The Male Genital Tract

I- Penis

Congenital anomalies

(1) Hypospadias and epispadias of penis:
   - In hypospadias, the urethra opens at ventral surface of the penis.
   - In epispadias, the urethra opens at dorsal surface of the penis.

Complications:
   1- Urinary obstruction (as the urethral opening is often constricted).
   2- Sterility (when the orifice is near the base of the penis).

(2) Phimosis

It is narrowing of the opening of the prepuce.

Complication:
   1- Balanitis (=inflammation of glans penis)
   2- Squamous cell carcinoma of the penis.
   3- Gradual urinary obstruction.

Inflammations

Inflammations of the penis almost invariably involve the glans and prepuce

✓ Specific infections: syphilis, gonorrhea, chancroid, granuloma inguinale, lymphopathia venerea, genital herpes
✓ Nonspecific infections: Balanoposthitis which is infection of the glans and prepuce caused by a wide variety of organisms like Candida albicans, anaerobic bacteria

TUMORS

- Tumors of the penis are uncommon.
- The most frequent neoplasms are carcinomas and a benign
epithelial tumor: condyloma acuminatum.

- In addition to benign and malignant categories, there are several forms of carcinoma in situ, exemplified by Bowen disease.

**II- Testis and Epididymis**

**CONGENITAL ANOMALIES**

✓ Cryptorchidism (undescended testis): *One or both testicles are arrested at a point during their descent to scrotum.*

**Causes:**
1. Deficiency of gonadotrophic hormone of pituitary.
2. Organic obstruction prevents the descent.
3. Testicular defect.

**M/E:** Atrophy of the seminiferous tubules with fibrosis.

**Complication:**
1. Liable to trauma (traumatic orchitis).
2. Infertility (in bilateral cases).
3. Malignancy (precancerous condition).

The left picture is normal while
The right is an example of undescended testis

**INFLAMMATIONS**

A. Non-Specific
   Epididymitis and Orchitis

✓ Epididymitis and possible subsequent orchitis are commonly related to infections in the urinary tract which presumably reach the epididymis and the testis through either the vas deferens or the
lymphatics of the spermatic cord.

✓ Orchitis:

1. Specific inflammation as due to Bacterial, viral, ....... etc

**Pathology:** acute inflammation with suppuration resulting in scarring and sterility.

**Tumors of Testis**

Usually manifested by firm painless enlargement of testis.

The tumors are divided into two major categories:

✓ germ cell tumors

✓ nongerminal tumors derived from stroma or sex cord.

Approximately 95% arise from germ cells. Most of these germinal tumors are highly aggressive cancers that are capable of rapid, wide dissemination,

Nongerminal tumors, in contrast, are generally benign, but some elaborate steroids, leading to interesting endocrinologic syndromes.

<table>
<thead>
<tr>
<th><strong>Germ Cell Tumors</strong></th>
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<tbody>
<tr>
<td>Seminoma</td>
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<tr>
<td>Spermatocytic seminoma</td>
</tr>
<tr>
<td>Embryonal carcinoma</td>
</tr>
<tr>
<td>Yolk sac (endodermal sinus) tumor</td>
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<tr>
<td>Choriocarcinoma</td>
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<tr>
<td>Teratoma</td>
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<table>
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<tr>
<th><strong>Sex Cord-Stromal Tumors</strong></th>
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<tbody>
<tr>
<td>Leydig cell tumor</td>
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<tr>
<td>Sertoli cell tumor</td>
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</table>
(1) Tumors of Non-germinal cells
- These are benign tumors, representing 3% of testicular tumors and arise from non germinal cells.
- They may secrete steroids and cause endocrinopathies.

(1) Leydig (interstitial) cell adenoma
It produces androgens
   1- Before puberty it leads to sexual precocity.
   2- After puberty, no body change are detected.

(2) Sertoli cell adenoma:
It produces estrogen leading to feminizing characters.

(2) Lymphoma
It represents 7% of testicular tumors and usually occurs above 65 years of age.

(3) Germ cell tumors
Most of these tumors are malignant and the peak incidence is from 19 to 35 years old.

Predisposing factors:
   1 - Genetic factors
   2- Undescended testis.
   3- Atrophic testis
   4- Venereal diseases.
### Examples

1- Seminoma (commonest malignant tumor of testis)

2- Teratoma

<table>
<thead>
<tr>
<th></th>
<th>Seminoma</th>
<th>Teratoma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incidence:</strong></td>
<td>More common</td>
<td>Less common</td>
</tr>
<tr>
<td><strong>Age:</strong></td>
<td>- 40-50 years of age.</td>
<td>- Peak incidence in twenties</td>
</tr>
<tr>
<td></td>
<td>- Unknown before puberty.</td>
<td>- May occur before puberty</td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td>Germ cells with gonadal differentiation.</td>
<td>Germ cell with embryonic differentiation.</td>
</tr>
<tr>
<td><strong>N/E</strong></td>
<td><img src="image1.png" alt="Image of Seminoma" /></td>
<td><img src="image2.png" alt="Image of Teratoma" /></td>
</tr>
<tr>
<td><strong>Shape</strong></td>
<td>Well defined rounded mass.</td>
<td>Irregular rounded or oval mass.</td>
</tr>
<tr>
<td><strong>Consistency</strong></td>
<td>- Fleshy</td>
<td>- varies in different parts</td>
</tr>
<tr>
<td><strong>C/S</strong></td>
<td>- homogenous, grey white and opaque (potato like)</td>
<td>- Not uniform, it is solid but show variable sized cystic cavities with areas of hemorrhage and necrosis.</td>
</tr>
</tbody>
</table>
**M/E**

* Tumor tissue which is:
  - Related to the locality.
  - Formed of sheets and cords of spermatogonic cells. They are separated by a fibrous stroma with lymphocytic infiltration.
  - The cells are uniform, large, polygonal with nucleus

* Tumor tissue which is:
  - Foreign to the locality
  - Formed of mixture of tissues derived from 3 germ layers.

It may be:
1. Differentiated (mature) teratoma.
2. Intermediate (immature) teratoma.
3. Undifferentiated teratoma.

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<thead>
<tr>
<th>Radio-sensitivity</th>
<th>Radio sensitive</th>
<th>Radio resistant</th>
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**Spread**

1. **Local**
   - Invade testicular tissue to reach tunica vaginalis, epididymis, spermatic cord and scrotal skin

2. **Lymphatic**
   - Common iliac, pancreatic L.N.
   - Later mediastinal and supraclavicular L.N.

3. **Blood**
   - Lung, then brain and bones.
Miscellaneous lesions

I - Varicocele

Definition: It is varicosity of the pampiniform plexus of veins in the spermatic cord.

Causes:  
1 - Primary: occur in young unmarried men.
2 - Secondary: usually detected over middle age.

It is due to:

a - pressure on the spermatic vein usually by a tumor of the kidney.
b - Right sided heart failure.
c - Venous thrombosis.

Pathology:  
1- Bag of warm like masses is felt in the scrotum.
2- Detective spermatogenesis.

II - Spermatocele

Definition: *Small spherical cysts filled with clear or opalescent fluid containing sperms and are in relation to the epididymis.*

Causes:
1- Embryological remnants.
2- Post inflammatory obstruction of epididymal ducts.

Pathology:

- Single or multilocular cyst.
- Often bilateral at the head of epididymis and less often at the body or tail.
- Thin walled, tense and contain a clear or most often a milky fluid (spermatozoa and albumin).
II-Prostate

*Inflammation*

I- Non specific inflammation

A) Prostatitis:

*Causes:* E. coli, Gonorrhea, staph. Aureus, strept pyogens,............. etc.

*Routes of infection:*

1 - Direct spread from cystitis, urethritis, urethral instrumentation.

2 - Blood borne infection.

*Pathology:*

- Acute suppurative prostatitis which may form abscess.
- Chronic prostatitis follows acute.

II- Specific Inflammation

1- Tuberculosis.
2- Syphilis.
3- Filariasis.
4- Bilharziasis.

**BENIGN ENLARGEMENT**

*Nodular Hyperplasia (Benign Prostatic Hyperplasia)*

✓ In the normal adult, the prostate weighs approximately 20 grams.
✓ The prostate is a retroperitoneal organ encircling the neck of the bladder and urethra and is devoid of a distinct capsule.
✓ In the adult, prostatic parenchyma can be divided into four biologically and anatomically distinct zones or regions: the peripheral, central, and transitional zones and the region of the anterior fibromuscular stroma

**Definition:** Hyperplastic enlargement of prostate.
**Incidence:** Extremely common. It begins in the fifth decade of life and increase progressively after that age.

**Cause:** Absolute or relative increase of estrogen.

**N/E:**

**Site:** lateral and middle lobes (they are stimulated by estrogen).

**Surface:** nodular.

**Consistency:** firm, rubbery.

**Shape:**

- The two lateral lobes are enlarged on each side of the urethra which may be elongated, tortous, deflected and compressed to slit like tube.

- The middle lobe forms a conical mass projecting upwards into the urinary bladder. The vesical sphincter is stretched by the enlarged lobe and is rendered incompetent.

**C/S:** shows ovoid nodules of different sizes.

1 - Glandular tissue nodules are grey, finely cystic (spongy) and soft.

2- Stromal tissue nodules are white.

**M/E:** *Hyperplasia of both glands and stroma.*

1) Glandular hyperplasia:

1 - The glands increase in number.

2- They are arranged into acini varying in size and shape.

3- They are lined by one or several layers of columnar cells sometimes forming papillae.

4- Some acini are dilated with flat lining.
5- The lumen of the acini contains concentric laminated round or oval homogenous pink bodies called corpora amylacia. They are formed of shedded epithelial cells undergoing hyaline change and fused by a granular pink secretion (N.B.: they can be stained with iodine).

6- Small foci of more active hyperplasia with the formation of masses of cells and cribriform pattern may develop.

(2) Fibromuscular stromal hyperplasia:
- The stroma increase due to hyperplasia of smooth muscles and fibroblasts.
  - It is frequently infiltrated with lymphocytes and plasma cells.

Effects (complications):

1) Prostatism: in 5-10% of cases.

2) Incomplete gradual urinary tract obstruction related to urethral changes and disturbance of vesical sphincter mechanism

a- Urethral changes

The prostatic urethra is elongated, curved, tortous, deflected and compressed to a mere slit.

b- Vesical Sphincter is streached.

c- The urinary bladder can not be completely emptied and its wall shows trabeculation with diverticulation (as in the photo). The urine accumulates (stasis) which predisposes to:
  - Cystitis
  - Formation of phosphate stone.

d- Ureters:  - Bilateral hydroureter
  - Bilateral pyoureter.

e- Kidneys:  - Bilateral hydronephrosis
- Bilateral pyonephrosis.
- Bilateral pyelonephritis.

3) Hypertension and the patient may die from uremia.

4) No relation to malignancy.

**Tumors**

**Adenocarcinoma of prostate**

**Incidence:**

- One of the commonest male cancers.
- Occurs in old age above 50 years (not detected before 40 years).

**Causes:** 1- Genetic factor (familial predisposition).

2- Excess androgens.

**N/E:** - Site: posterior lobe.

- The gland is enlarged and hard.

**C/S:** shows uncapsulated mass with vague irregular outline (infiltrating borders).

- It is greyish white in colour with small yellow foci (fatty change or necrosis).

**M/E:** 1 - Adenocarcinoma of varying degree of differentiation.

2- Histochemical staining for detection of mucin and acid phosphatase produced by tumor cells.

**Spread:** *(1) Local:*  

1- Within the prostate: invades prostatic urethra (urethral obstruction is common).

2- Infiltrate the capsule to involve seminal vesicles, floor of urinary bladder and rectum (causing piles).
(2) Lymphatic:
   a- To regional L.N (sacral and para aortic L.N)
   b- Perineural lymphatics leading to sciatica.

(3) Blood:
   1- Via systemic veins to lung, liver, bone.
   2- Via the vertebral system of veins especially to lumbar or sacral vertebrae.

N/B: bone metastasis is usually osteosclerotic (osteoblastic) i.e bone forming. This raises alkaline phosphatase enzyme.

**Tumor marker in prostatic carcinoma:**

(1) Serum acid phosphatase concentration is elevated.
   - It is produced by tumor cells and serves as marker for follow up of effectiveness of therapy.

(2) Prostatic specific tissue antigen (P.S.A).

(3) Carcinoembryonic antigen (C.E.A).

(4) Alkaline phosphatase enzyme rises with osteosclerotic bone metastasis.

**Diseases of tunica vaginalis**

(1) Hydrocele:
   - Collection of serous fluid within tunica vaginalis
   - Types and causes:
     1- **Primary**: unknown cause
     2- **Secondary**: due to:
        a- Diseases of testis,
epididymis and spermatic cord e.g. trauma, tortion of testis, inflammations and tumors.
b- Generalised oedema.
   - Effects: Pressure atrophy of testis, 2ry infection (pyocele).

(2) Haematocele:
- Collection of blood within tunica vaginalis.
- Types and causes:
  1- Primary: unknown cause
  2- Secondary: due to:
      a- Trauma.
      b- Malignant tumors of testis.
      c- Haemorrhagic blood diseases.

Complications (effects):
  1- Pressure atrophy of testis.
  2- 2ry infection (pyocele).
  3- Organization of blood, fibrosis in tunica vaginalis and its cavity.

(3) Chylocele: Accumulation of lymphatic fluid within tunica vaginalis. It is due to lymphatic obstruction. e.g. in filariasis