Testicular and prostatic tumors

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Testicular Neoplasms:

- Peak incidence at 15-34 yr
- most common tumors in men (15-34 yr)
- 10% of cancer deaths
- include:

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

II. **Sex cord-stromal tumors**: generally benign.

RISK FACTORS:

1. **whites > blacks**
2. **Cryptorchidism :(**risk of cancer in undescended testis, and even contralateral descended testis).
3. **Intersex syndromes (**Androgen insensitivity syndrome; Gonadal dysgenesis)
4. **Family history: (**4 to 10 X in their fathers and brothers of affected men).

5. **cancer in one testis (**↑risk of ca in contralateral testis).
6. **isochromosome of short arm of chromosome 12, i(12p)**: (in virtually all germ cell tumors, regardless of their histologic type).
7. ***intratubular germ cell neoplasia (in situ lesion)*** :Most testicular tumors in postpubertal males arise from it.

Testicular germ cell tumors are sub-classified into:

I. **Seminomas**

II. **Non-seminomatous germ cell tumors(NSGCT)**

- **The histologic appearances may be:**

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

Seminomas:

- **Make up to 50% of all testicular tumors**
- ***Classic seminoma*:**
  - 40-50 years old
  - Rare in prepubertal children
  - painless enlargement of testis
  - Histologically identical to ovarian dysgerminomas and to germinomas occurring in the CNS and other extragonadal sites.

ORPHOLOGY

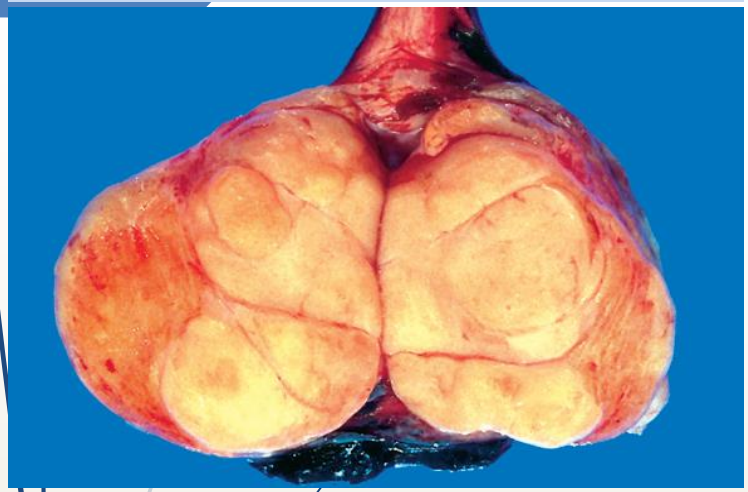
Grossly:

- soft, well-demarcated tumors, usually without hemorrhage or necrosis.

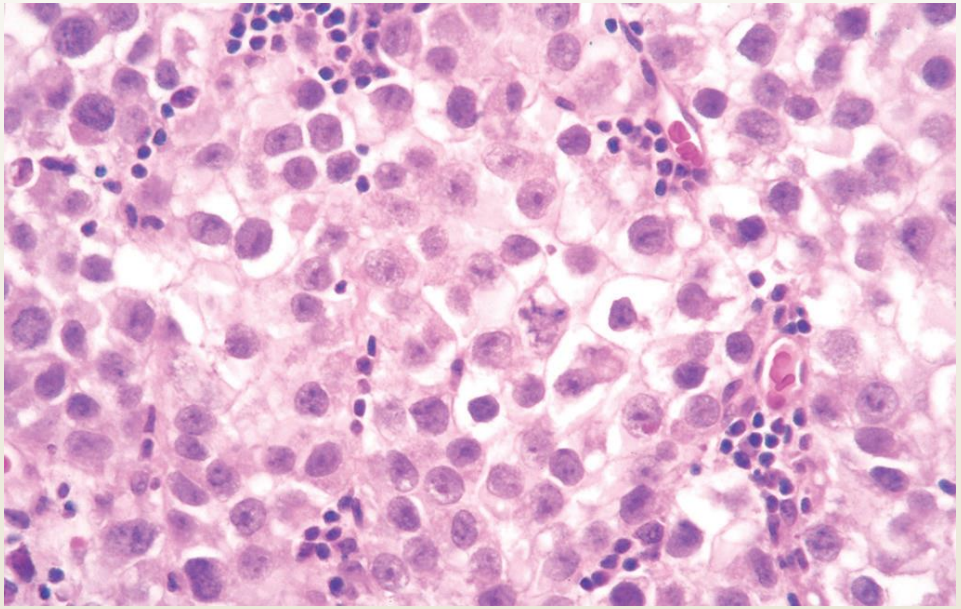
Histologically:

- **large, uniform cells with distinct cell borders, clear, glycogen-rich cytoplasm, round large nuclei, and 1-2 conspicuous nucleoli**
- The cells arrayed in small lobules with intervening delicate fibrous septa.
- A lymphocytic infiltrate usually is present

Seminoma :circumscribed, pale, fleshy, homogeneous mass



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

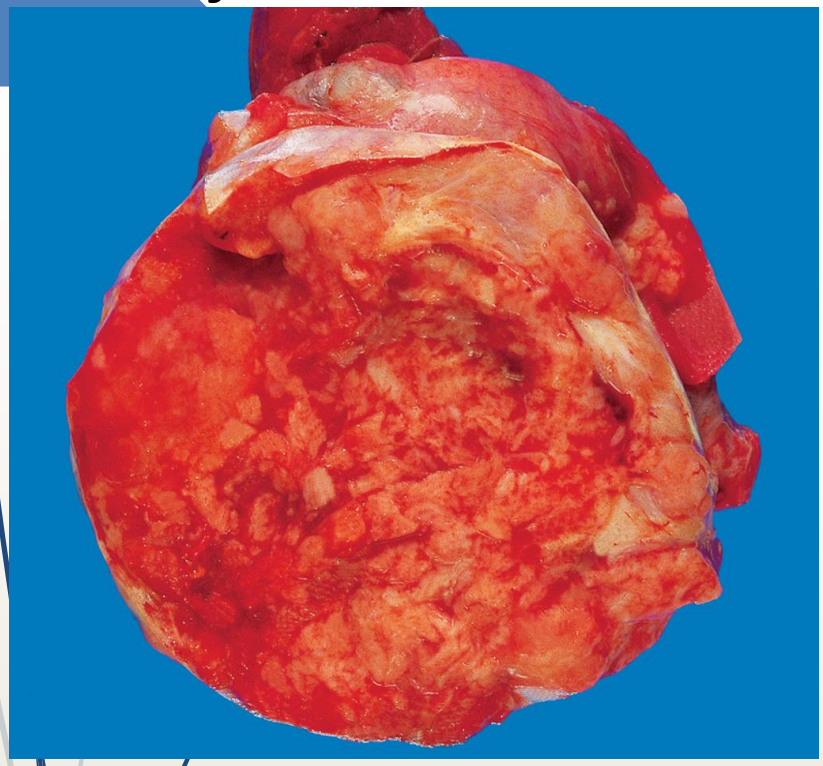


2. Embryonal carcinomas

:

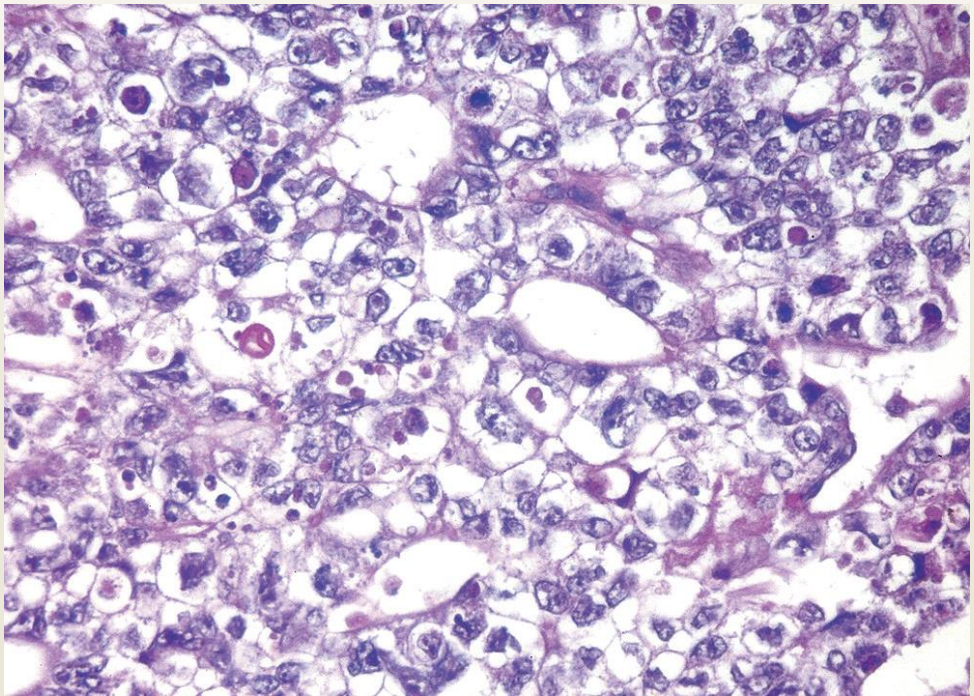
- **20-30 years old**
- **More aggressive than seminoma**
- **Grossly:**
  - Are ill-defined masses containing foci of hemorrhage and necrosis
- **Microscopically:**
  - large and primitive-looking tumor cells; basophilic cytoplasm, indistinct cell borders, large nuclei, prominent nucleoli, pleomorphic, and increased mitotic activity

Embryonal carcinoma



The tumor is hemorrhagic

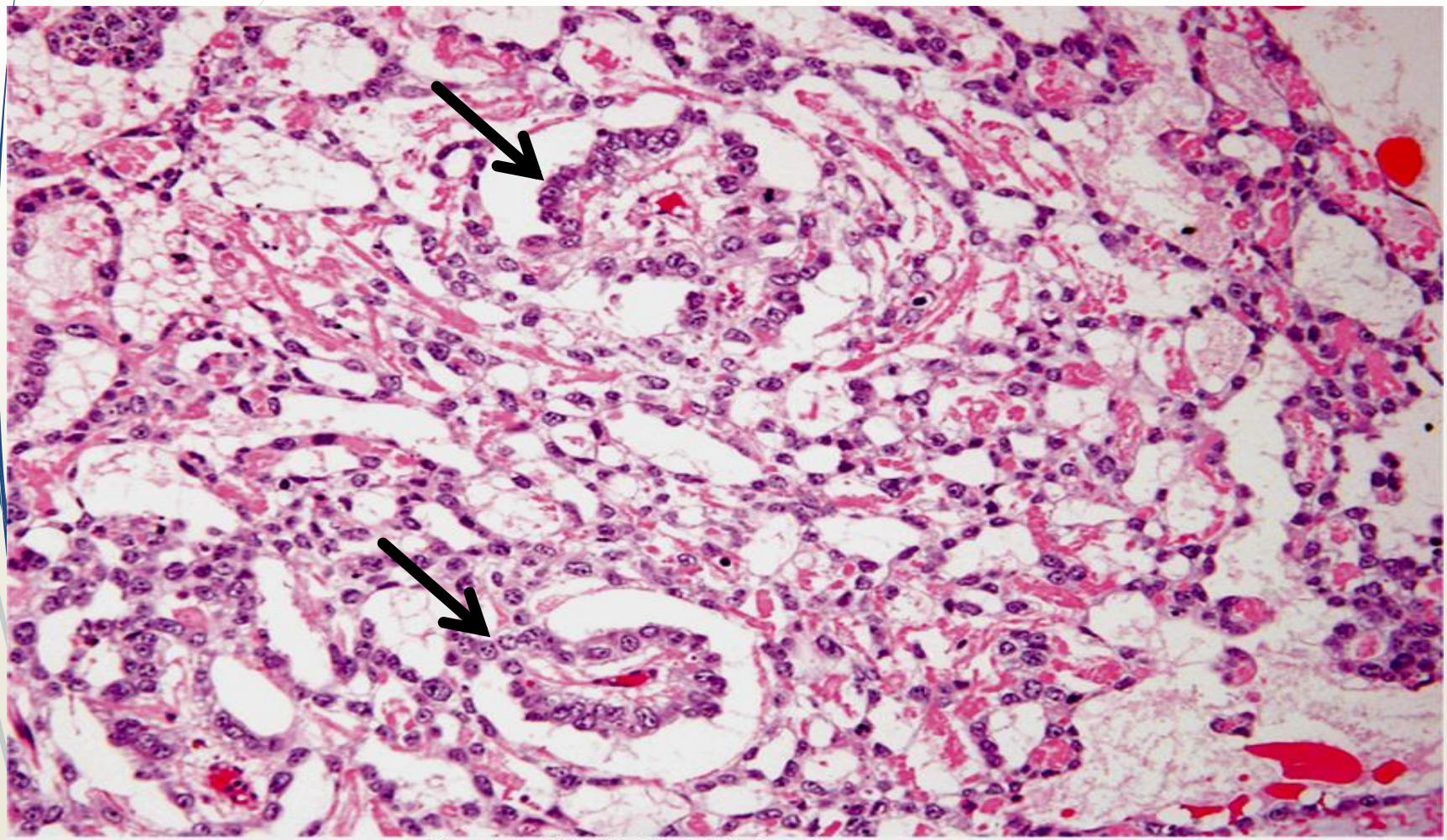
Sheets of undifferentiated cells & primitive gland -like structures. The nuclei are large and hyperchromatic



3. Yolk sac tumors

- most common primary testicular neoplasm in **children** <3 yr
- good prognosis in kids
- In adults: rare and worse prognosis
- **Grossly:**
- large and may be well demarcated.
- **Histologically:**
- A distinctive feature is the presence of structures resembling primitive glomeruli, called **Schiller-Duvall bodies**.
- **AFP** can also be detected in the serum.

Schiller-Duvall bodies.



4. Choriocarcinoma

- 20-30 years old
- highly malignant
- Rare <1% of all germ cell tumors
- can also arise in the female genital tract
- ↑ serum level of HCG.

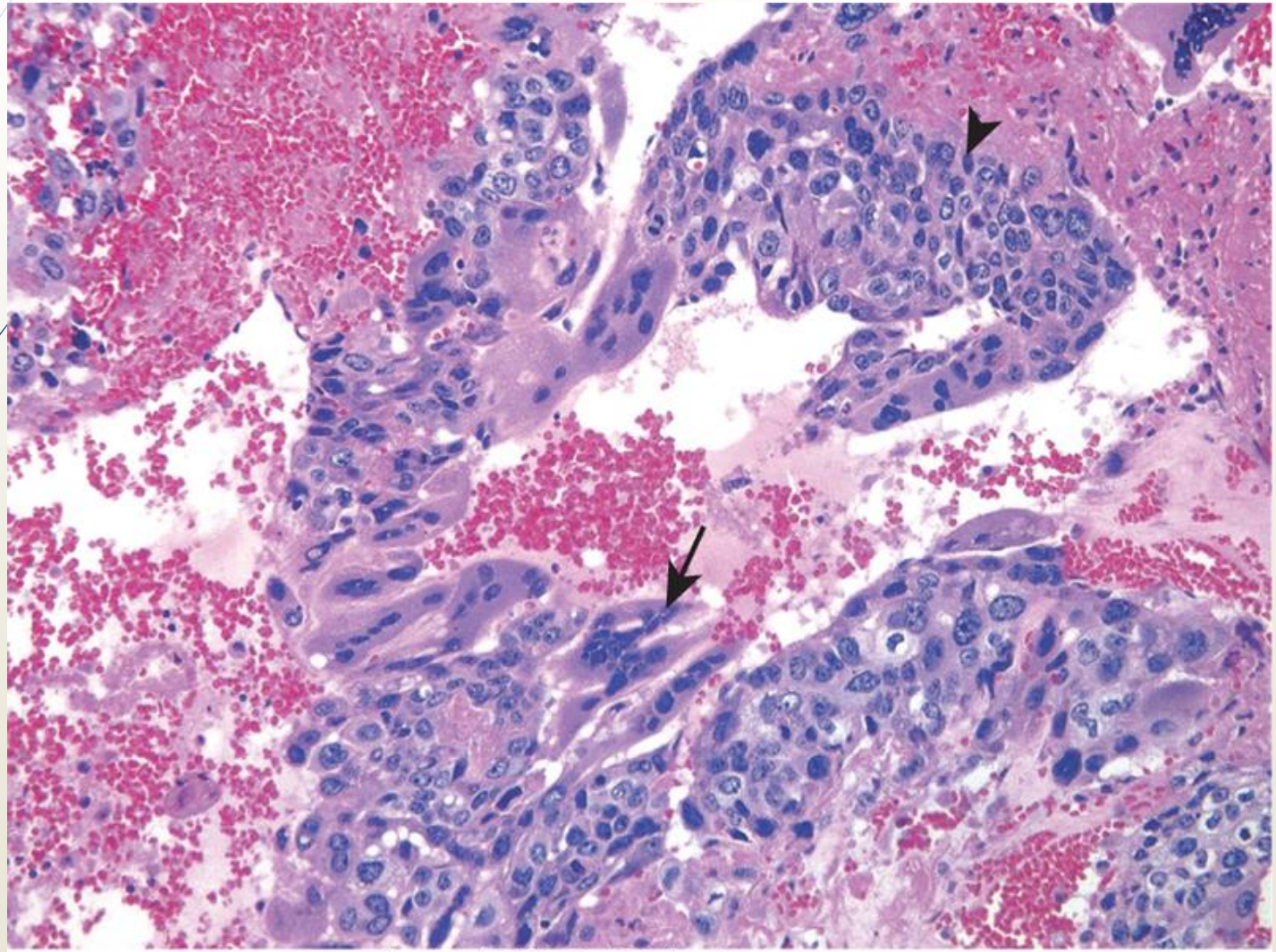
Grossly:

- necrosis and hemorrhage are extremely common

Microscopic examination:

- Syncytiotrophoblasts: large multinucleated cells; containing HCG.
- Cytotrophoblasts: single, fairly uniform nucleus.

4. Choriocarcinoma

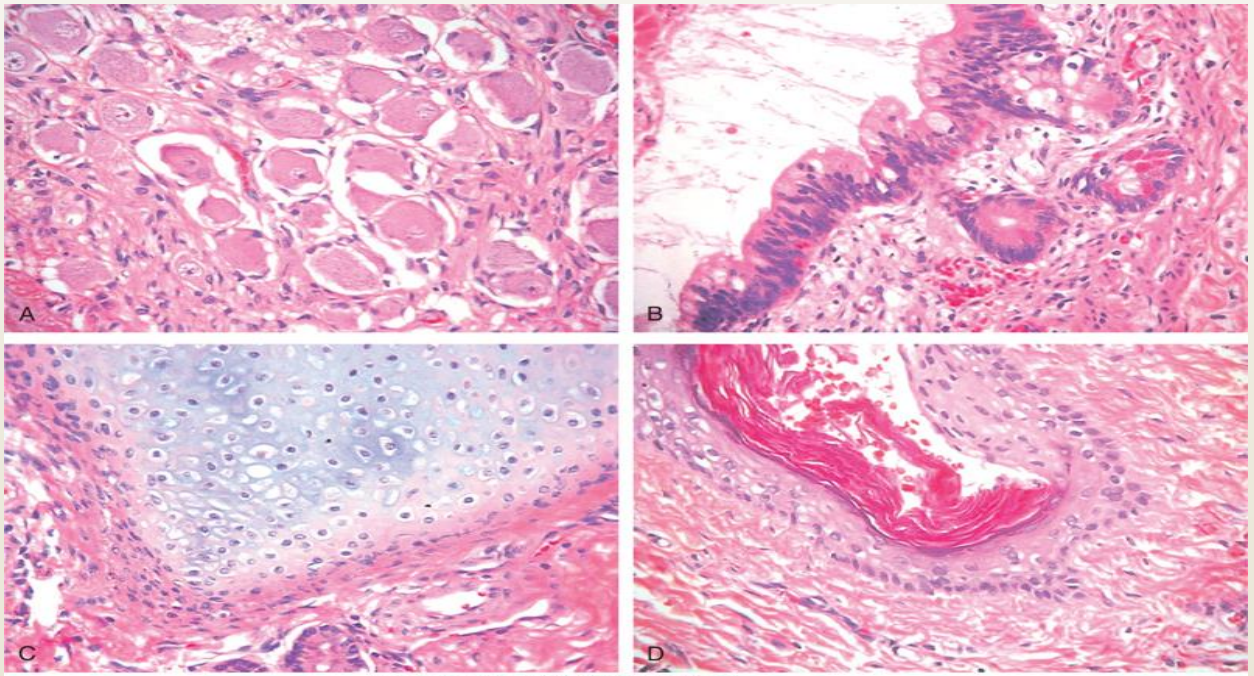


Kumar et al: Robbins Basic Pathology, 9e.

5. Teratomas

- neoplastic germ cells differentiate along somatic cell lines
- Reminiscent of the normal derivatives of more than one germ layer.
- All ages
- common in infants and children; 2nd to yolk sac tumors
- In adults: pure is rare (3%). However, the frequency of mixed teratomas with other germ cell tumors ≈ 45%.

- **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.



Clinical Features of testicular germ cell neoplasms:

- present with **painless testicular mass**
- Some tumors, especially NSGCT, may have metastasized widely by 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:**

- remain confined to the testis for long periods
- Metastases to iliac and paraaortic lymph nodes
- Hematogenous metastases occur late

II. Nonseminomatous germ cell neoplasms:

- metastasize earlier, by lymphatic & hematogenous routes (**liver and lung** mainly)

Assay of tumor markers secreted by germ cell tumors:

- helpful in diagnosis and follow up
  - **HCG** is **always elevated** in **choriocarcinoma**
  - **AFP** is increased in **yolk sac tumor**
  - **lactate dehydrogenase (LDH)** level correlate with **tumor burden** (tumor size or load), regardless of type

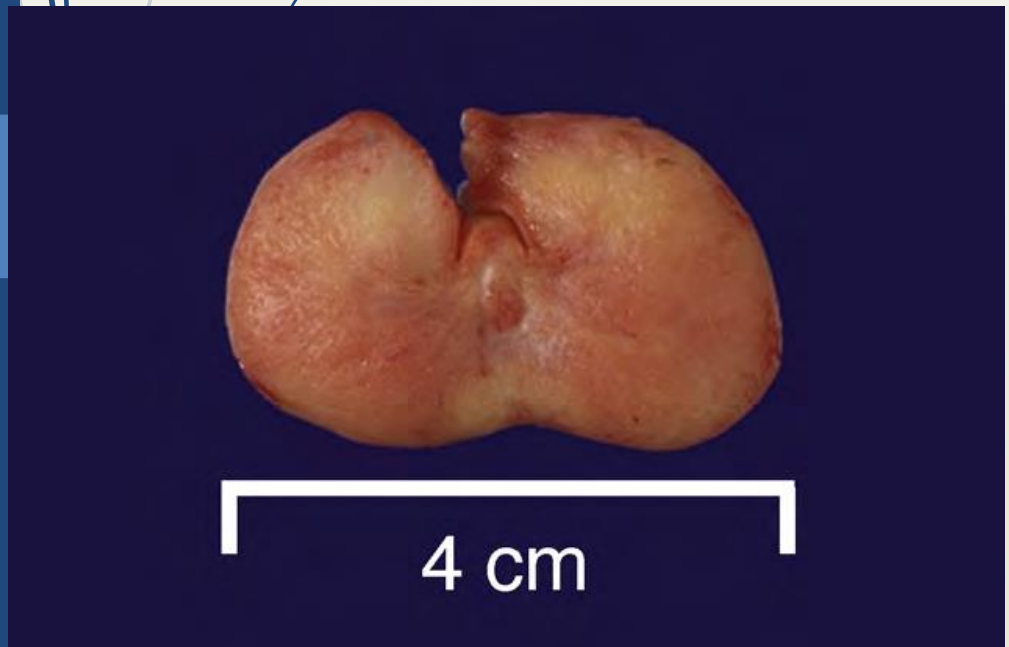
TREATMENT:

Seminoma:

- **extremely radiosensitive**
- tends to remain **localized** for long periods
- **best** prognosis.
- >95% of patients with early-stage disease can be cured.

- **Nonseminomatous germ cell tumors:**
  - Aggressive tumors; **chemotherapy**.
  - **choriocarcinoma, which is associated with a poorer prognosis.**

Prostate gland pathology



Benign Prostatic Hyperplasia (Nodular Hyperplasia)

extremely common in men ≥40; frequency rises with age.

- androgen-dependent proliferation of both stromal and epithelial elements
- does not occur in in males with genetic diseases that block androgen activity.
- **Pathogenesis**: Dihydrotestosterone (DHT) is synthesized in the prostate from circulating testosterone by **5α-reductase, type 2**.
- DHT → support growth and survival of prostatic epithelium and stromal cells by binding to **androgen receptors**
- **DHT is 10 times more potent**

Morphology:

- BPH **always** occurs in **inner transition zone of prostate.**
- **Grossly:**
  - Prostatic enlargement by many well circumscribed nodules bulging from the cut surface
  - Compressed urethra
- **Microscopically:**
  - composed of proliferating glands and fibromuscular stroma.
  - The hyperplastic glands are lined by 2 cell layers: tall, columnar epithelial cells and a peripheral layer of flattened basal cells.

Clinical features:

Because BPH preferentially 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**

Carcinoma of the Prostate

most common form of cancer in men > 40

- ↓prostate cancer mortality, due to increased early detection through screening

PATHOGENESIS

1. **Androgens.**

- Prostate cancer does not develop in males castrated before puberty.
- Cancers regress in response to surgical or chemical castration

2. Heredity: ↑risk among first-degree relatives of patients with prostate cancer.

3. Environment:

- Geographical variationsdiet: westernized dietary habits

4. Acquired somatic mutations

The most common gene rearrangements in prostate cancer→ fusion genes consisting of the androgen regulated promoter of the ***TMPRSS2*** gene and the coding sequence of ***ETS*** family transcription factors.

→***TMPRSS2-ETS*** **fusion genes**

Clinical Features

- 70% - 80% arise in peripheral glands →palpable as irregular hard nodules on digital rectal examination.
- elevated serum prostate-specific antigen (PSA) level screening tests.
- Bone metastases (axial skeleton) →osteoblastic (bone-producing) lesions on bone scans