Testicular and prostatic tumors

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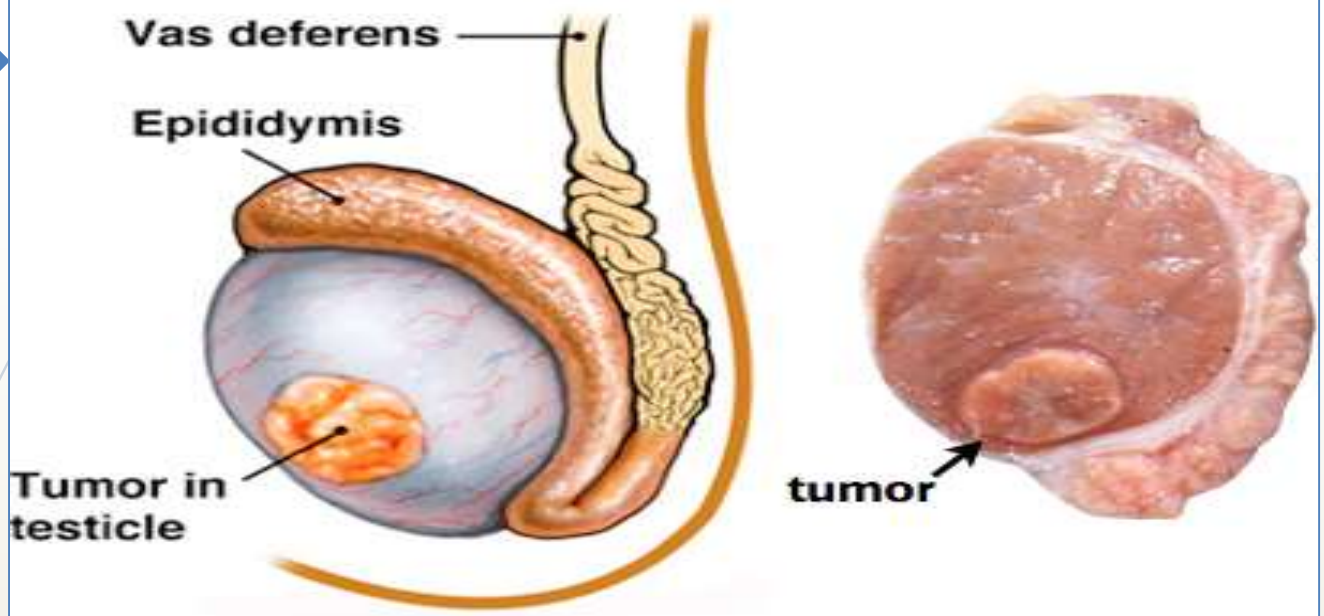
Testicular Cancer



- Most common in ages 20–35 years
- Painless, firm, hard, fixed scrotal mass
- Ultrasound

The most common tumors in young men <40 years; causes 10% of cancer deaths
include:

I. Germ cell tumors : *(95%); all are malignant in postpubertal males*

II. Sex cord-stromal tumors: (5%); generally benign.

Testicular germ cell tumors are sub-classified into:

I. Seminomas

II. Non-seminomatous germ cell tumors(NSGCT)

- embryonal ca
- yolk sac tumor
- choriocarcinoma
- teratoma

- **The histologic appearances may be:**

1. **Pure** (i.e. composed of a single histologic type; 40% of cases)
2. **Mixed** (60% of cases).

RISK FACTORS:

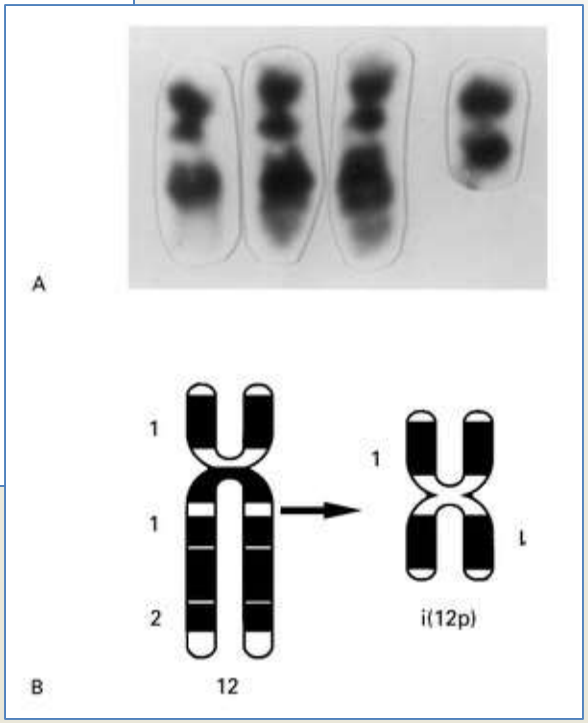
1. **whites > blacks**
2. **Cryptorchidism :**

(3-5 folds risk of cancer in undescended testis, and an increased risk of cancer in contralateral descended testis).

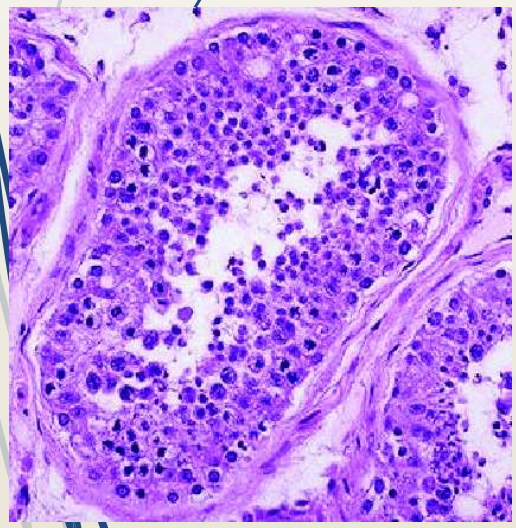
3. **Intersex syndromes: e.g.** Androgen insensitivity syndrome; Gonadal dysgenesis
4. **Family history:** relative risk is higher than normal in fathers, brothers, and sons of affected patients

5. **The development of cancer in one testis** markedly increase risk of neoplasia in the contralateral testis.

6. **An isochromosome of the short arm of chromosome 12, i(12p)**, is found in virtually all **postpubertal** germ cell tumors, regardless of their histologic type.



- 7. Most testicular tumors in post-pubertal males arise from the in situ lesion "***intratubular germ cell neoplasia"***, *currently called* ***germ cell neoplasm in situ (GCNIS)***



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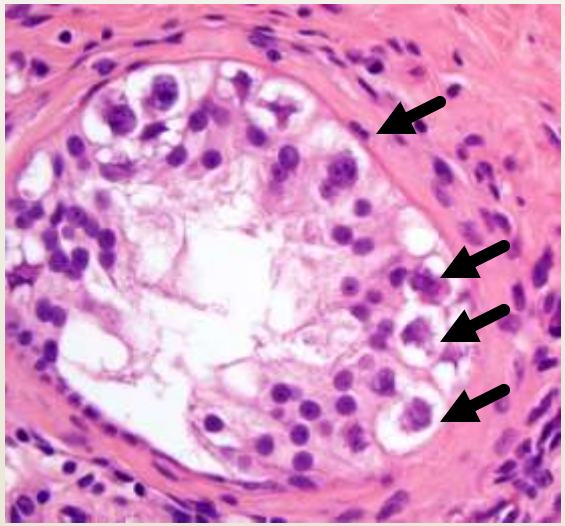
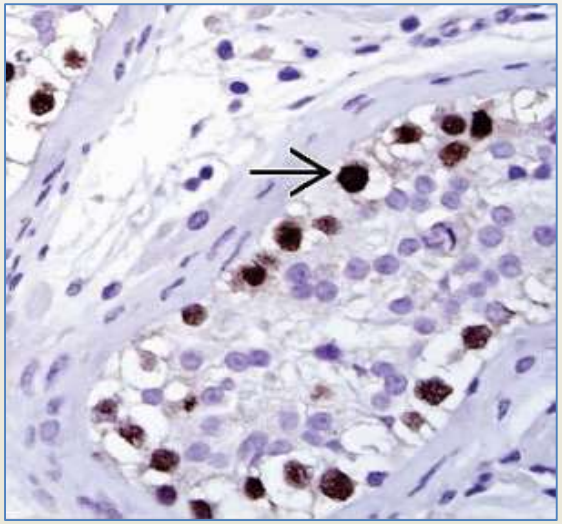


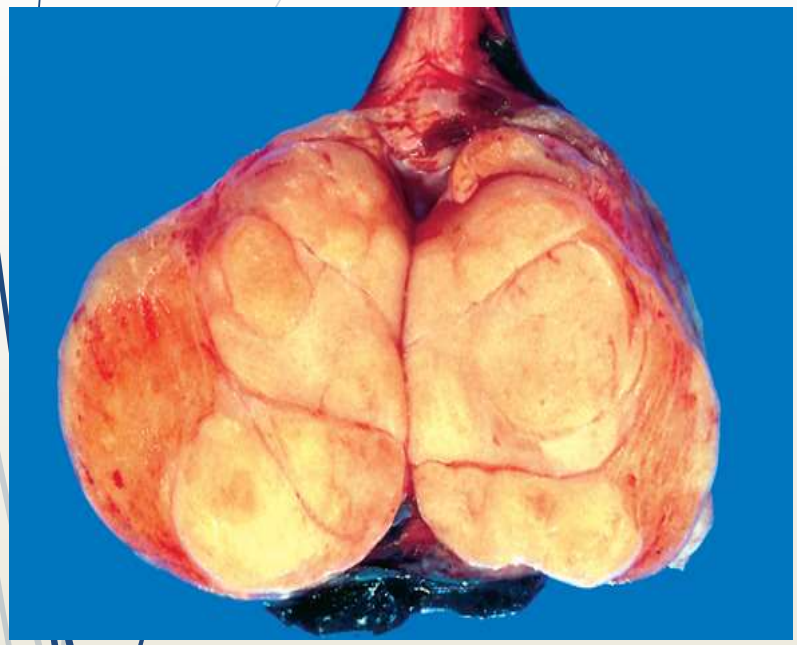


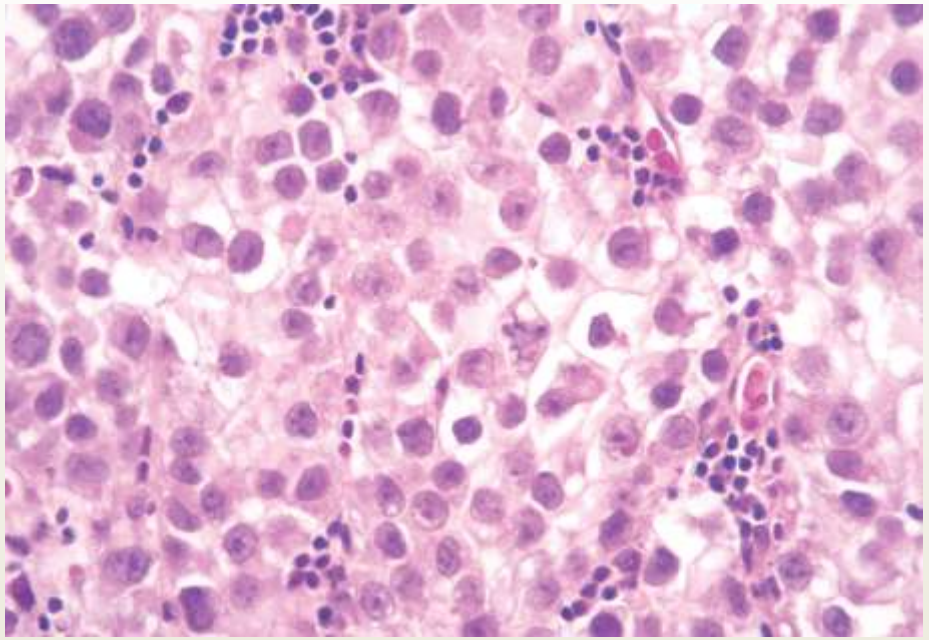
germ cell neoplasia in situ (GCNIS)

I. Seminoma:

- **Make up to 50% of all testicular tumors**
- ***Classic seminoma*:**
  - Rare in prepubertal children
  - Progressive painless enlargement of the testis
  - Histologically identical to ovarian dysgerminomas and to germinomas occurring in the CNS and other extragonadal sites.

1. Seminoma

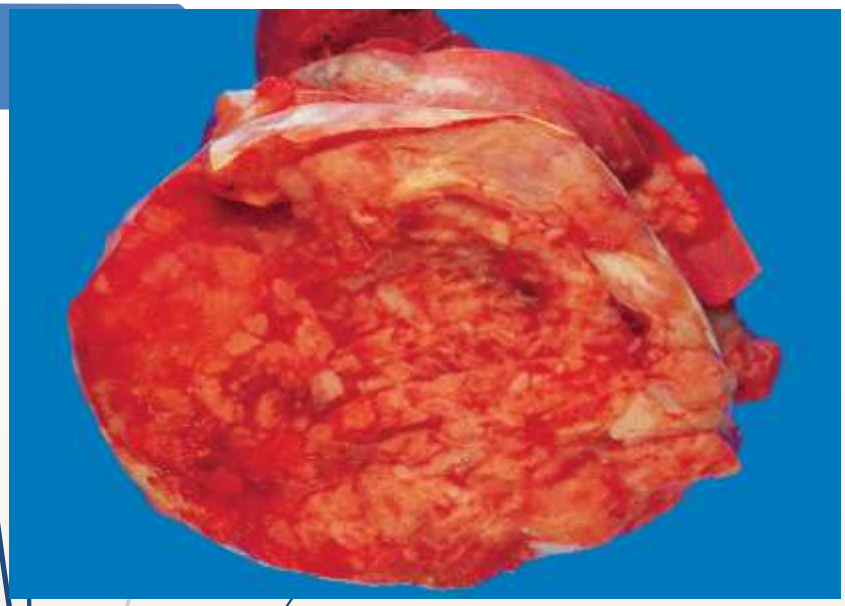




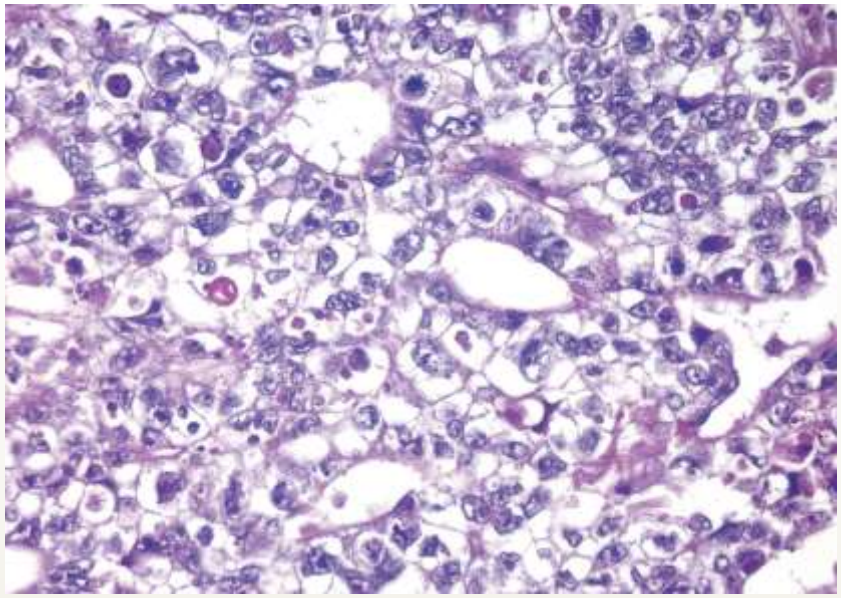
Seminoma :circumscribed, pale, fleshy, homogeneous mass; usually without hemorrhage or necrosis.

Microscopic examination reveals large cells with distinct cell borders, pale nuclei, prominent nucleoli, and lymphocytic infiltrate.

2. Embryonal carcinoma



ill-defined masses containing foci of hemorrhage and necrosis



Sheets of undifferentiated cells & primitive gland -like structures. The nuclei are large and hyperchromatic with prominent nucleoli, and increased mitotic activity

- **20-30 years old**
- **More aggressive than seminoma**

3. Yolk sac tumors

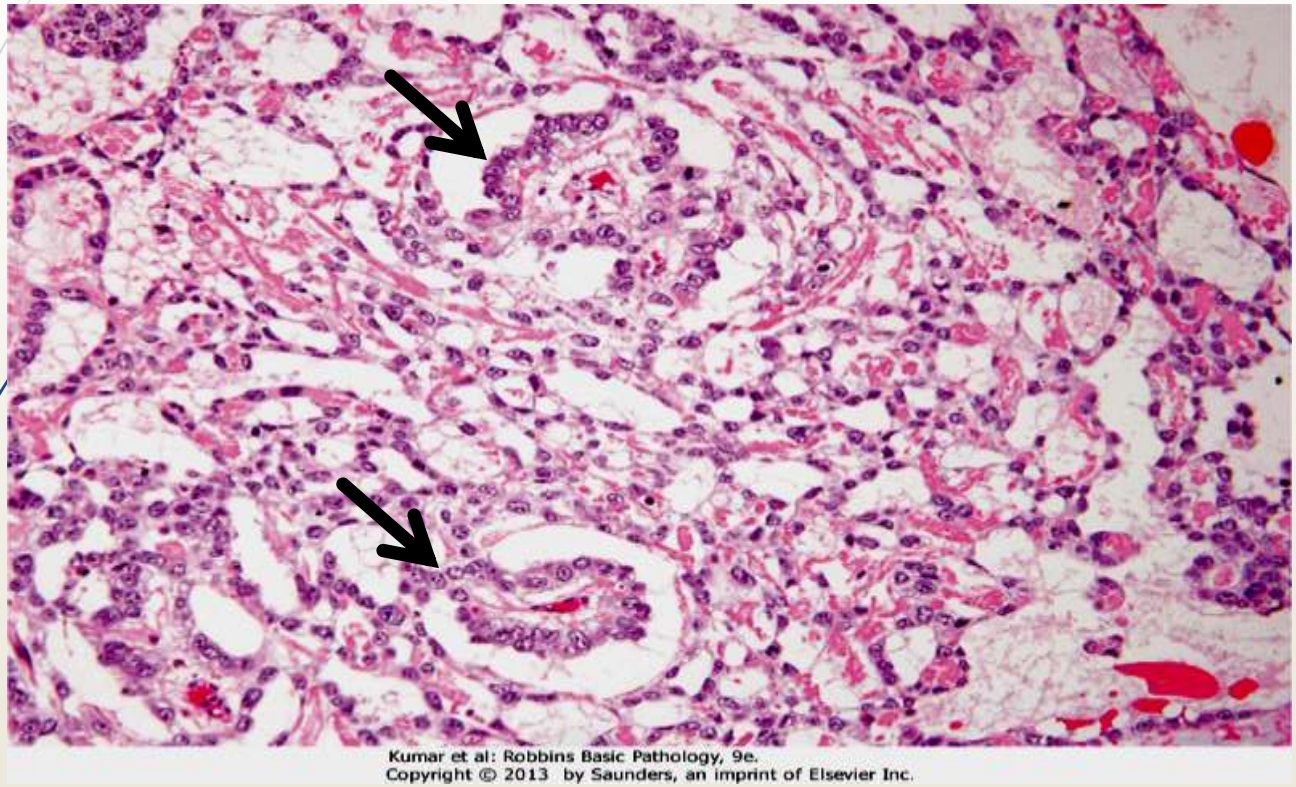
- The most common primary testicular neoplasm in **children** <3 year
- good prognosis in young children
- In adults, pure form of yolk sac tumors is rare and have a worse prognosis

Yolk sac tumors **macroscopically:**

- large and may be well demarcated.
- **Histologically:**

- The tumor is composed of low cuboidal to columnar epithelial cells forming Microcysts, Lacelike (reticular) patterns.
- A distinctive feature is the presence of structures resembling primitive glomeruli, called **Schiller-Duvall bodies.**
- **Alpha- feto-protein (AFP)** usually detected in serum.

3. Yolk sac tumor (arrows: Schiller-Duvall bodies)



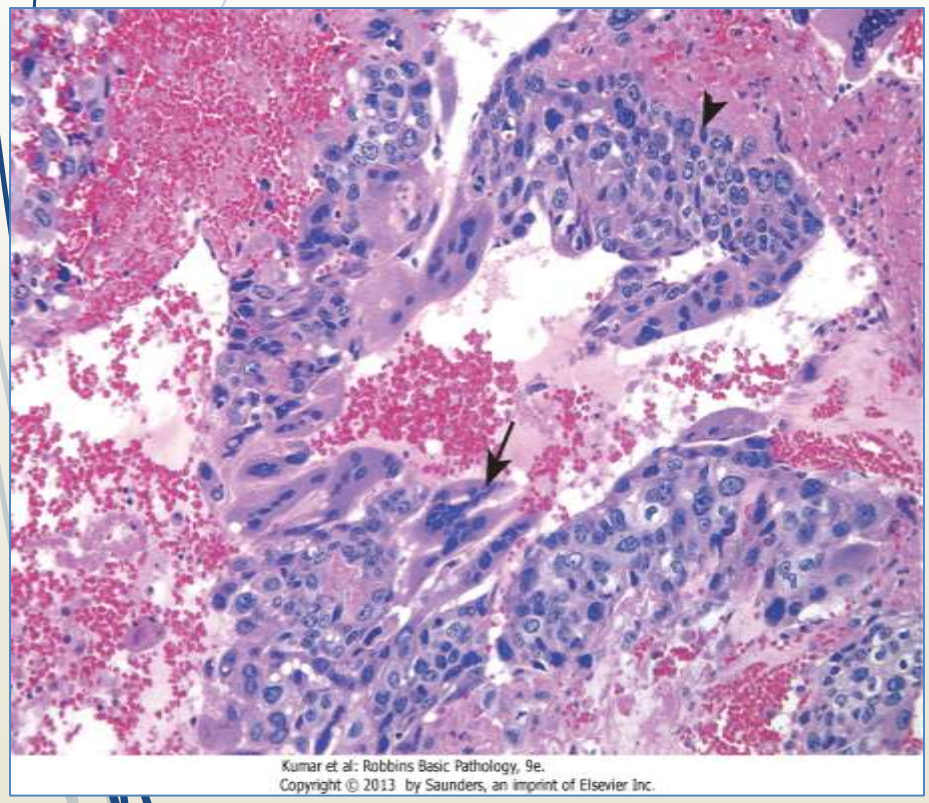
4. Choriocarcinomas

- 20-30 years old
- highly malignant form of testicular tumor.
- its “pure” form is rare, constituting less than 1% of all germ cell tumors; usually mixed with other germ cell tumors
- can also arise in the female genital tract
- Elevated serum level of **HCG**.

Choriocarcinoma

Arrow: Syncytiotrophoblast

Arrow head: Cytotrophoblast



Macroscopically:

- The primary tumors often are small (<5cm) , palpable nodule with no testicular enlargement, even in patients with extensive metastatic disease.
- necrosis and hemorrhage are extremely common

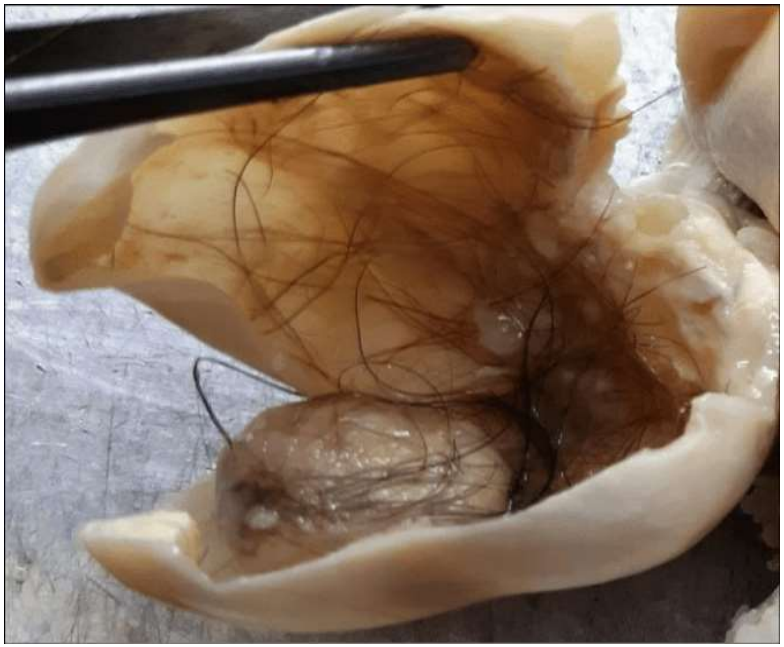
Microscopic examination:

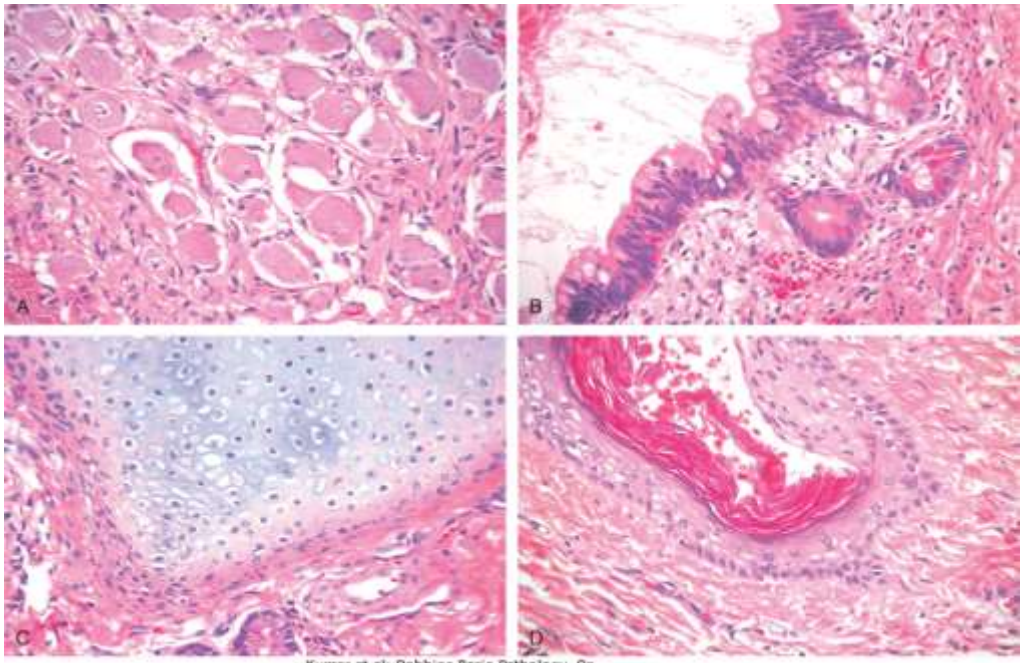
- Syncytiotrophoblasts: large multinucleated cells with abundant eosinophilic vacuolated cytoplasm producing **HCG**.
- Cytotrophoblasts: polygonal cells with distinct borders and clear cytoplasm; grow in cords or masses and have a single, fairly uniform nucleus.

5. Teratoma

- The neoplastic germ cells differentiate along somatic cell lines showing various cellular or organoid components
- Reminiscent of the normal derivatives of more than one germ layer.
- All ages
- Pure forms of teratoma are common in infants and children , being second in frequency only to yolk sac tumors
- In adults, pure teratomas are rare, constituting 2% to 3% of germ cell tumors. However, the frequency of teratomas mixed with other germ cell tumors is approximately 45%.

5. Teratoma





- **Grossly:**

firm masses containing cysts and recognizable areas of cartilage

- **Histologically:**

1. **Mature teratomas:**

a heterogeneous, collection of differentiated cells or organoid structures, such as neural tissue, muscle bundles, islands of cartilage, clusters of squamous epithelium, etc

2. **Immature teratomas:**

- Share histologic features with fetal or embryonal tissues

- **In prepubertal males**, mature teratomas usually follow a benign course.
- **In postpubertal males**, all teratomas are malignant, being capable of metastasis regardless of whether they are composed of mature or immature elements.
- it is not critical to detect immaturity in a testicular teratoma of a postpubertal male.

Clinical Features of testicular germ cell neoplasms:

- present most frequently with a **painless testicular mass** that is non-translucent
- Some tumors, especially NSGCT, may have metastasized widely by the time of diagnosis
- Biopsy of a testicular neoplasm is **contraindicated,** because it's associated with a risk of tumor spillage
- The standard management of a solid testicular mass is **radical orchiectomy**, based on the presumption of malignancy.

Seminomas and nonseminomatous tumors differ in their behavior and clinical course:

I. Seminomas:

- often remain confined to the testis for long periods and may reach considerable size before diagnosis.
- Metastases most commonly in the iliac and paraaortic lymph nodes, particularly in the upper lumbar region.
- Hematogenous metastases occur late in the course of the disease.

II. Nonseminomatous germ cell neoplasms:

- tend to metastasize earlier, by lymphatic & hematogenous (**liver and lung** mainly) routes.
- Metastatic lesions may be identical to the primary testicular tumor or different containing elements of other germ cell tumors

Assay of tumor markers secreted by germ cell tumors:

- helpful in diagnosis and follow up (recurrence and response to therapy)
  - ✓ **HCG** : **elevated** in patients with **choriocarcinoma**
  - ✓ **AFP** : **elevated** in patients with **yolk sac tumor**
  - ✓ **lactate dehydrogenase (LDH)** level:
  - correlate with the **tumor burden** (tumor size and load); regardless of histologic type

TREATMENT:

- **Seminoma:**
  - **Surgery; highly radiosensitive**
  - tends to remain **localized** for long periods
  - **best** prognosis.
  - >95% of patients with early-stage disease can be cured.
- **Nonseminomatous germ cell tumors:**
  - histologic subtype **DOES NOT** influence the therapy.
  - 90% of patients achieve complete remission with **aggressive chemotherapy**, and **most are cured**.
  - The exception is **choriocarcinoma, which is associated with a poorer prognosis.**

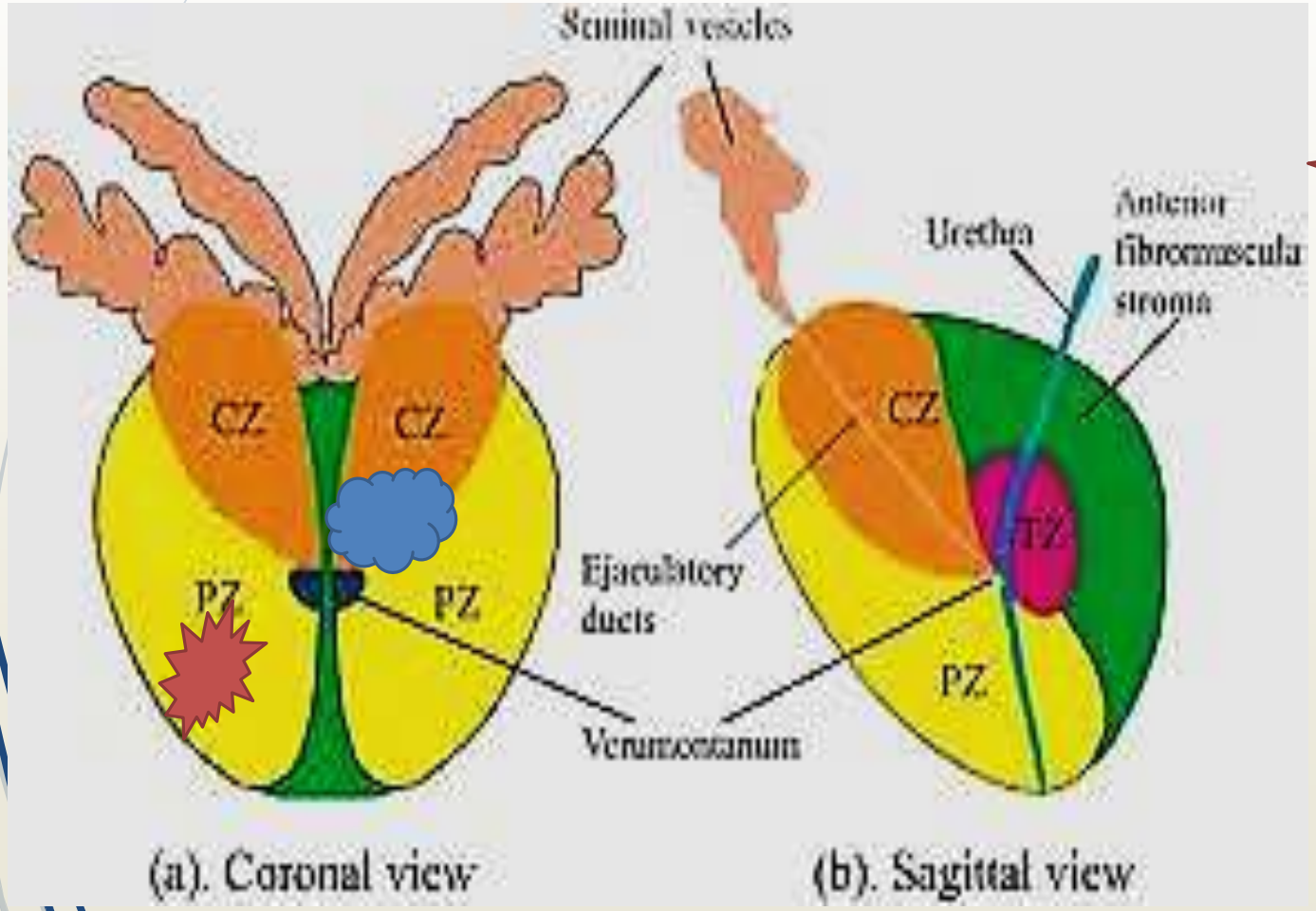
Prostate gland pathology

1- Benign Prostatic Hyperplasia (BPH)
2- Carcinoma of the Prostate

Prostate zones

BPH

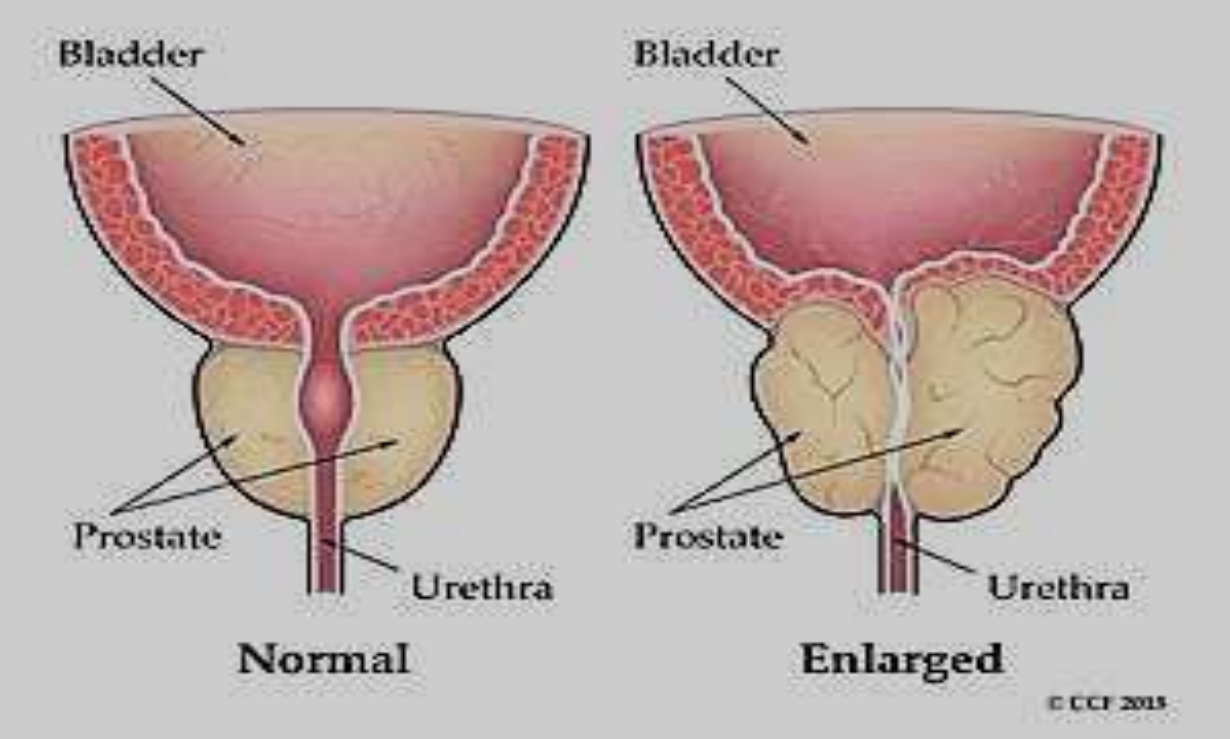
cancer



Benign Prostatic Hyperplasia

- extremely common cause of prostatic enlargement in men ≥40; frequency rises with age.
- **androgen-dependent** proliferation of both stromal and epithelial elements
- does **not** occur in males with genetic diseases that block androgen activity.
- **Pathogenesis:**
- Dihydrotestosterone (DHT) is synthesized in prostate from circulating testosterone by enzyme **5α-reductase.**
- DHT support growth and survival of prostatic epithelium and stroma by binding to **androgen receptors**
- **DHT is 10 times more potent**.

Benign prostatic hyperplasia

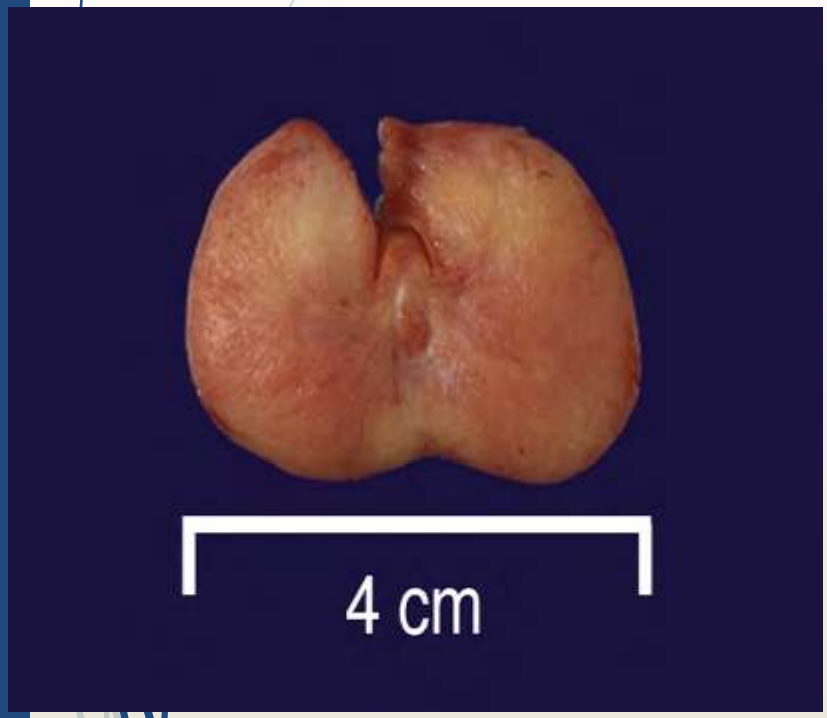


- BPH **always** occurs in the **inner transition zone of the prostate.**

Grossly:

- Prostatic enlargement (60 -100 g versus 30 g in normal)
- many well circumscribed nodules bulging from the cut surface
- Compressed urethra

Macroscopically: enlarged gland with many well-defined nodules



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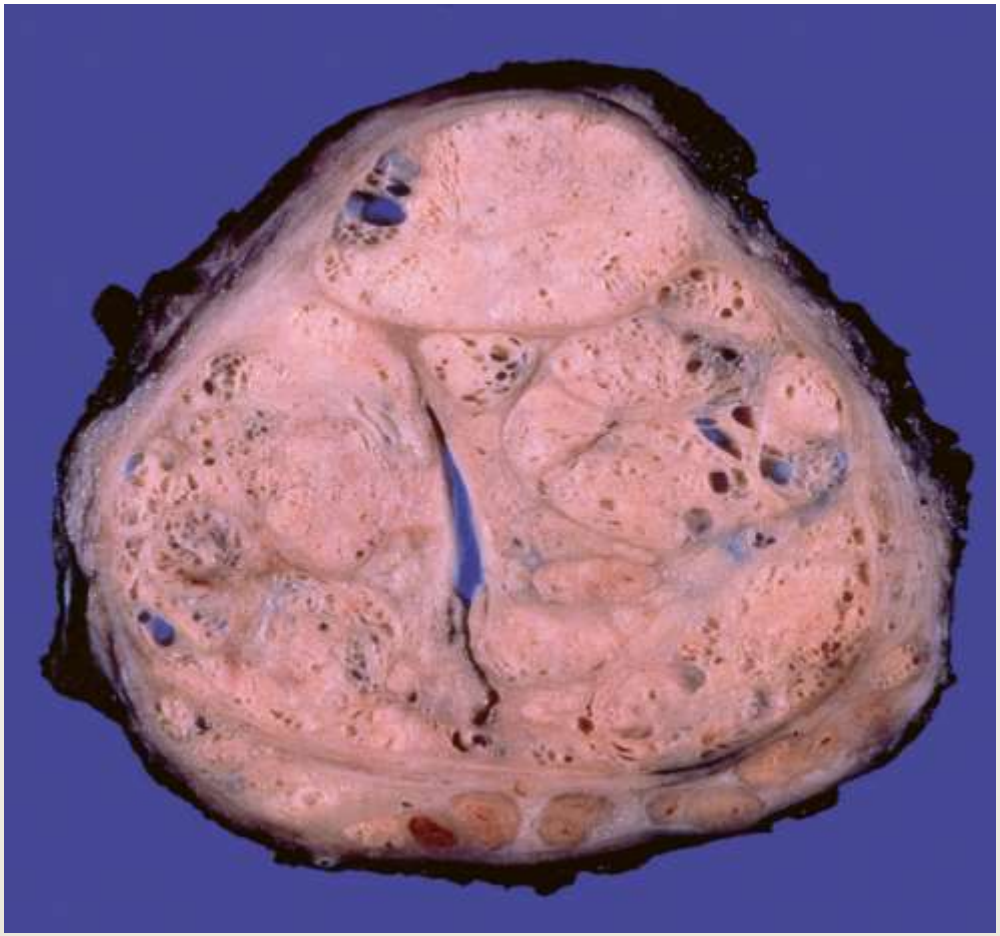
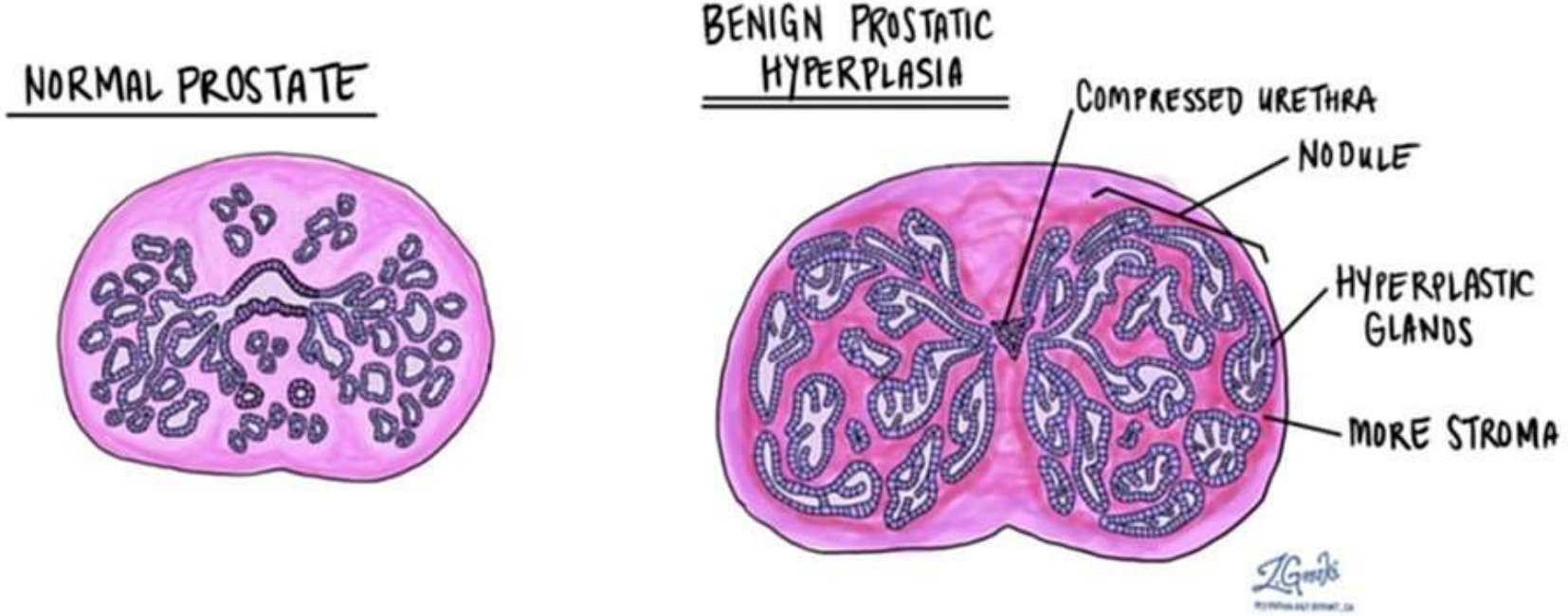
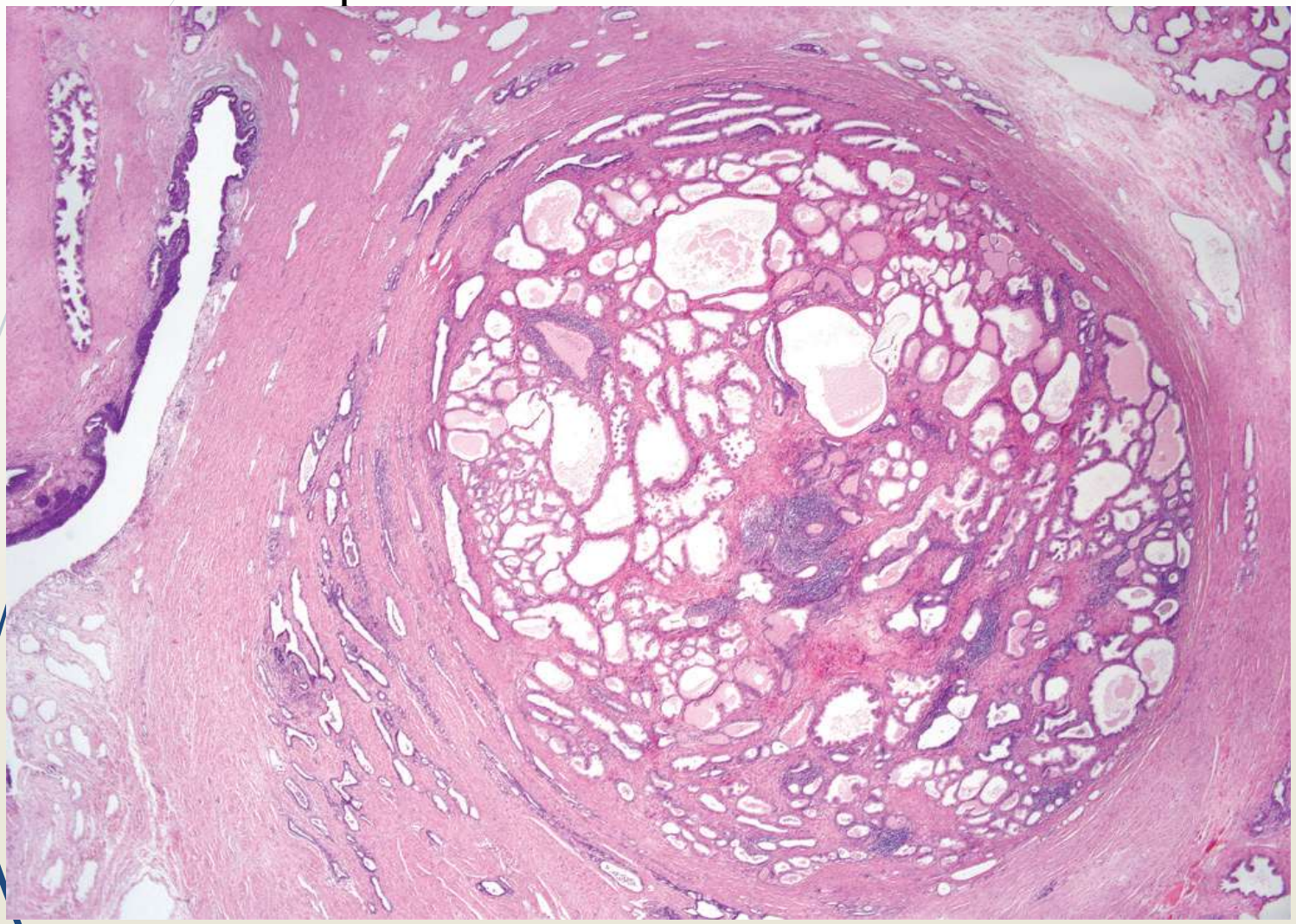


BPH

- **Microscopically:**
  - hyperplastic nodules composed of proliferating glandular elements and fibromuscular stroma.
  - The hyperplastic glands are lined by tall, columnar epithelial cells and a peripheral layer of flattened basal cells.



Nodular hyperplasia of the prostate →well-demarcated nodule with a portion of urethra.



BPH- Clinical features:

Because BPH involves the **inner portions of the prostate,** the most common manifestations are **:**

- **lower urinary tract obstruction**

  →difficulty in starting stream of urine (hesitancy)

  →intermittent interruption of urinary stream

  →urinary urgency, frequency, and nocturia (bladder irritation)

- **↑ risk of urinary tract infections**
- **TREATMENT:**
- Drugs:

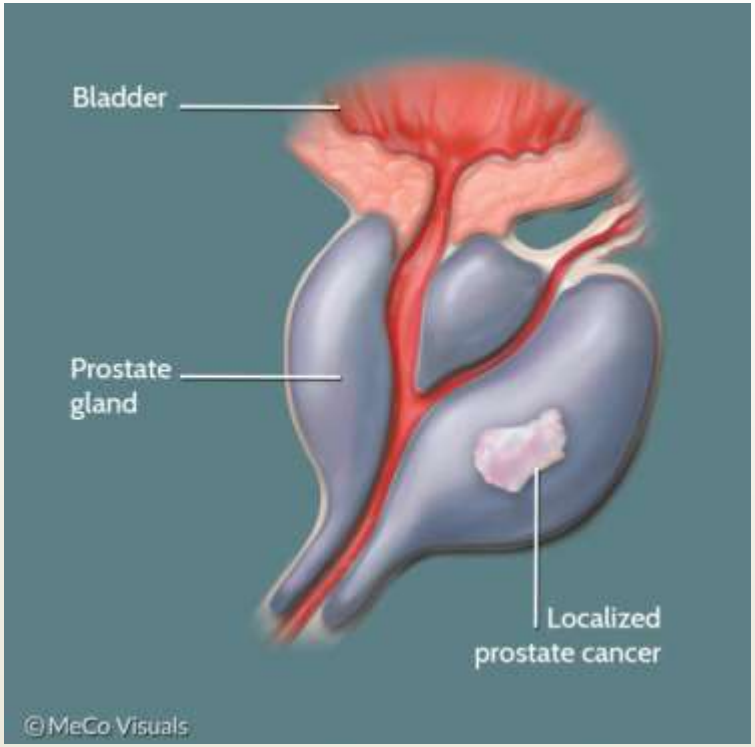
1- 5-alpha reductase inhibitors

2- agents that block α1-adrenergic receptors (relax prostatic smooth muscle)

- +/- Surgery

Carcinoma of the Prostate

- >50 years of age.
- **The most common form of cancer in men > 40**
- significant drop in prostate cancer mortality, due to increased detection of the disease through screening



PATHOGENESIS

1. Androgens.

- Cancer of prostate does not develop in males castrated before puberty.
- Cancers regress in response to surgical or chemical castration

2. Heredity:

↑risk first-degree relatives of patients with prostate cancer.

3. Environment:

- Geographical variations; diet. e.g. rise of incidence in Japanese immigrants to US

4. Acquired somatic mutations

- ***TMPRSS2-ETS*** **fusion genes:** most common gene rearrangements in prostate cancer (fusion genes of androgen regulated promoter ***TMPRSS2*** gene and ***ETS*** family transcription factors).

Clinical Features

- 70% - 80% in **peripheral** zones of gland (palpable as irregular hard nodules on digital rectal examination).
- **Screening test**: digital rectal examination + elevated serum prostate-specific antigen (PSA) level
- **Metastasis: Osteoblastic** (bone-producing) Bone metastases in axial skeleton lesions on bone scans

Prostate cancer = ✸