugs might be used. Generally, vaccinations are available, so with the vaccination, some forms of HPV can be prevented. Apart from that, there are different topical medicines that can be used to remove warts. Then HSV, which is like herpes or the herpes simplex virus, is also one type of STI or viral infection.

In these cases, blisters can be observed in the genital area or the mouth, which can be highly significantly transmitted; it can even be transmitted by touch. Not only through sexual intercourse, HSV or herpes can also be transmitted by simple touch, a simple kiss, and other forms of sexual contact. And the complication can have an increased risk of HIV acquisition and transmission. The treatment can be given via antiviral medication to reduce the effect of the herpes virus. Apart from that, generally, the herpes virus can be latent, and periodically there can be an outbreak.

Finally, we will discuss HIV, or the human immunodeficiency virus. This is basically a virus that can affect our neurological system or the immune system. Basically, it can be transmitted

through sexual intercourse, but apart from that, it can be transmitted by blood, semen, vaginal fluid, and even breast milk. Symptoms can be severe because it is an immunodeficiency virus; it will significantly weaken our immune system, causing acute flu-like symptoms, which may also include fever, sore throat, and rash. Apart from that, clinical latency or asymptomatic cases, or cases with few symptoms, can also be observed in some instances of AIDS.

Complications can arise whenever an immunodeficiency syndrome like this happens, and the patient may frequently need to go to the doctor. There are different types of antiviral or antiretroviral therapies, or ART therapies, to control the virus that are currently being given to the patients. So, basically, this will improve immune function and reduce transmission. So, in previous days there was almost no cure for AIDS, but nowadays a lot of antiviral medications are available to control the spread of the virus in the body and to boost the immunity in our body to fight off those infections. Then male infertility is a condition that can eventually be caused by a lack of production of testosterone.

There can also be other situations, like STIs or bacterial infections, that can cause medical or male infertility. Basically, in cases of male infertility, even though there might be sperm production, the sperm quality or number could be too low. And in those cases, it would not be able to properly have a mix of the sperm, and even though the sperm grow and infuse with the female egg or embryo, the embryonic formation or fertilization will not happen. So, basically, male infertility is a significant issue. And there are different symptoms, mostly like the inability to conceive, and there can also be other associated symptoms; for example, testicular pain, sexual dysfunction, or hormonal imbalances.

Diagnosis can be done by semen analysis to check for proper sperm development, to check the quality of the sperm, and to check the number of sperm. Apart from that, hormone testing or genetic testing can also be done. Treatment can include testosterone or hormonal therapy. Apart from that, in vitro fertilization, or IVF, can be done by taking healthy sperm from another donor or by isolating healthy sperm from the same donor. So, hopefully you kind of like different types of male reproductive diseases we discussed, including different conditions such as STIs.

So, basically, infertility is not just a woman-related issue; you have to remember that almost one-third of the total infertility cases can also happen to males. So, in terms of the societal taboo, females should not have to suffer the consequences. We would like both males and females to go to the clinic and test their physical conditions to identify who is having an actual issue. And there are different kinds of therapies, different kinds of intervention strategies, and of course, in vitro fertilization and IVF, which is a kind of change that alters the medical industry, where fertilization can occur outside of the body, and eventually, an embryo can be implanted into the body to conceive a baby. So, the activity question is: what are the different risk factors and preventive measures for prostate cancer, and what are the current screening recommendations? So if you liked this, this was a very straightforward class where we discussed different diseases, their conditions, and their different treatment approaches.

So if you are enjoying your human physiology class. Thank you for attending today's class. If you have any questions, please discuss them during the live sessions. You can also drop the questions via email. Let us meet again very soon with another new class on human physiology. Thank you again.