

MALE GENITAL SYSTEM

Cryptorchidism: Retention of testes in the abdominal cavity is called cryptorchidism which occurs due to failure of testicles to descend in scrotum through inguinal canal after birth. This permanent retention of testicles in abdominal cavity causes their hypoplasia leading to lack of spermatogenesis. Such testes are more prone for development of neoplastic growth.

Macroscopic and Microscopic features

- Testes – small and softer.
- The Leydig cells may be normal or hyperplastic.
- The seminiferous tubules lack spermatogenic activity.
- The interstitial space has more fibrous tissue.

Spermatocele: There is failure of development of mesonephric tubules and does not connect with vas deferens resulting into blind tubules filled with spermatozoa.

Hydrocele: It is a condition in which clear serous fluid accumulates in the tunica vaginalis.

Haematocele: It is a condition in which blood is present in the tunica vaginalis.

Testicular Degeneration: It is the degeneration of the seminiferous epithelium. It may be unilateral or bilateral.

Etiology-

- Physical – Excessive heat, freezing temperature, trauma, haematoma and laceration of scrotum and radiation
- Localised / systemic infection causing fever, toxæmia, orchitis, inflammatory changes of tunica vaginalis, scrotum and epididymitis.
- Vascular lesion caused by torsion of testes, spermatic cord compression, testicular biopsy, inflammation of testicular artery.
- Artery – thrombus, hyalinization in arteries lead to testicular degeneration
- Obstructive lesion in the head of epididymis interferes with the flow of spermatozoa and testicular tubular secretions. The back pressure cause degeneration of germinal layers of the seminiferous tubules.
- Nutritional deficiency of vitamin - A, phosphorus, protein and energy
- Toxic substances like arsenic, metals, cadmium chloride and naphthalene
- Hormonal imbalance of FSH and LH and improper administration of hormones
- Auto immunization with auto / isologus spermatozoal materials

Pathogenesis

- Avitaminosis causes testicular degeneration through inhibition of release of gonadotrophins.
- Cadmium chloride causes lesions in the vascular endothelium resulting in thrombosis
- Radiation affects highly sensitive spermatogonia.
- The testicular degeneration caused by highly chlorinated naphthalene is generally reversible.

Macroscopic features

- A testis undergoing degeneration is swollen and softer than normal, do not bulge on cut surface but in chronic cases, it is smaller and firm.

Microscopic features

- Microscopic findings vary with severity and stage of degeneration. The entire length of some tubules may be affected, while in others only partial part may be affected.
- Seminiferous tubules collapsed, degenerated and degenerated tubules may contain calcium deposit.
- Localised / systemic infection causing fever, toxemia, orchitis, inflammatory changes of tunica vaginalis, scrotum and epididymitis.
- Vacuolation of the Sertoli cells and loss of germ cells. At the end stage of testicular degeneration, Sertoli cells are the only lining cells that remain but as the time passes, they also disappear leaving the basement membrane exposed.
- Artery – thrombus, hyalinization in arteries lead to testicular degeneration
- Obstructive lesion in the head of epididymis interferes with the flow of spermatozoa and testicular tubular secretions. The back pressure cause degeneration of germinal layers of the seminiferous tubules.

ORCHITIS:

[Orchitis is the inflammation of testes characterized by edema, necrosis and infiltration of neutrophils, macrophages, lymphocytes and proliferation of fibrous tissue leading to atrophy in chronic cases.]

Etiology-

- **Trauma** – This is more common in rams as they have pendulous testes.
- **Bacteria** – The infection may extend from the lower part i.e. epididymis or may be haematogenous. Most common bacteria are-
 - Brucella abortus in bulls
 - Brucella suis in boars
 - Corynebacterium pyogenes, Corynebacterium ovis and Pasteurella pseudotuberculosis rodentium in rams
- Salmonella abortus equi in donkeys and stallions

- *Pseudomonas mallei* in stallions
- *Mycobacterium tuberculosis*
- *Actinomyces bovis*

Types-

- Non-specific Orchitis- It is of unknown cause, most commonly present in bulls and stallions. There are no gross lesions.
- Intra tubular Orchitis
- Necrotizing Orchitis-most severe form of Orchitis.
- Granulomatous Orchitis
- Auto immune Orchitis

Macroscopic and Microscopic features

- Enlargement of testes, congestion, oedema, swelling of the scrotum.
- Due to pressure by the exudate and the action of the pathogen, necrosis of the testes occurs with suppuration and abscess formation.
- Atrophy and hardening in chronic cases.
- Seminiferous epithelium shows degeneration and desquamation.
- Interstitial tissue is infiltrated with lymphocytes, macrophages and plasma cells.
- In suppurative orchitis, there will be a suppurative area filled with neutrophilic exudate
- The bacteria can be seen in large numbers in the epithelial cells and necrotic areas
- In chronic cases, Interstitial tissue has more amount of fibrous tissue infiltration of mononuclear cells
- Granulomatous lesions in case of actinomycosis and tuberculosis.

EPIDIDYMITIS:

Epididymitis is the inflammation of epididymis characterized by catarrhal or suppurative exudate with necrosis of lining epithelium.

Etiology

- *Brucella avis* in sheep
- Other organisms that cause orchitis which is preceded by epididymitis

Macroscopic and microscopic features

- Hardening and enlargement of epididymis upto 3-4 times in the chronic stage.
- Edema of scrotum
- Accumulation of mucus and/ or purulent exudate in epididymis.
- Accumulation of serous exudate in scrotum.
- Necrosis of lining epithelium of epididymis
- Infiltration of neutrophils, macrophages and lymphocytes

- Edema
- Formation of granuloma in chronic cases and interstitial tissue shows increased fibrous tissue.

FUNICULITIS:

Funiculitis is inflammation of spermatic cord which is usually seen after castration. scirrhus cord is the chronic inflammation of spermatic cord in usually occur in cattle and horses which is characterized by excessive formation of granulation tissue in the stump of castrated cord due to infection.

Etiology-

- Botryomycosis
- Actinomycosis
- Castration
- Unsanitary conditions

Macroscopic and microscopic features

- Enlargement of scrotum
- Hard swelling/ chronic abscess
- Excessive formation of granulation tissue at the site of castrated wound.
- Abscesses with thick walls may be present in the tissue and infiltration of macrophages, lymphocytes, neutrophils around sulfur granules forming rosette.

SEMINAL VESICULITIS:

Seminal vesiculitis is the inflammation of seminal vesicle characterized by metaplasia of the columnar epithelial lining to cornified stratified squamous epithelium.

Etiology

- Pseudomonas aeruginosa
- Chlamydia psittaci
- Mycoplasma bovigenitalium
- Actinomyces pyogenes
- Corynebacterium renale
- Brucella abortus
- E. coli

Macroscopic and microscopic features

- Melanosis in bulbourethral glands.
- Enlargement, hardness of seminal vesicle.
- Metaplasia of columnar epithelium into severely cornified stratified squamous epithelium.
- Proliferation of melanoblasts/ melanocytes.

- Alveoli and interstitial tissue is infiltrated with neutrophils in acute cases where as in chronic cases, interstitial tissue with infiltration of lymphocytes, plasma cells and histiocytes.

PROSTATITIS:

Prostatitis is the inflammation of prostate gland by formation of painful abscess, atrophy, hyperplasia of epithelial cells, proliferation of fibroblasts and formation of cysts. It occurs in dogs.

Etiology

- Hormonal imbalance
- Pyogenic staphylococci, streptococci

Macroscopic and microscopic features

- Presence of abscess encapsulated by fibrous tissue
- Enlargement of prostate causing obstruction of urethra
- Obstruction in rectal passage
- Hematuria
- Infiltration of neutrophils and liquefied necrosis.
- Chronic inflammation is characterized by hyperplasia of glandular epithelium, fibroblasts and smooth muscle fibers.
- Cystic glandular hyperplasia.
- Infiltration of lymphocytes.

BALANOPOSTHITIS:

Balanoposthitis is the inflammation of prepuce and glans penis characterized by phimosis or paraphimosis and pain during copulation. Balanitis is inflammation of glans penis and posthitis is inflammation of prepuce.

Etiology

- Trichomonas foetus
- BHV-1 virus
- Vesicular exanthema virus
- Mycoplasma spp.
- Pseudomonas aeruginosa
- Actinomyces ptlogenes
- Corynebacterium renale

Macroscopic and microscopic features

- Phimosis and paraphimosis due to pain, adhesions.
- Congestion, presence of exudate and mucosal lymph follicles may be enlarged.
- In the bulls (known as infectious pustular balanoposthitis) pustules form on the preputial lining and glans penis, giving them a granular appearance.
- Lymphocytic infiltration in the degenerated epithelium.

Phimosis: Phimosis is the failure of extension of penis from its sheath.

Paraphimosis: Paraphimosis is the failure of withdrawal of extended penis.

Hypospadias: It is urethral opening in ventral side of the penis.

Epispadias: It is urethral opening on the dorsal side of the penis.

Phallocampsis: Phallocampsis is the deviation of penis, which may be spiral (*Cork screw penis*) or ventral deviation (*rainbow penis*).