UROGENITAL SYSTEM

PATHOLOGY OF THE MALE GENITAL TRACT

Learning Objectives:
- To know common types of congenital anomalies and their clinical significance.
- To know the common types of infections in the male genital tract.
- To understand the common tumour or tumour-like lesions in the male genital tract.
- To understand the significance of tumour markers.

PENIS, URETHRA AND SCROTUM

Congenital Anomalies

Hypospadia and Epispadia:
- Urethral opening on the ventral or dorsal surface of penis.
- Predispose to urinary tract infection in infancy and childhood as well as interfering with normal ejaculation in later life.

Congenital urethral valvular obstruction:
- Membranous flap in the prostatic urethra is a cause of urinary obstruction.

Phimosis:
- The orifice of the prepuce is too small for its normal retraction.
- May also be produced after inflammatory scarring.

Inflammation

Nonspecific infections
- Nonspecific infections of the prepuce (balanitis) and glans (prosthtitis) may be caused by various pyogenic bacteria or Candida albicans.
- May be predisposed by poor personal hygiene.

Specific sexually transmitted diseases
- Transmitted mainly by sexual contact. Examples: Syphilis, Gonorrhea, Chlamydial infections, Lymphogranuloma venereum, Granuloma inguinale, Genital herpes, Chancroid.
- Each has different clinicopathological characteristics.
  - eg. Complications of gonorrhoea in male patients:
    1. Spread of infection: urethra (fistula, stricture) → prostate → vas deferens → epididymus → testis (atrophy, scarring)
    2. Chronic persistent inflammation
    3. Systemic involvement: endocarditis, arthritis

Other infections that can be sexually transmitted
- Trichomonas vaginalis, Condyloma acuminata (Human Papilloma Virus), AIDS
**Tumour like lesions**

**Condyloma acuminata (venereal warts)**
- Most commonly associated with Human Papilloma Virus (HPV) types 6 and 11
- **Gross** - single or multiple warty papillary growth on penis/scrotum
  - they may spread locally to involve wide areas in the anogenital region
- **Histology** - fibroblastic branching stalk covered by acanthotic squamous epithelium
  - koilocytes: perinuclear halo + smudged nuclei
  - differentiated from squamous carcinoma by the mature epithelium

**Malignant Tumours**

**Squamous cell carcinoma**
- First occupational cancer recognized in chimney sweeps
- The most common malignant tumor of penis
- **Age:** 50-70 years
- **Etiology:**
  - rare in people with circumcision soon after birth
  - related to poor personal hygiene and smegma
  - associated with HPV infection
- **Gross:** exophytic ulcerated growth or nodular plaques
- **Histology:** squamous cell carcinoma
- **Course:** regional lymph nodes metastasis

**Carcinoma in Situ**
- Smooth, soft red plaques or elevated, scaly reddish papules on the glans and penis.
- May develop into invasive squamous cell carcinoma if untreated.

**PROSTATE**

**Inflammation**

**Acute and chronic prostatitis**
- Extend from the bladder or urethra
- Nonspecific infection caused by coliform bacteria, gonococci or chlamydia

**Granulomatous prostatitis**
- May be caused by specific infections such as tuberculosis or syphilis
- Nonspecific inflammatory reaction to inspissated secretion/ autoimmune causation

**Benign nodular hyperplasia (BNH) / Benign prostatic hyperplasia (BPH)**
- Extremely common disorder in men over 50
- **Gross** - distinct circumscribed grey white nodules in the periurethral zone
- **Histology** - proliferation of both glandular and fibromuscular stromal elements
  - infarct, infection, squamous metaplasia
- **Clinical symptoms, signs and complications**
  (i) asymptomatic
  (ii) compression of urethra - difficulty in urination, frequency or dribbling
  (iii) retention of urine
    - bladder distention and hypertrophy
    - hydroureters and hydronephrosis
- chronic renal failure

(iv) superimposed infections - prostatitis or cystitis

**Prostatic carcinoma**

**Incidence**
- Marked geographical and racial difference: common in American males (more prevalent in blacks) but uncommon in orientals

**Etiology**
- Role of androgen in the growth of the tumor

**Clinical presentation**
- Clinical symptoms (prostatism) is present, hard mass find during rectal examination.
- Incidental finding during microscopic examination of the tissue surgically removed for non-malignant disease, particularly BPH.
- Present with signs and symptoms of metastasis (e.g. back pain due to vertebral metastasis)
- Tumors of the prostate detected during autopsy on patients that showed no clinical evidence of prostatic cancer

**Tumour markers**: Prostatic acid phosphatase, Prostatic specific antigen

**Gross**: yellowish, hard, gritty tissue

**Histology**
- Adenocarcinoma, usually microacini
- Perineural invasion

**Modes of spread**
- Local - causing prostatic urethra obstruction and may infiltrate into periphery adjacent tissue
- Lymphatics - presacral in pelvis, iliac and paraaortic lymph nodes
- Blood - vertebra, osteoblastic, widespread metastasis

**Treatment**: surgery + hormonal therapy

**TESTES AND EPIDIDYMIS**

**Congenital anomalies**

**Cryptorchidism** (undescended testes)
- A complete/incomplete failure of the intraabdominal testes to descend into the scrotal sac
- Incidence: about 0.25% of all adult male
- Significance: inguinal hernia, trauma, testicular atrophy (at and after puberty), increased incidence of testicular tumor

**Inflammation**
- More common in the epididymis than in the testes. Gonorrhea and tuberculosis almost invariably arise in the epididymis, whereas syphilis affects the testis first. Orchitis may complicate 25-30% of mumps in postpubertal group.
- Granulomatous orchitis, probably as reaction to extravasated sperms, usually occur in middle aged men and may clinically simulate tuberculous orchitis or testicular tumor.
Vascular lesions

Torsion
• Twisting of spermatic cord interferes with venous drainage and causes engorgement and hemorrhagic infarct of the testis.

Testicular Tumours:
• Infrequent but nearly always malignant; <1% of cancer in male.
• Over 90% of primary testicular tumours are considered to be of germ cell origin; 5% from gonadal stroma; and the rest from other components of the testis.

I. Germ Cell Tumours:

Aetiology:
1. Cryptorchidism:
• A cryptorchid testis is thirty to fifty times more likely to develop a malignant tumor than a normally placed testis.
• Abdominal testis are at higher rate than inguinal ones.
• Contralateral normal testis may be involved.
• Seminoma is the most common type.
• Frequency of malignancy does not decrease in orchiopexy after 6 years of age.
2. Genetic - ?higher incidence in siblings

Age and Incidence

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Presentation: Testicular enlargement or pain, Distant metastasis

Pattern of spread
Mode of spread:
- a) Seminoma → Lymphatic
- b) Embryonal Ca → Teratoma → Lymphatic and blood
- c) Choriocarcinoma → blood

Treatment: surgery, irradiation and chemotherapy.

Prognosis: depends on the histologic type and the extent of spread at presentation.
Histogenesis:

GERM CELL

Tumor of totipotent cell

SEMINOMA

EMBRYONAL CARCINOMA

Extra-embryonic tissue

Trophoblast

Yolk sac

Embryonic tissue

Ectoderm

Mesoderm

Endoderm

TERATOMA

Histological Types

A. Seminoma (classical):
   • Well-demarcated tan-white homogeneous mass composed of uniform cells in lobules separated by a fine stroma.
   • Tumour cells are large and round with a large central hyperchromatic nucleus, prominent nucleoli and a sharp cell border. The cells contain glycogen.
   • Classical seminoma is radiosensitive with favourable prognosis after orchidectomy and postsurgical irradiation.

B. Embryonal Carcinoma:
   • A highly malignant tumour with variable pattern. The cells resemble anaplastic epithelial cells.
   • Spread is by lymphatics but haematogenous dissemination is frequent. Prognosis is poor.

C. Yolk-Sac Tumour:
   • Microscopically characterised by distinctive perivascular structures and hyaline globules.
   • Tumour contains demonstrable alpha-fetoprotein.
   • Spread is via lymphatics and blood.

D. Choriocarcinoma:
   • A highly malignant tumour composed of two elements - cytotrophoblastic and syncytiotrophoblastic cells.
   • Serum and urinary Human chorionic gonadotrophin (HCG) is elevated.
   • Distinct propensity to haematogenous dissemination.

E. Teratoma:
   • A histologically complex tumour composed of tissue derived from more than one of the three primary germ layers: ectodermal elements (skin, hair, keratin and skin appendages), mesodermal elements (e.g. bone, cartilage, smooth muscle etc.) and endodermal elements (e.g. intestine and bronchial mucosa, thyroid, etc.).
• Subdivided into mature and immature teratomas. Teratomas in adults are capable of metastasis, even if they appear entirely mature. For unknown reasons, differentiated mature teratomas of testis in infants and small children are usually benign.

F. Germ Cell Tumours (mixed type):

Tumour Markers
1. Human chorionic gonadotrophin (HCG)
   • Secreted by sycytiotrophoblastic cells in the placenta.
   • Elevated levels are seen in most choriocarcinomas, some embryonal carcinomas and some seminoma containing syncytiotrophoblasts.
2. Alpha-fetoprotein (AFP)
   • Secreted in yolk sac tumors and some embryonic carcinoma.

Significance of Tumour Markers
• Detection of non-seminomatous elements
• Detection of recurrence
• Detection of metastasis

II. Gonadal Stromal Tumours

Gonad (Testis & Ovary)

Sex cord
  ➔ Sertoli cells
  ➔ Granulosa cells

Stroma
  ➔ Leydig cells
  ➔ Theca cells

About 5% of testicular tumours. Majority are largely Leydig cell tumours.

III. Lymphoma and Leukaemia

About 2-5% of all testicular malignancies (mostly secondary). Testicular lymphoma is however the most common testicular tumor in men older than 60 years of age.

IV. Metastasis

REFERENCES: