Testis

Must know

1-Classification of testicular tumor

2-Tumor markers in diagnosis

3-Morphology of

a) Seminoma
b) Embryonal carcinoma
c) Yolk sac tumor

4-Cryptorchidism

Testicular lesion

- Congenital Anomalies
- Regressive Changes
- Inflammation (*Nonspecific , Specific Inflammations, Granulomatous (Autoimmune) Orchitis)*
- Vascular Disorders(torsion)
- Spermatic Cord and Paratesticular Tumors
- Testicular Tumors

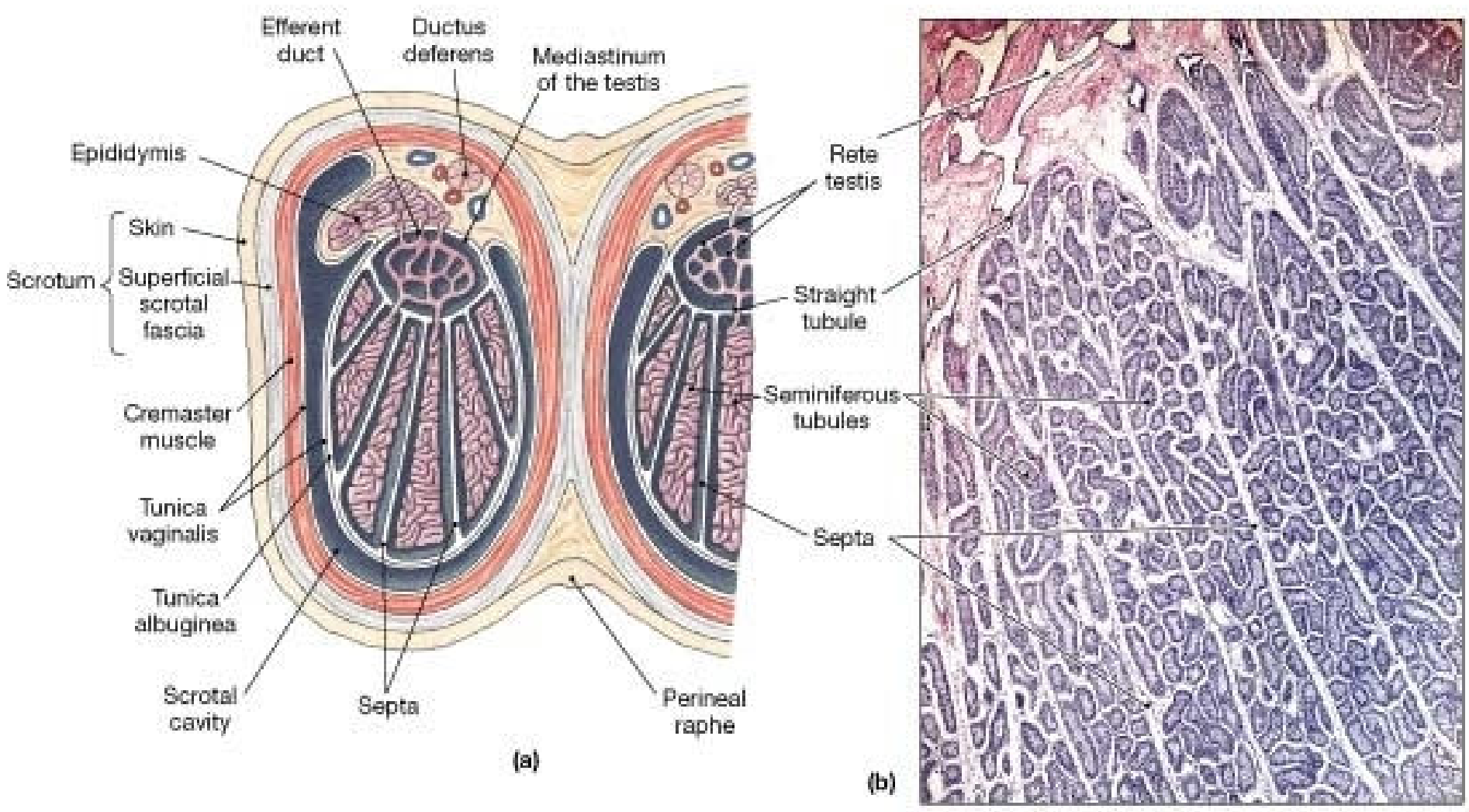


FIGURE 28-4 Structure of the Testes. **(a)** Diagrammatic sketch (frontal section) and anatomical relationships of the testes. **(b)** Micrograph of a section through a testis. (LM × 26)

INFLAMMATIONS-

- Inflammation of the testis is termed as orchitis and of epididymis is called as epididymitis; the latter being more common

1-Non-specific Epididymitis and Orchitis-

- may be acute or chronic
- common routes of spread are via the **vas deferens, or lymphatic and haematogenous routes**
- caused by urethritis, cystitis, prostatitis and seminal vesiculitis
- common infecting organisms in *Neisseria gonorrhoeae* and *Chlamydia trachomatis*

Grossly,

- **acute stage-** firm, tense, swollen and congested

  may be multiple abscesses, especially in gonorrhoeal infection

- **chronic stage-** variable degree of atrophy and fibrosis

Histologically,

- ***acute-*** congestion, oedema and diffuse infiltration by neutrophils, or formation of neutrophilic abscesses

- **Chronic-** focal or diffuse chronic inflammation, disappearance of seminiferous tubules, fibrous scarring and destruction of interstitial Leydig cells

2-Granulomatous (Autoimmune) Orchitis -

Non-tuberculous granulomatous orchitis-

- unilateral, painless testicular enlargement
- may resemble a **testicular tumour** clinically
- autoimmune basis is suspected

Gross- enlarged

- Cut section of the testicle is greyish-white to tan-brown
- ***Histologically,*** granulomatous reaction(non caseating) is present diffusely throughout the testis and is confined to the seminiferous tubules
- Peritubular fibrosis
- interstitial lymphocytes and plasma cells

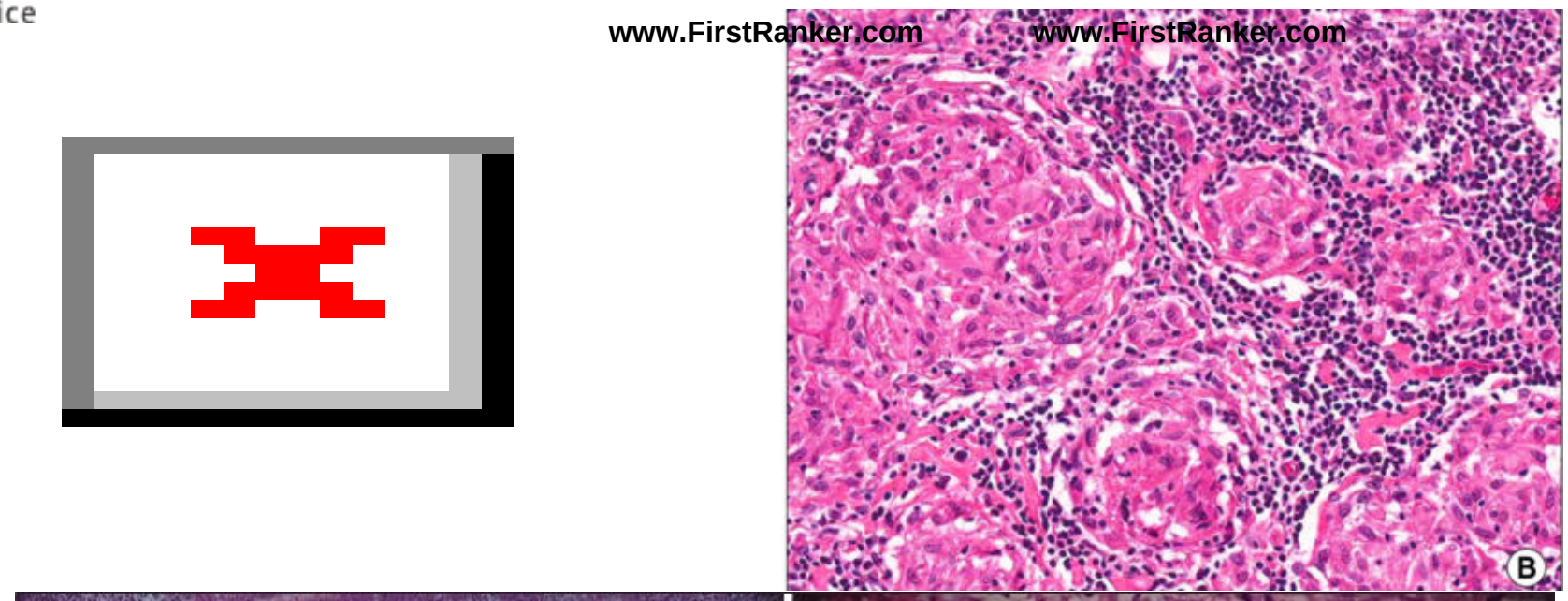
3-Tuberculous Epididymo-orchitis-

- invariably begins in the epididymis and spreads to the testis

- May spread via -tuberculous seminal vesiculitis, prostatitis and renal tuberculosis
- haematogenous spread- from tuberculosis of the lungs

Grossly, discrete, yellowish, caseous necrotic areas

- ***Microscopically,*** numerous tubercles which may coalesce to form large caseous mass
- Characteristics of typical tubercles such as epithelioid cells, peripheral mantle of lymphocytes, occasional multinucleate giant cells and central areas of **caseation necrosis** are seen
- AFB positive



4-Spermatic Granuloma(epididymitis nodosa)

- Spermatic granuloma is the term used for development of inflammatory lesions due to invasion of **spermatozoa into the stroma**

MORPHOLOGIC FEATURES-

Grossly,

- a small nodule, 3 mm to 3 cm in diameter in head of epididymis

- firm, white to yellowish-brown

- ***Histologically,*** it consists of a granuloma composed of histiocytes, epithelioid cells, lymphocytes and some neutrophils
- **Characteristically, the centre of spermatic granuloma contains spermatozoa and necrotic debris**

Vascular disorder

Torsion of Testis

- Twisting of the spermatic cord
- sudden cessation of venous drainage and arterial supply
- usually followed by sudden muscular effort or physical trauma
- Trauma may occure in either in a fully-descended testis or in an **undescended testis**

1-Neonatal torsion-

- occurs either in utero or shortly after birth
- It **lacks any associated anatomic defect in testis**

2-“Adult” torsion-

- is typically seen in **adolescence** and presents with the sudden onset of testicular pain
- *bell-clapper abnormality* -bilateral anatomic defect that leads to increased mobility of the testes (*bell-clapper abnormality*)

- Viable- manually untwisted within approximately 6 hours of the onset of torsion

MORPHOLOGIC FEATURES-

duration and severity of vascular occlusion

- may be coagulative necrosis of the testis and epididymis
- may be haemorrhagic infarction

Spermatic Cord and Paratesticular Tumors

1-Lipomas

- common lesions involving the **proximal spermatic cord**, identified at the time of inguinal hernia repair
- represent retroperitoneal adipose tissue that has been pulled into the inguinal canal along with the hernia sac, rather than a true neoplasm

2-Adenomatoid tumor-

- most common benign paratesticular tumor
-
- typically occurring near the upper pole of the epididymis

- grossly , well circumscribed small nodules
- Microscopically- Proliferation of glandular structures, irregularly lined by cuboidal to flattened epithelial cell

- Treatmet- local excision

Malignant tumor

- rhabdomyosarcomas -children
- liposarcomas- adults

CLASSIFICATION OF TESTICULAR TUMOR

- most useful **classification of tumors** is **histogenetic**
- Named according to from which tissue they arise and of which they consist

Table 21-5 Pathologic Classification of Common Testicular Tumors

Germ Cell Tumors
Seminomatous tumors
Seminoma
Spermatocytic seminoma
Nonseminomatous tumors
Embryonal carcinoma
Yolk sac (endodermal sinus) tumor
Choriocarcinoma
Teratoma
Sex Cord-Stromal Tumors
Leydig cell tumor
Sertoli cell tumor

WHO histological classification of testis tumours

- **Germ cell tumours**
- Tumours of one histological type (pure forms)
- Tumours of more than one histological type (mixed forms)
- **Sex cord/gonadal stromal tumours Pure forms**
- **Miscellaneous tumours of the testis**
- **Haematopoietic tumours**
- Tumours of collecting ducts and rete
- Tumours of paratesticular structures
- Mesenchymal tumours of the spermatic cord and testicular adnexae
- Secondary tumours of the testis

WHO histological classification of testis tumours

Germ cell tumours		Sex cord/gonadal stromal tumour:	
Intratubular germ cell neoplasia, unclassified	9064/2[1]	Incompletely differentiated	8591/1
Other types		Sex cord/gonadal stromal tumours, mixed forms	8592/1
		Malignant sex cord/gonadal stromal tumours	8590/3
Tumours of one histological type (pure forms)		Tumours containing both germ cell and sex	
Seminoma	9061/3	cord/gonadal stromal elements	
Seminoma with syncytiotrophoblastic cells		Gonadoblastoma	9073/1
Spermatocytic seminoma	9063/3	Germ cell-sex cord/gonadal stromal tumour, unclassified	
Spermatocytic seminoma with sarcoma			
Embryonal carcinoma	9070/3	**Miscellaneous tumours of the testis**	
Yolk sac tumour	9071/3	Carcinoid tumour	8240/3
Trophoblastic tumours		Tumours of ovarian epithelial types	
Choriocarcinoma	9100/3	Serous tumour of borderline malignancy	8442/1
Trophoblastic neoplasms other than choriocarcinoma		Serous carcinoma	8441/3
Monophasic choriocarcinoma		Well differentiated endometrioid carcinoma	8380/3
Placental site trophoblastic tumour	9104/1	Mucinous cystadenoma	8470/0
Teratoma	9080/3	Mucinous cystadenocarcinoma	8470/3
Dermoid cyst	9084/0	Brenner tumour	9000/0
Monodermal teratoma		Nephroblastoma	8960/3
Teratoma with somatic type malignancies	9084/3	Paraganglioma	8680/1
Tumours of more than one histological type (mixed forms)		**Haematopoietic tumours**	
Mixed embryonal carcinoma and teratoma	9081/3		
Mixed teratoma and seminoma	9085/3	**Tumours of collecting ducts and rete**	
Choriocarcinoma and teratoma/embryonal carcinoma	9101/3	Adenoma	8140/0
Others		Carcinoma	8140/3
Sex cord/gonadal stromal tumours		**Tumours of paratesticular structures**	
Pure forms		Adenomatoid tumour	9054/0
Leydig cell tumour	8650/1	Malignant mesothelioma	9050/3
Malignant Leydig cell tumour	8650/3	Benign mesothelioma	
Sertoli cell tumour	8640/1	Well differentiated papillary mesothelioma	9052/0
Sertoli cell tumour lipid rich variant	8641/0	Cystic mesothelioma	9055/0
Sclerosing Sertoli cell tumour		Adenocarcinoma of the epididymis	8140/3
Large cell calcifying Sertoli cell tumour	8642/1	Papillary cystadenoma of the epididymis	8450/0
Malignant Sertoli cell tumour	8640/3	Melanotic neuroectodermal tumour	9363/0
Granulosa cell tumour	8620/1	Desmoplastic small round cell tumour	8806/3
Adult type granulosa cell tumour	8620/1		
Juvenile type granulosa cell tumour	8622/1	**Mesenchymal tumours of the spermatic cord and testicular adnexae**	
Tumours of the thecoma/fibroma group			
Thecoma	8600/0	**Secondary tumours of the testis**	
Fibroma	8810/0		

TNM classification of germ cell tumours of the testis

Testicular cancer is staged using the TNM system created by the American Joint Committee on Cancer (AJCC)

It's based on 4 key pieces of information:

- **T** refers to how much the main (primary) **tumor** has spread to tissues next to the testicle
- **N** describes how much the cancer has spread to regional (nearby) **lymph nodes**
- **M** indicates whether the cancer has **metastasized** (spread to distant lymph nodes or other organs of the body)
- **S** indicates the serum (blood) levels of tumor markers that are made by some testicular cancers

- **Letters or numbers appear after** T, N, M, and S to provide more details about each piece of information.
- The numbers 0 through 4 indicate **increasing severity**
- The letters "IS" after the T stand **for in situ,** which means the tumor is contained in **one place** and has not yet penetrated to a deeper layer of tissue.
- The letter X after T, N, M, or S means "**cannot be assessed**" because the information is not known

TNM classification of germ cell tumours of the testis

pTNM pathological classification

- pTx –Primary tumour **cannot be assessed**
- pT0 **No evidence** of primary tumour (e.g. histologic scar in testis)
- pTis Intratubular germ cell neoplasia (**carcinoma in situ)**
- pT1 Tumour **limited to testis and epididymis without** vascular/lymphatic invasion; tumour may invade tunica albuginea but not tunica vaginalis
- pT2 Tumour pT1 + **involvement of tunica vaginalis**
- pT3 Tumour invades **spermatic cord** with or without vascular/lymphatic invasion
- pT4 Tumour invades **scrotum** with or without vascular/lymphatic invasion

pN – Regional lymph nodes

- pNX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis
- pN1 <**2 cm or less** in greatest dimension and **5 or fewer positive nodes**
- pN2 **2 to 5 cm in greatest dimension**; or **more than 5 nodes positive**, none more than 5 cm; or evidence of extranodal extension of tumour
- pN3 Metastasis with a lymph node mass **more than 5 cm** in greatest dimension

S – Serum tumour markers

- SX Serum marker studies not available or not performed
- S0 Serum marker study levels within normal limits
- LDH, hCG (mIU/ml) ,AFP (ng/ml)

Serum tumor markers (S)

For staging, serum (blood) levels of tumor markers are measured *after* the testicle containing the cancer has been removed with surgery

	LDH (U/liter)	HCG (mIU/ml)	AFP (ng/ml)
SX	Marker studies not available or not done.		
S0	Normal	Normal	Normal
S1 *	<1.5 x Normal	<5,000	<1,000
S2 +	1.5 - 10 x Normal	5,000 - 50,000	1,000 - 10,000
S3 +	>10 x Normal	>50,000	>10,000

Cryptorchidism

- Cryptorchidism is a complete or partial failure of the intra-abdominal testes to descend into the scrotal sac

associated with

- testicular dysfunction
- an increased risk of testicular cancer

- **In 70% of cases, the undescended testis lies in the inguinal ring**
- in 25% in the abdomen

ETIOLOGY. exact etiology is **not known** in majority of cases

1. Mechanical factors-

- short spermatic cord
- narrow inguinal canal
- adhesions to the peritoneum
- problems with development of the gubernaculum
- a patent processus vaginalis, or impaired intra-abdominal pressure have also been hypothesized to contribute to cryptorchidism

2. Genetic factors-

- up to 23% of cases suggesting an underlying genetic mutation
- Mutations in insulin-like factor 3 and its receptor, LGR8, have been demonstrated in a small number of cases
- trisomy 13

3. **Hormonal factor-** cryptorchidism is only rarely associated with a well-defined hormonal disorder

- deficient androgenic secretions
- mullerian inhibiting substance
- insulin-like 3 hormone

4. **Neuromuscular**- abnormalities of the **genitofemoral nerve's calcitonin gene-related peptide** or the cremasteric nucleus have been postulated to cause cryptorchidism

Miscellaneous-

- Maternal alcohol consumption, analgesic consumption, and smoking have also been associated with an increased risk
- Gestational diabetes has been shown to be related to the development of cryptorchidism

MORPHOLOGIC FEATURES. Cryptorchidism is unilateral in 80% cases

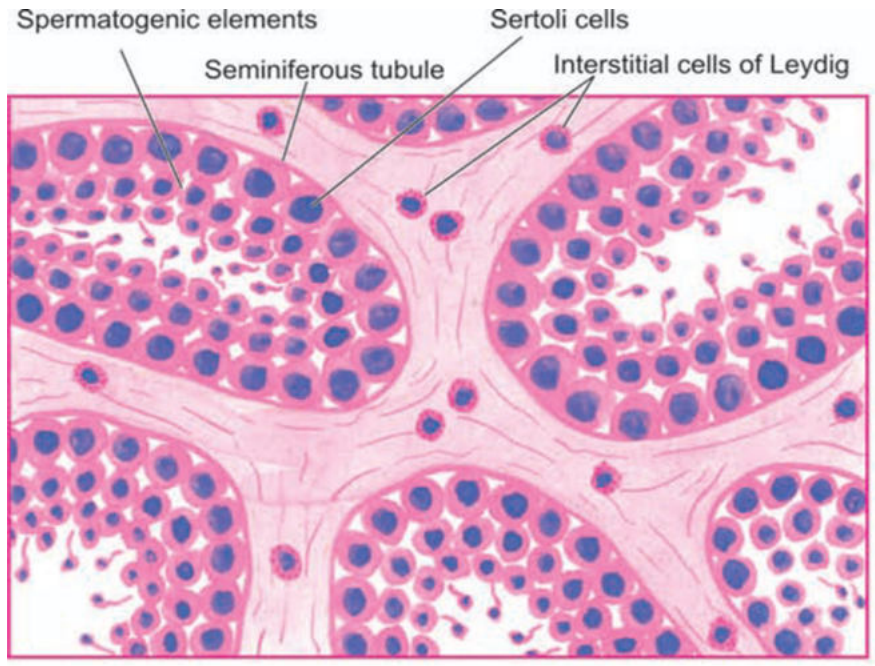
Grossly, the cryptorchid testis is small in size, firm and fibrotic

Histology-

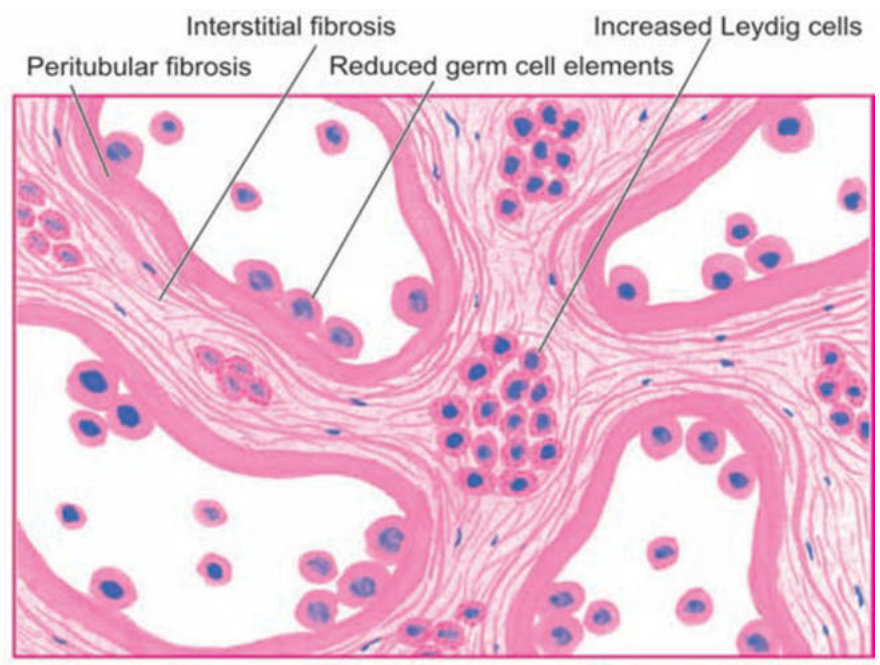
1-Seminiferous tubules

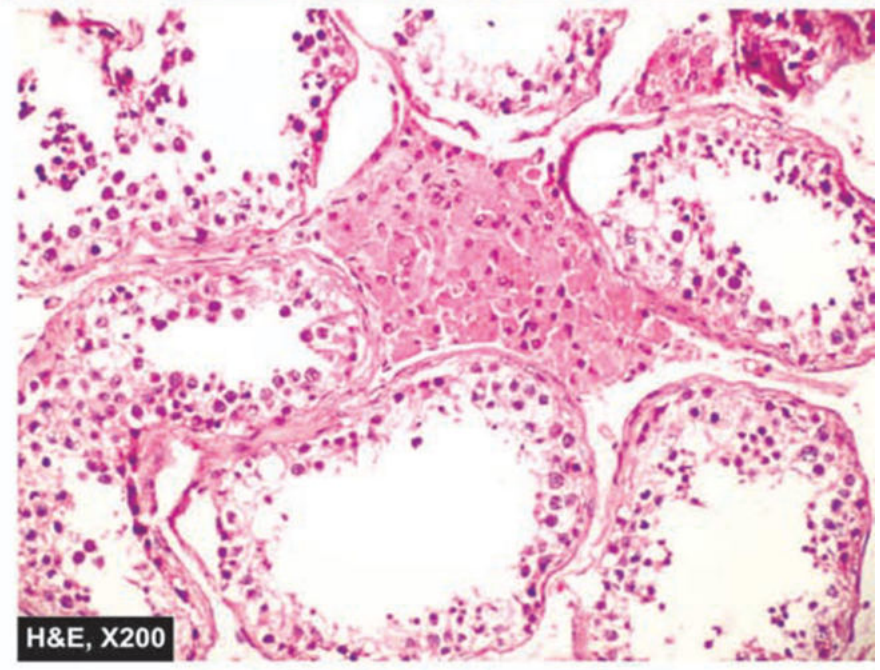
- **tubular basement membrane is thickened**
- **hyalinised tubules** with **a few Sertoli** cells
- foci of **spermatogenesis** are discernible in 10% of cases

2. ***Interstitial stroma:*** **usually increase in the interstitial fibrovascular stroma** and conspicuous presence of **Leydig cells**, seen singly or in small clusters

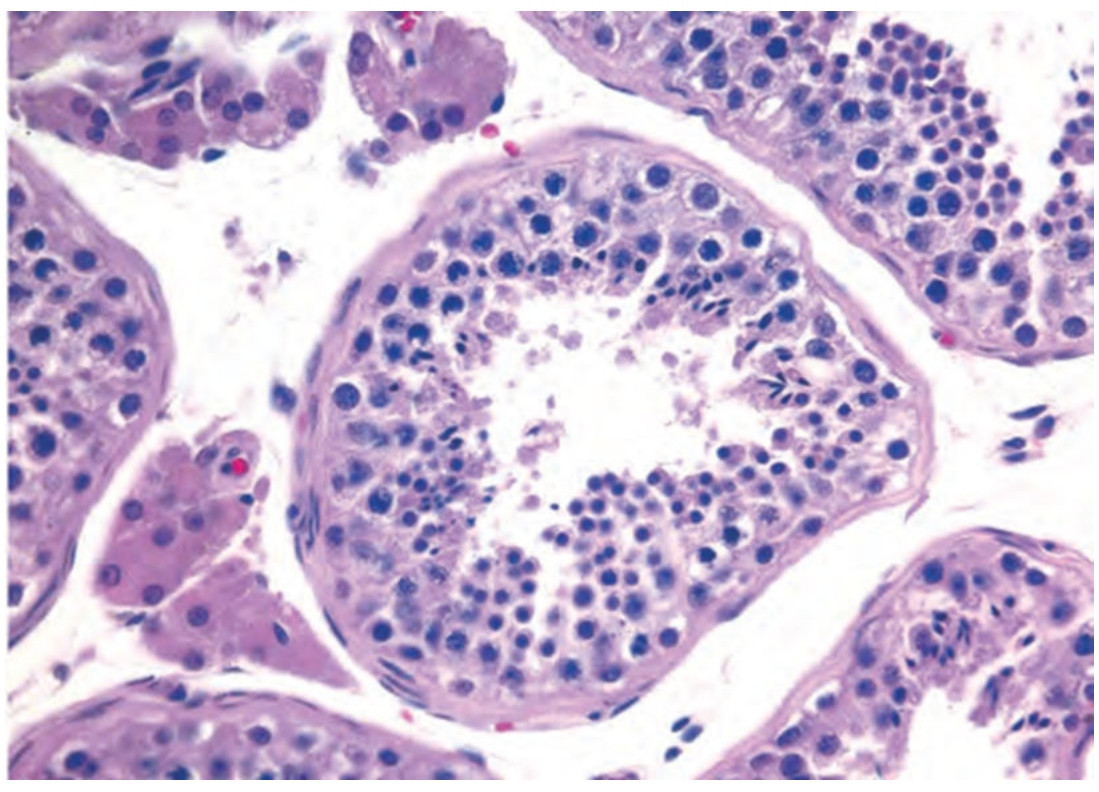


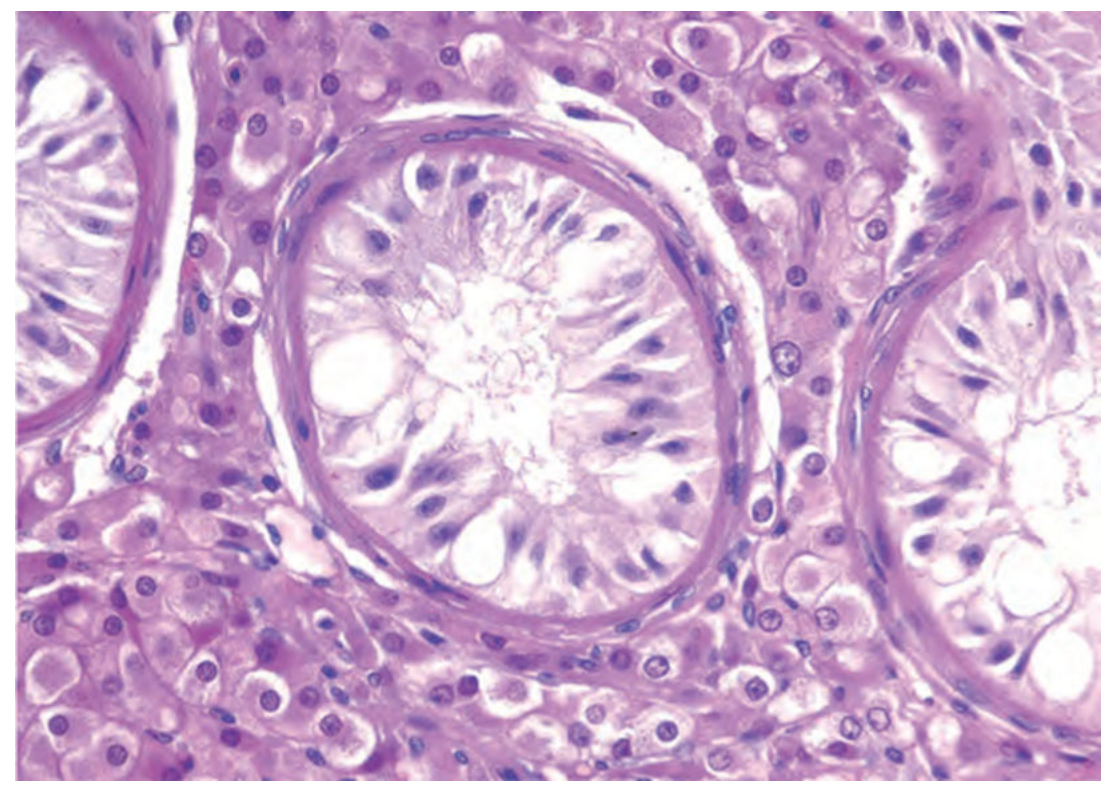
A, NORMAL TESTIS





B, CRYPTORCHID TESTIS





- **CLINICAL FEATURES.** asymptomatic and is discovered only on physical examination

1. Sterility-infertility. Bilateral cryptorchidism is associated with sterility while unilateral disease may result in infertility

2. Inguinal hernia. A concomitant inguinal hernia is frequently present along with cryptorchidism

3-Malignancy. Cryptorchid testis is at 30-50 times increased risk of developing testicular malignancy

- most commonly seminoma and embryonal carcinoma, than a normally descended testis
- risk of malignancy is greater in intraabdominal testis than in testis in the inguinal canal

- current recommendations are for correction at 6 to 12 months of age
- carcinoma arises from foci of intratubular germ cell neoplasia within the atrophic tubules
- Orchiopexy reduces the risk of sterility and cancer

Tumour marker

Tumour markers- Germ cell tumours of the testis secrete polypeptide hormones and certain enzymes which can be detected in the blood

There are two principal serum tumour markers

- alpha fetoprotein (AFP) and
- beta subunit of human chorionic gonadotropin (shCG)

- In addition, carcinoembryonic antigen (CEA), human placental lactogen (HPL), placental alkaline phosphatase, testosterone, oestrogen and luteinising hormone may also be elevated

AFP-

- synthesized by **fetal yolk sac** and also the **liver and intestine**
- elevated in **50-70% of testicular germ cell tumours**
- Markedly elevated in yolk sac tumor
- **a serum half life of 4.5 days**
- However, elevated serum AFP levels are **also found in liver cell carcinoma**

hCG-

- secreted by **placental trophoblastic cells**
- elevated in **non-seminomatous germ cell tumours of the testis** (e.g. in **choriocarcinoma**, yolk sac tumour and embryonal carcinoma)
- elevated in 50% of patients with germ cell tumours
- elevation in seminoma in 10-25% of cases

Lactate dehydrogenase (LDH)-

- may also be elevated
- direct relationship between LDH and tumour burden
- However, this test is nonspecific although its degree of elevation correlates with bulk of disease

Applications-

- **In the evaluation of testicular masses**
- **In the staging of testicular germ cell tumors**. For example, after orchiectomy, persistent elevation of HCG or AFP concentrations indicates stage II disease even if the lymph nodes appear of normal size by imaging studies
- **In assessing tumor burden**
- **In monitoring the respons to therapy**. After eradication of tumors there is a rapid fall in serum AFP and HCG. With serial measurements it is often possible to predict recurrence before the patients become symptomatic or develop any other clinical signs of relapse

TESTICULAR TUMOR

Testicular tumor

- Most germ cell tumours occur between the **ages of 20 and 50 years**
- Before puberty, seminoma is extremely uncommon
- **usual** germ cell tumours , yolk sac tumour and the better differentiated types of teratoma
- Spermatocytic seminoma and malignant lymphoma usually occur in **older patients**
- incidence increases shortly after the onset of puberty and reaches a **maximum** in men in the late **twenties and thirties**

ETIOLOGIC FACTORS

- **Cryptorchidism**
- **Other developmental disorders-** Dysgenetic gonads associated with endocrine abnormalities such as androgen insensitivity syndrome
- **Genetic factors-**high incidence in first-degree family members, twins
- **Other factors.** A few less common factors

➢ *Orchitis*

➢ *Trauma*

➢ *Carcinogens.* LSD, hormonal therapy for sterility, copper, zinc etc

Prenatal risk factors –

- consistent associations of testicular cancer with **low birth weight**

Exposures in adulthood

- Possible etiological clues, however, include a **low level of physical activity and high socioeconomic class**

❑**PATHOGENESIS-**vast majority of these tumours originate from germ cells

1-Developmental disorders- contribute to the pathogenesis

2-Molecular genetic features-common molecular pathogenesis of all germ cell tumours:

- *Hyperdiploidy* is almost a constant feature
- isochromosome of short arm of chromosome 12
- *Telomerase activity* is present in all germ cell tumours of the testis
- Other mutations include *p53*, *cyclin E* and *FAS* gene

3-Intratubular germ cell neoplasia (ITGCN) or carcinoma insitu-

*Most testicular germ cell tumors originate from a precursor lesion called intratubular germ cell neoplasia (ITGCN)**exceptions*** to this rule are

- pediatric yolk sac tumors
- Teratomas
- adult spermatocytic seminoma

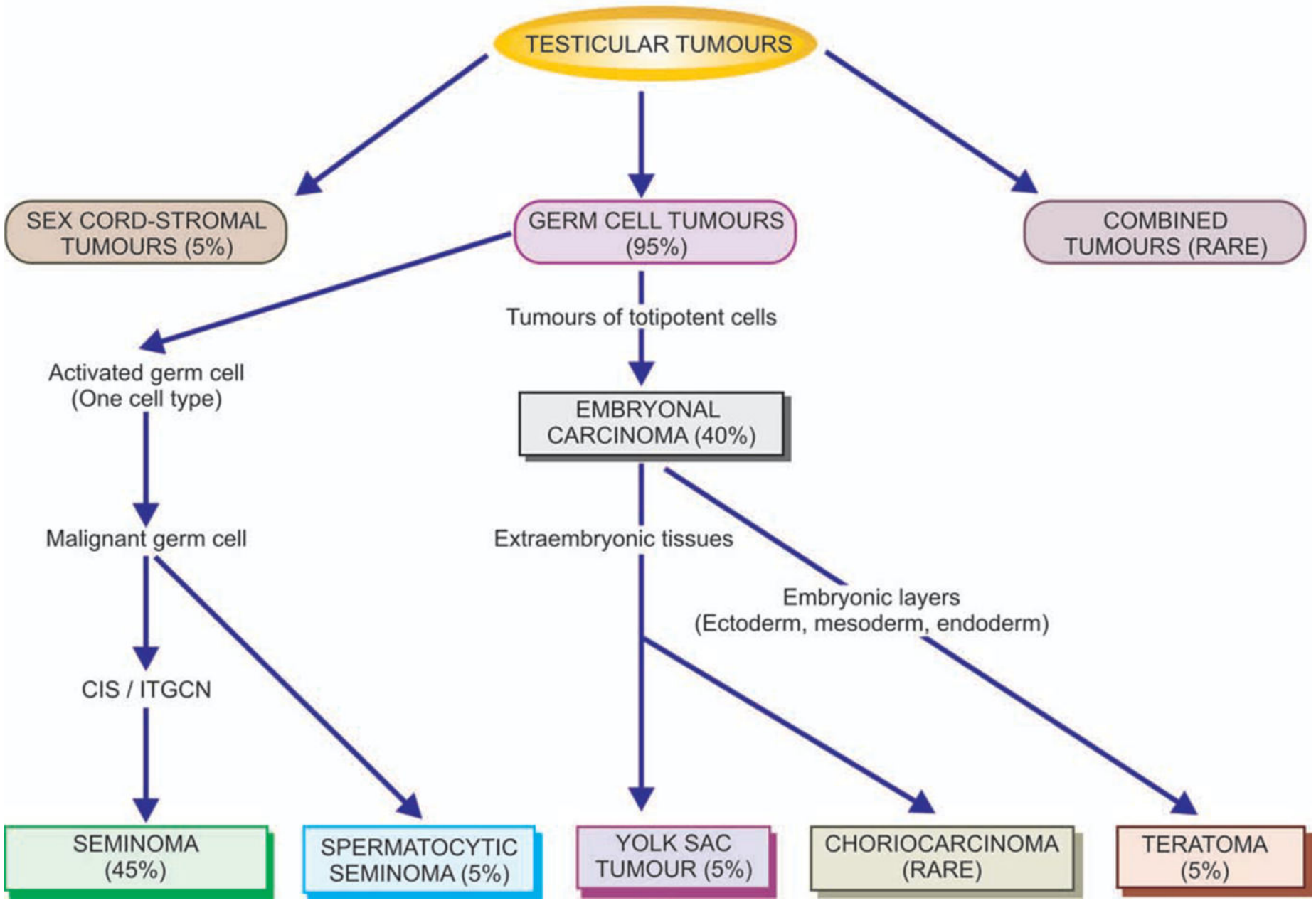
4-Three hit' process. Germ cells in seminiferous tubules undergo

a. ***first hit-****activate the cell*

b. ***second hit-*** *occure in CIS cell and further activate*

c. third hit- via some epigenetic phenomena cell become invasive

this sequential tumorigenesis explains the development of seminomatous tumours



CLINICAL FEATURES AND DIAGNOSIS

- gradual gonadal enlargement and a dragging sensation in the testis
- secondary symptoms such as pain, lymphadenopathy, haemoptsis and urinary obstruction (Metastatic involvement)

SPREAD-

- *Lymphatic spread*- retroperitoneal para-aortic lymph nodes, mediastinal lymph nodes and supraclavicular lymph nodes
- *Haematogenous spread* -primarily occurs to the lungs, liver, brain and bones

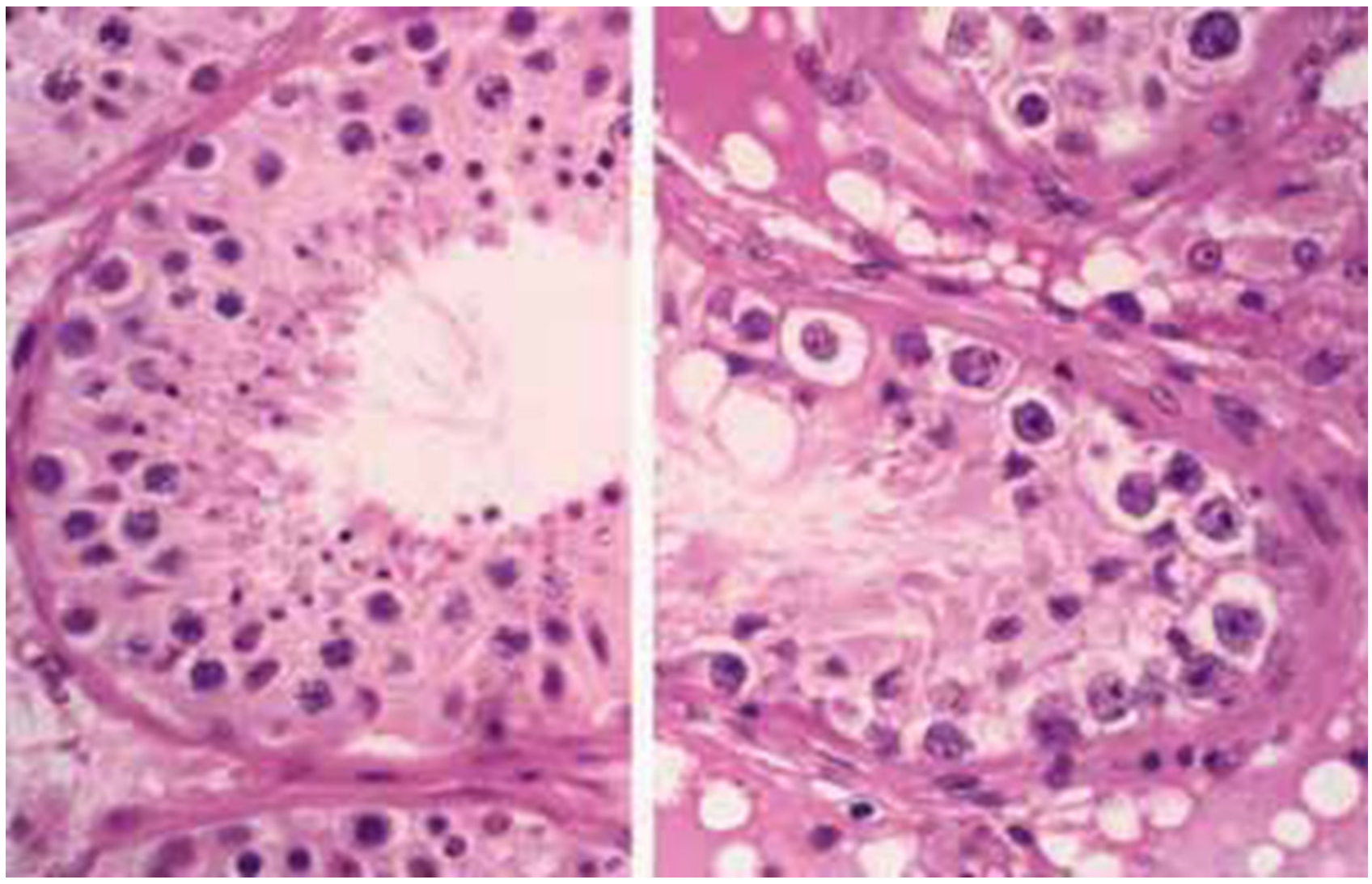
1-Intratubular germ cell neoplasia, unclassified type (IGCNU)

- *Also called* carcinoma *in situ* (CIS) stage of germ cell tumours
- preinvasive stage of germ cell tumours
- intratubular **seminoma** and intratubular **embryonal carcinoma** are common
- 2-4% of cryptorchidism pt show
- **Clinical features -** atrophic testis, infertility, maldescended testis, and intersex features

- **gross-** no grossly visible lesion
- **Histopathology** - Germ cells with abundant vacuolated cytoplasm, large, irregular nuclei and prominent nucleoli located within the seminiferous tubules
- restricted to the seminiferous tubules without evident invasion into the interstitium

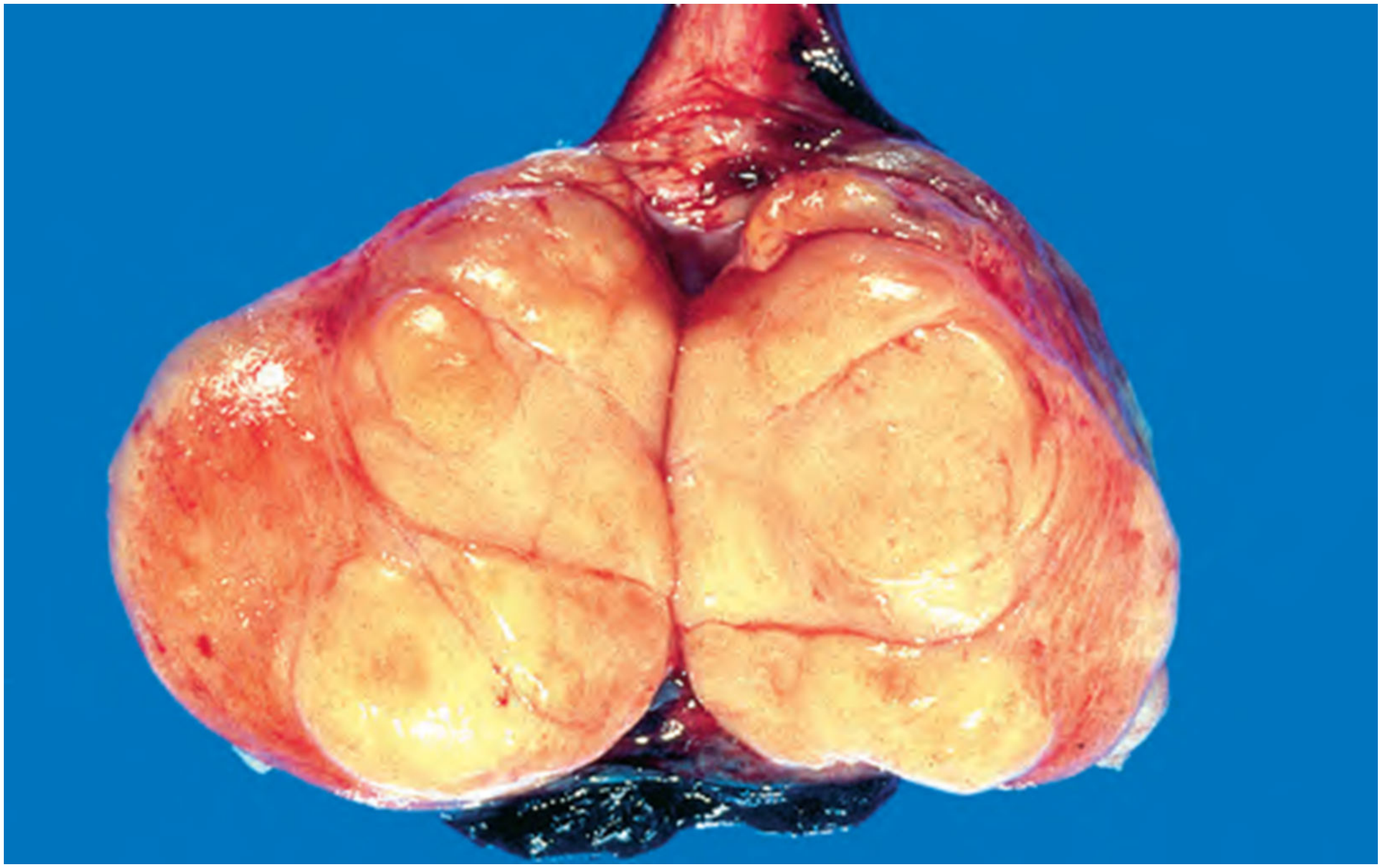
- *Immunoprofile-* PLAP can be demonstrated in 83-99% of intratubular germ cell neoplasia of the unclassified type (IGCNU) cases and is widely used for diagnosis

Comparison of morphological features of normal seminiferous tubules (left part) and intratubular germ cell neoplasia (IGCNU) in seminiferous tubules (right part).



Seminoma

- **Seminomas are the most common type of germ cell tumor, making up about (50%)**
- peak incidence is the **third decade** and they almost never occur in infants
- An identical tumor arises in the ovary, where it is called *dysgerminoma*



MORPHOLOGY- cut surface has a homogeneous, graywhite, lobulated, usually devoid of hemorrhage or necrosis

Generally the tunica albuginea is not penetrated

but occasionally extension to the epididymis, spermatic cord, or scrotal sac occurs

Microscopy- typical seminoma is composed of sheets of uniform cells divided into poorly demarcated lobules by delicate fibrous septa containing a lymphocytic infiltrate

Tumor cell-

cell is large and round to polyhedral and has a distinct cell membrane; clear or watery-appearing cytoplasm; and a large, central nucleus with one or two prominent nucleoli

Stroma-

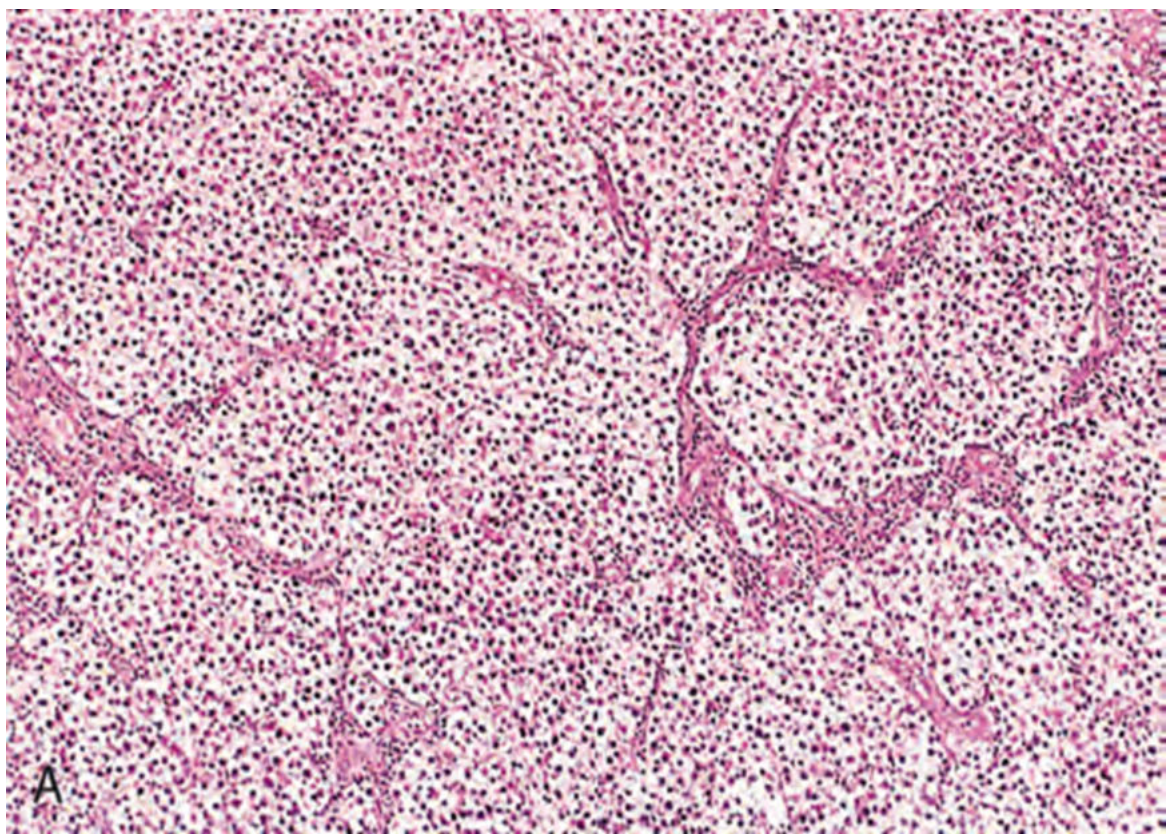
- delicate fibrous tissue which divides the tumour into lobules
- characteristic lymphocytic infiltration, indicative of immunologic response of the host to the tumour

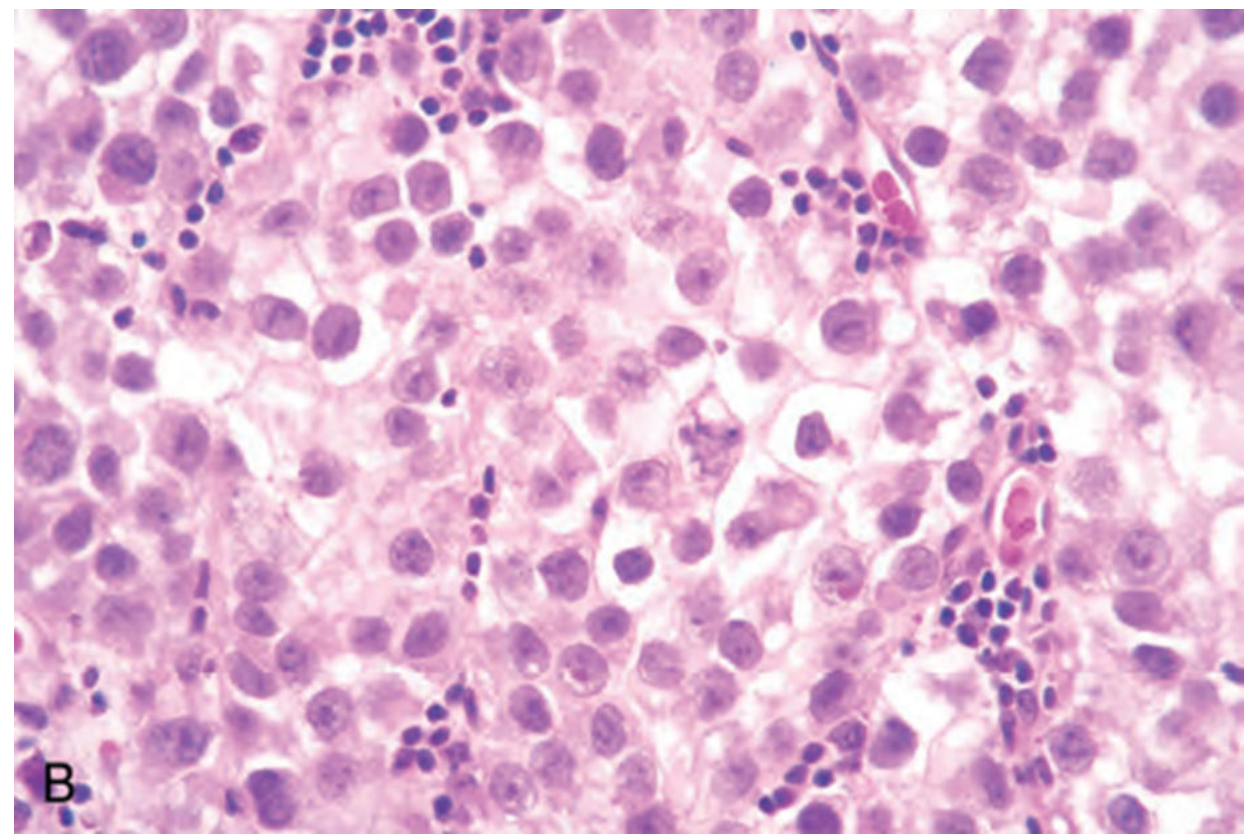
Variable features-

- tumor giant cells and greater mitotic activity
- 15% of seminomas contain syncytiotrophoblasts
- ill-defined granulomatous reaction (20%)

Special stain-Cytoplasm contains variable amount of glycogen that stains positively with **PAS reaction**

IHC- seminoma cells stain positively for KIT, (regardless of KIT mutational status), OCT4, and placental alkaline phosphatase (PLAP)





Prognosis-

- better than other germ cell tumours
- tumour is highly radiosensitive

Spermatocytic Seminoma-

- Spermatocytic seminoma is both clinically and morphologically a distinctive tumour from classic seminoma

- Incidence of about 5% of all germ cell tumours
- older patients
- generally in 6^{th} decade of life
- bilateral in 10% of patients

- ***Grossly,*** spermatocytic seminoma is homogeneous, larger, softer and more yellowish and gelatinous than the classic seminoma

- ***Histologically,*** the distinctive features are as under:

1. Tumour cells. lymphocyte-like to huge mononucleate or multinucleate giant cells. Majority of cells are, however, of **intermediate size.** Mitoses are often frequent.

2. Stroma. stroma lacks lymphocytic and granulomatous reaction seen in classic seminoma.

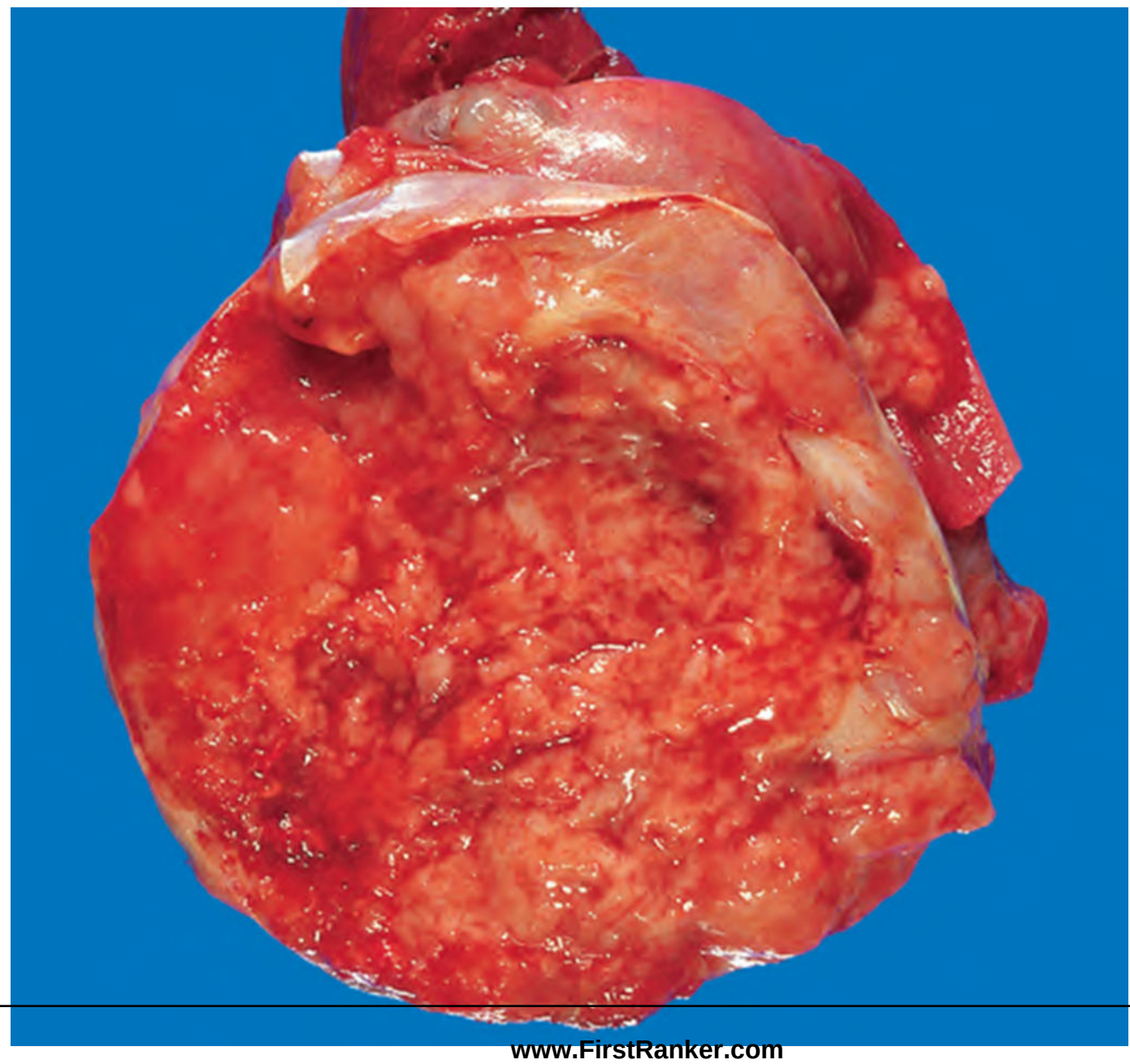
- *prognosis* of spermatocytic seminoma is excellent
- slow-growing and rarely metastasises
- tumour is radiosensitive

Embryonal Carcinoma-

- 30% of germ cell tumours more common
- 2nd to 3rd decades of life
- 90% cases are associated with elevation of AFP or hCG or both

Grossly,- a small tumour in the testis

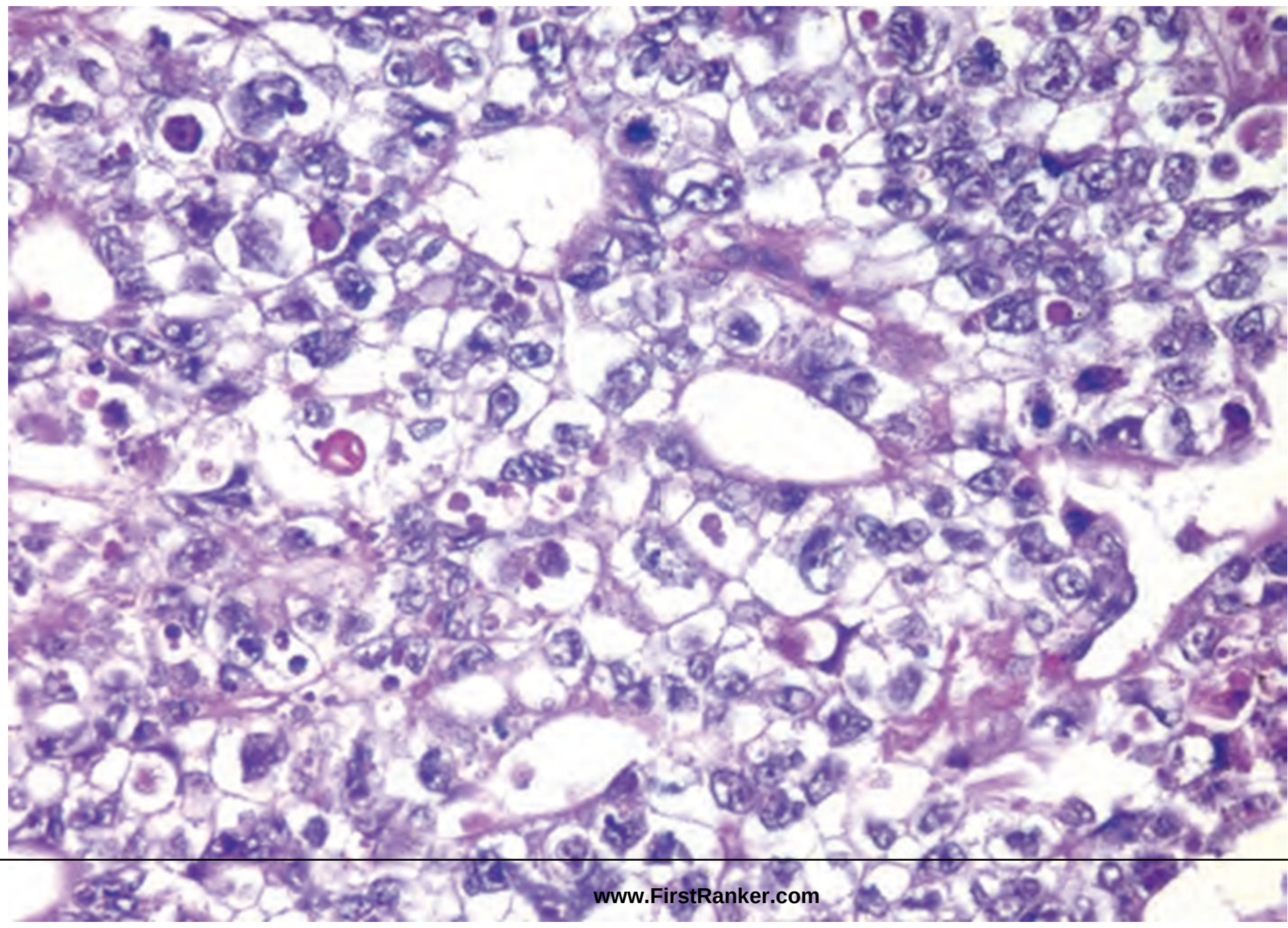
- **distorts the contour of the testis** as it frequently invades the tunica and the epididymis
- Cut surface- greywhite, soft with areas of haemorrhages and necrosis



Microscopy-

1. tumour cells are arranged in a variety of *patterns*— glandular, tubular, papillary and solid

2.*tumour cells* are **highly anaplastic carcinomatous** cells having large size, indistinct cell borders, amphophilic cytoplasm and prominent hyperchromatic nuclei



Yolk Sac Tumour *(Synonyms: Endodermal Sinus Tumour, Orchioblastoma, Infantile Embryonal Carcinoma)*

- most common testicular tumour of infants and young children upto the age of 4 year
- may be present as the major component in 40% of germ cell tumours
- AFP levels are elevated in 100% cases of yolk sac tumours

- ***Grossly,*** the tumour is generally soft, yellow-white, mucoid with areas of necrosis and haemorrhages

Microscopically, yolk sac tumour has the following features

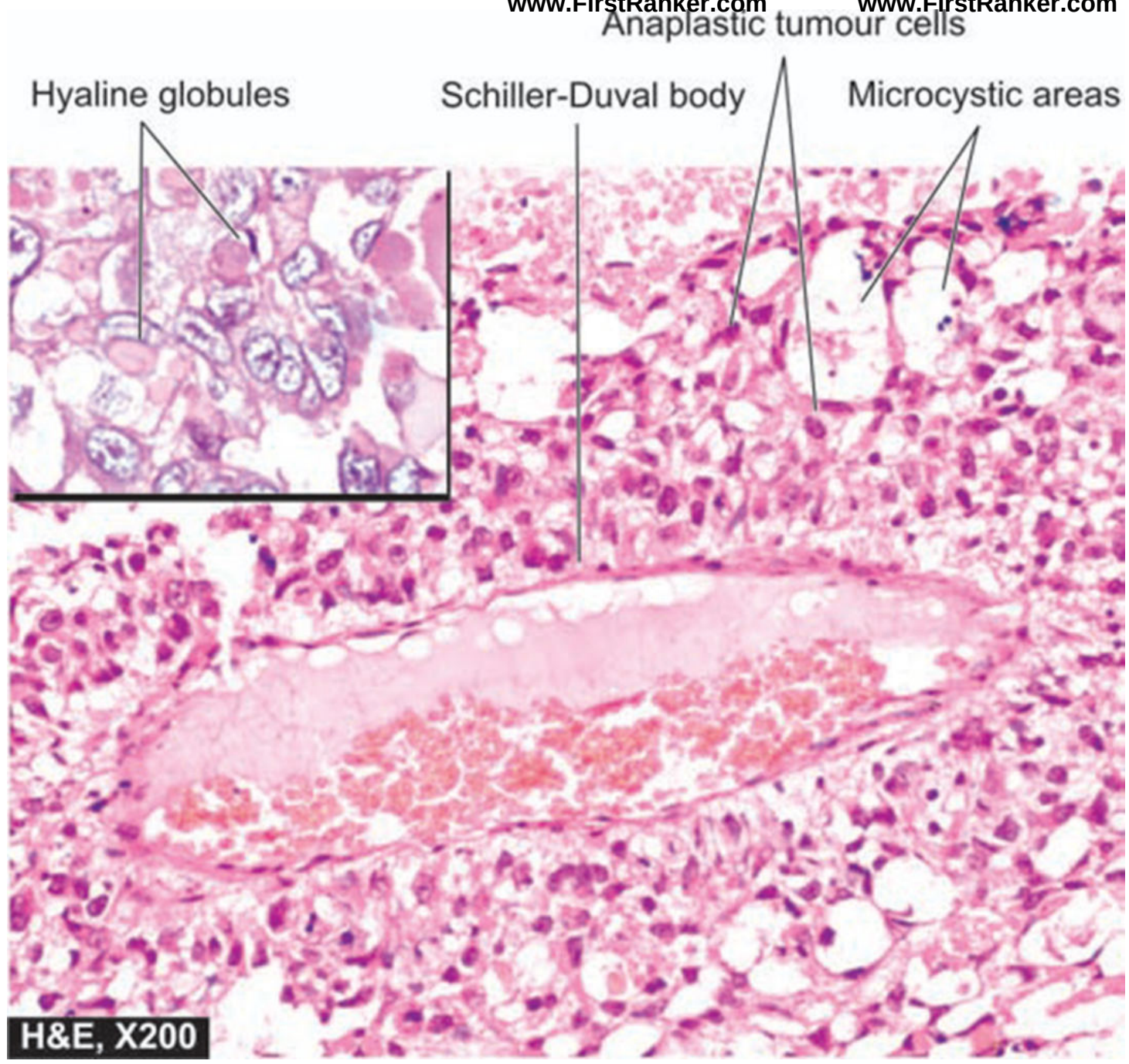
1. *patterns*—loose **reticular network, papillary, tubular and solid arrangement**

2. flattened to cuboid epithelial cells with clear vacuolated cytoplasm

3.A pathognomonic feature is **Schiller -Duvel body**

a central vessel surrounded by tumor cells in a cystic space often lined by flattened tumor cells

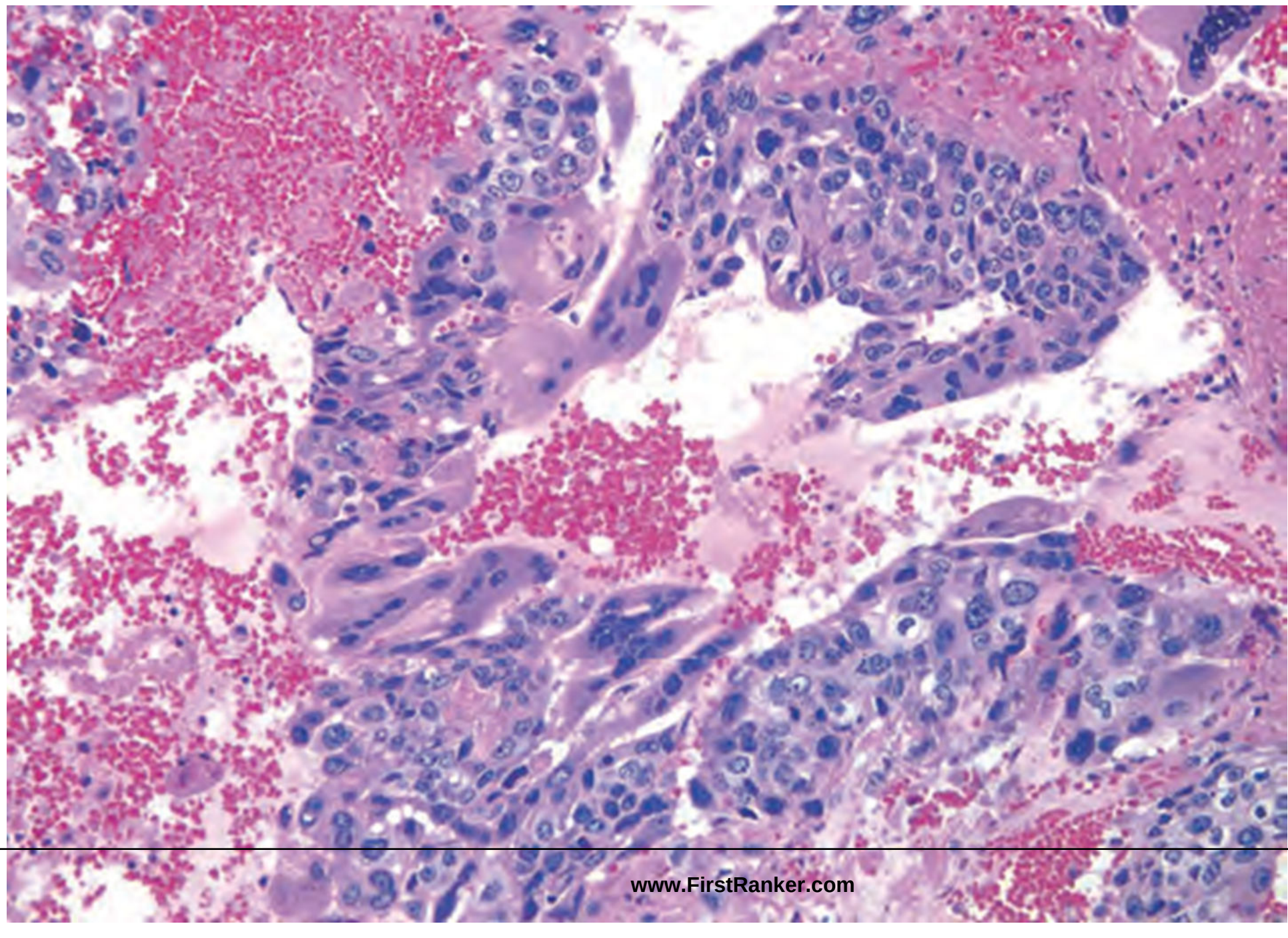
4. presence of both intracellular and extracellular PAS-positive *hyaline globules*



Choriocarcinoma

- highly malignant tumour composed of syncytiotrophoblast and cytotrophoblast
- 2nd decade of life
- serum and urinary levels of hCG are greatly elevated in 100% cases

- ***Grossly,*** the tumour is usually small and may appear as a **soft, haemorrhagic and necrotic mass**
- ***Microscopically,*** the characteristic feature is **syncytiotrophoblast and cytotrophoblast without formation of definite placental-type villi**



Teratoma-

- Teratomas are complex tumours composed of tissues derived from more than one of the three germ cell layers—endoderm, mesoderm and ectoderm
- more common in infants and children and constitute (40%)
- in adults they comprise 5% of all germ cell tumours

MORPHOLOGIC FEATURES. Testicular teratomas are classified into 3 types:

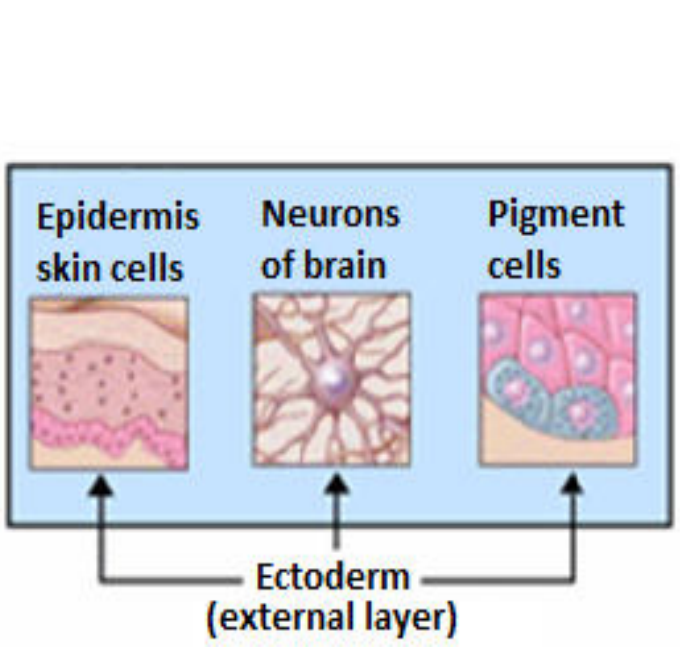
1. Mature (differentiated) teratoma
2. Immature teratoma
3. Teratoma with malignant transformation

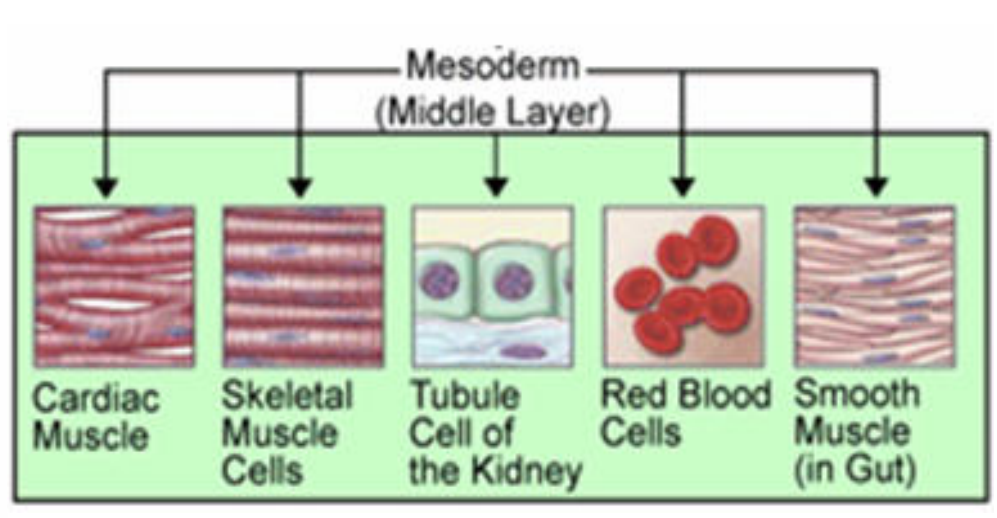
Gross-

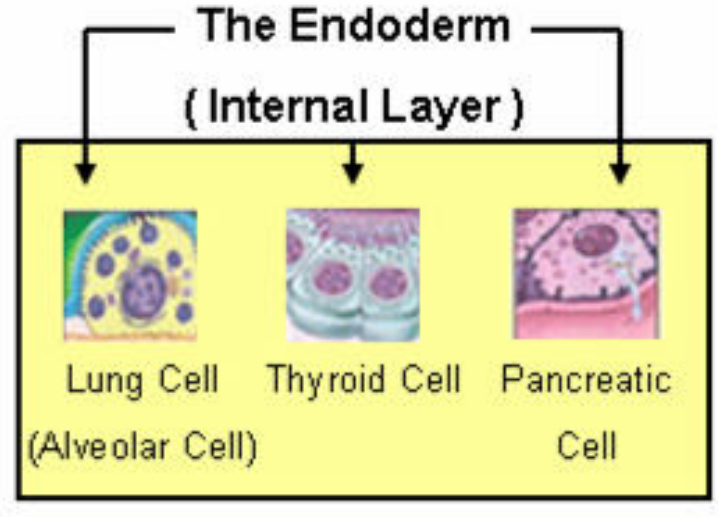
- large, grey-white masses enlarging testis

- *Cut surface* shows characteristic variegated appearance—grey-white solid areas, cystic and honey-combed areas, and foci of cartilage and bone

Germ cell layer derivatives







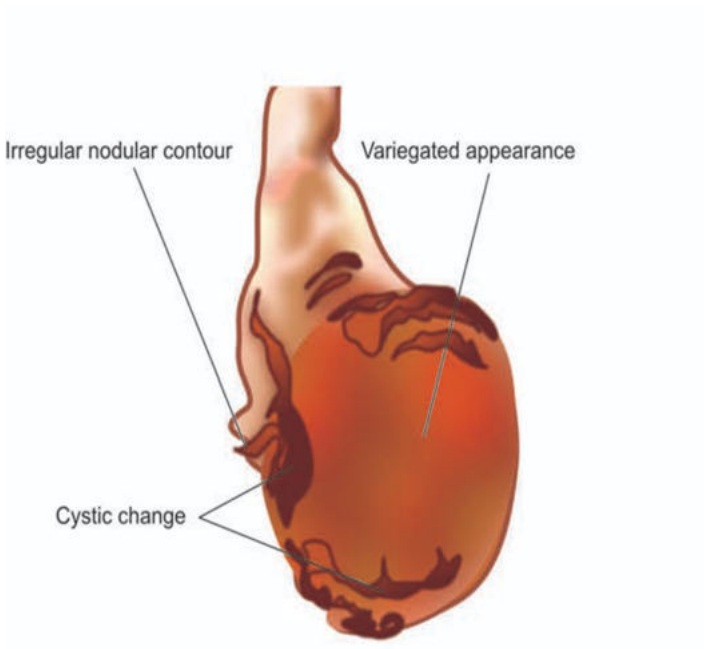
Microscopicy-

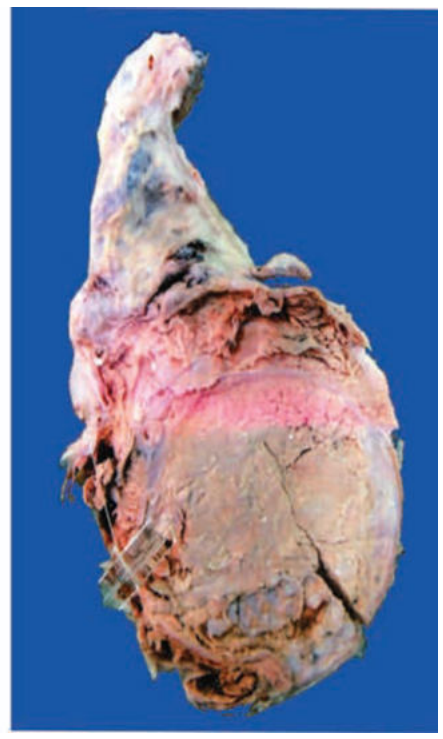
- three categories of teratomas show different appearances:

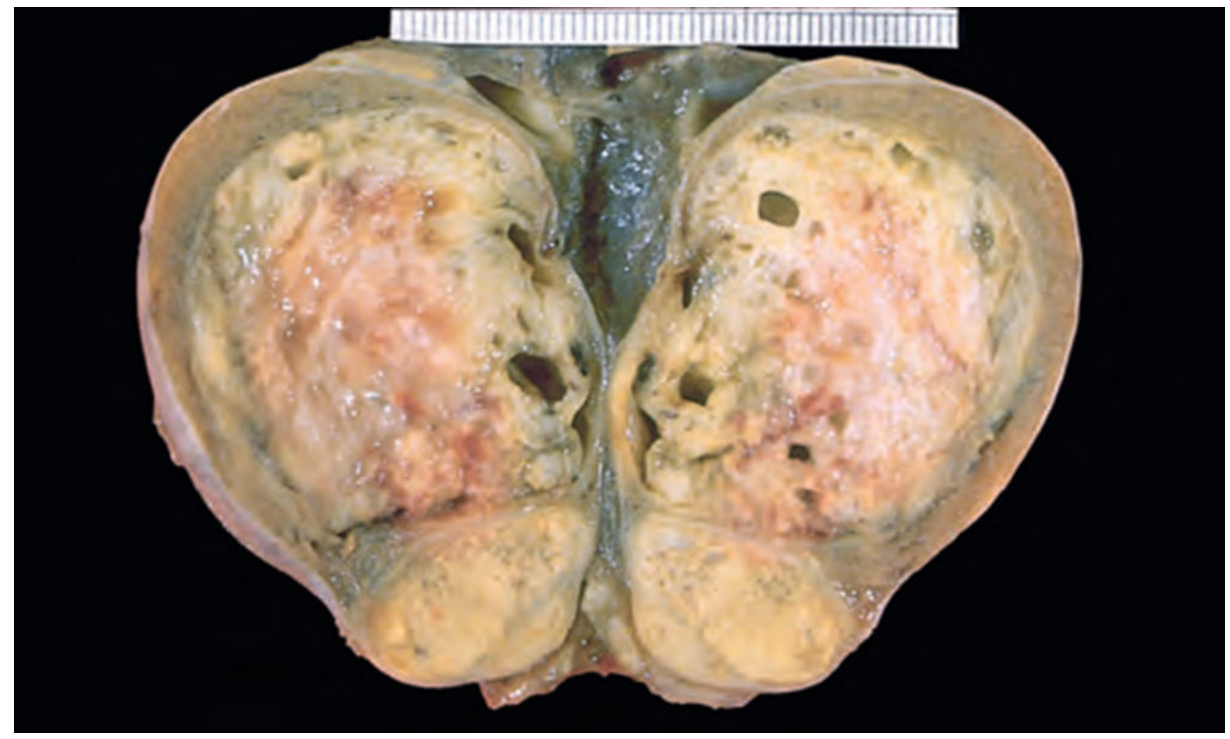
1-Mature (differentiated) teratoma. Well differentiated structures such as cartilage, smooth muscle, intestinal and respiratory epithelium, mucus glands, cysts lined by squamous and transitional epithelium, neural tissue, fat and bone

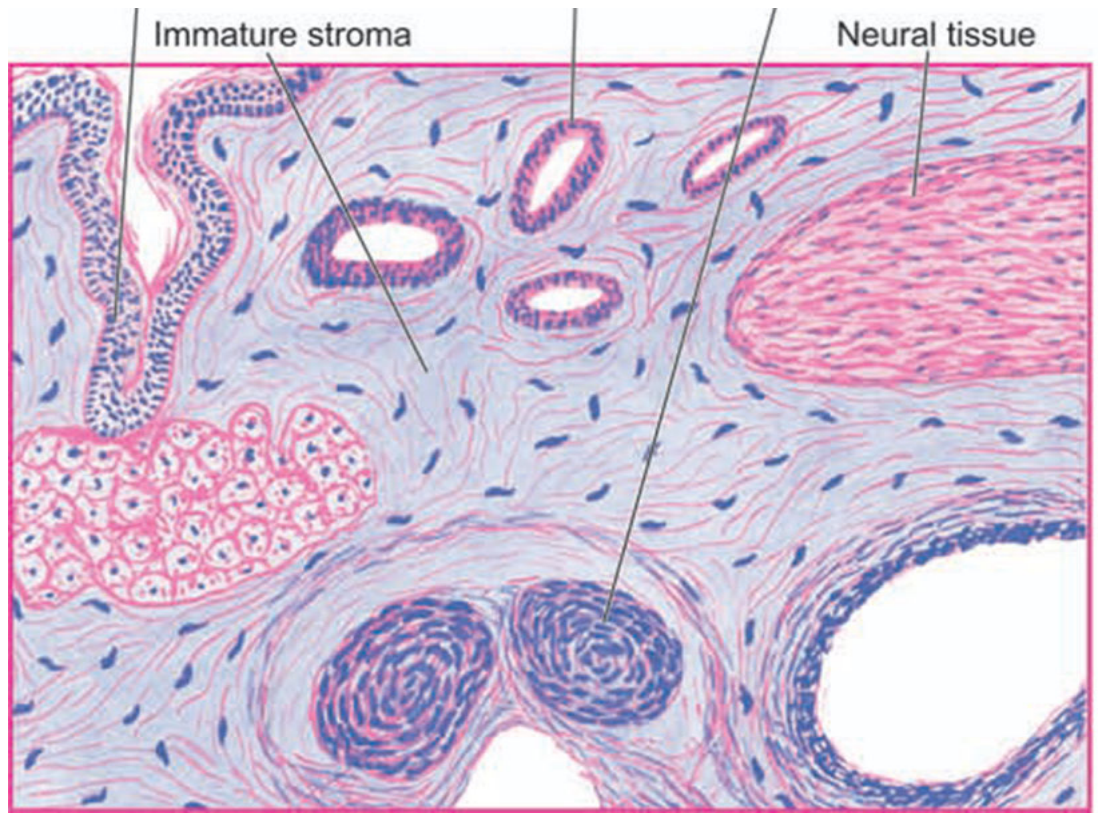
2-Immature teratoma.

- incompletely differentiated and **primitive or embryonic tissues**
- along with some mature elements present are poorly-formed cartilage, mesenchyme, neural tissues, abortive eye, intestinal and respiratory tissue elements etc
- **Mitoses are usually frequent**

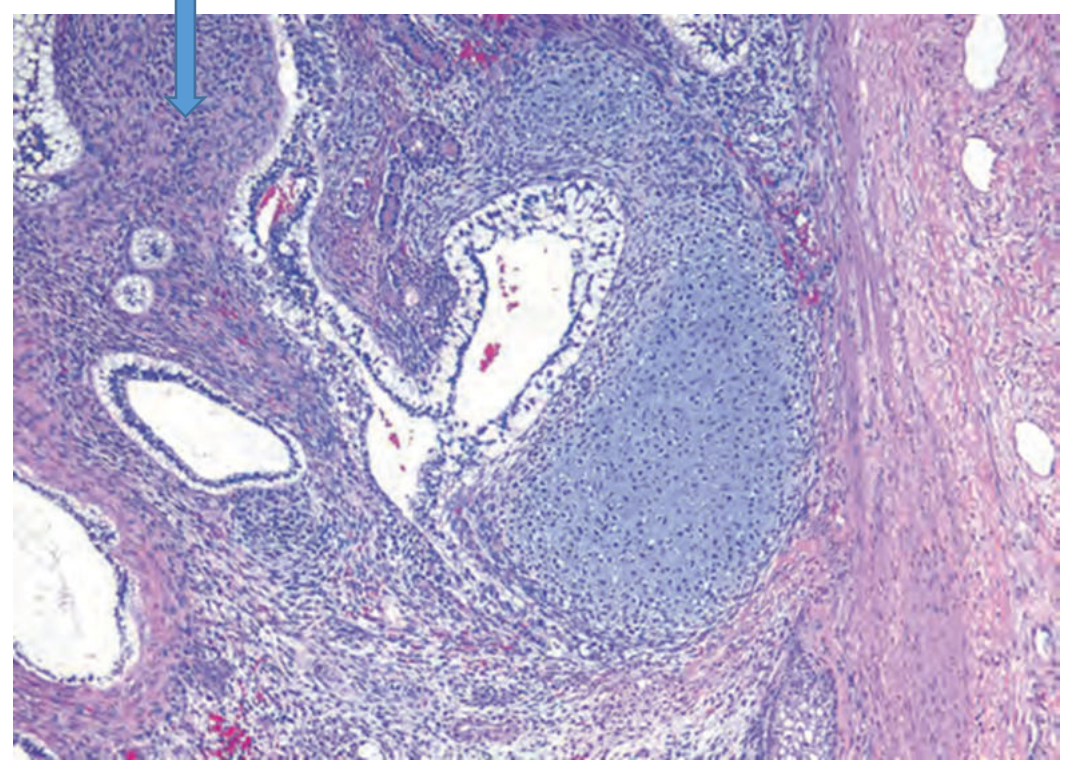








Immature stroma



3-Teratoma with malignant transformation-

- extremely rare form of teratoma
- one or more of the tissue elements show malignant transformation
- Transformation may take the form of a squamous cell carcinoma, mucin-secreting adenocarcinoma, sarcoma, or other cancers.
- importance of recognizing a non–germ cell malignancy arising in a teratoma is that these secondary tumors are chemoresistant

Mixed Germ Cell Tumours

- About 60% of germ cell tumours have more than one of the above histologic types (except spermatocytic seminoma) and are called mixed germ cell tumours

most common combinations of mixed germ cell tumours are as under:

1. Teratoma, embryonal carcinoma, yolk sac tumour and syncytiotrophoblast
2. Embryonal carcinoma and teratoma (teratocarcinoma)
3. Seminoma and embryonal carcinoma

- **SEX CORD-STROMAL TUMOURS-**Tumours arising from specialised gonadal stroma

primitive mesenchyme>>>

- specialised stroma of gonads in either sex gives rise to theca, granulosa and lutein cells in the female
- **Sertoli** and **interstitial Leydig cells** in the male

❖Leydig (Interstitial) Cell Tumour-

- 20 to 50 yr,
- secrete androgen, or both androgen and oestrogen

Grossly, as a small, well-demarcated and lobulated nodule. Cut surface is homogeneously yellowish or brown

Histologically, the tumour is composed of sheets and cords of normal-looking Leydig cells

These cells contain abundant eosinophilic cytoplasm and Reinke's crystals and a small central nucleus

❖**Sertoli Cell Tumours (Androblastoma)-**

- infants and children
- Oestrogen or androgen
- gynaecomastia in an adult
- precocious sexual development in a child

- ***Grossly,*** the tumour is **large, firm, round, and well circumscribed**. Cut surface is **yellowish or yellow-grey**

- ***Microscopically,*** Sertoli cell tumour is composed of benign Sertoli cells arranged in well-defined tubules

MIXED GERM CELL-SEX CORD STROMAL TUMOURS-

- **Gonadoblastoma-** secrete androgen
- ***Grossly,*** the tumour is of variable size, yellowish-white and soft
- ***Microscopically,*** gonadoblastoma is composed of 2 principal cell types—large germ cells resembling seminoma cells, and small cells resembling immature Sertoli, Leydig and granulosa cells

OTHER TUMOURS

Malignant Lymphoma-

- comprises 5% of testicular malignancies
- most common testicular tumour in the elderly
- Bilaterality is seen in half the cases
- Most common are large cell non-Hodgkin's lymphoma of B cell type

Must know

1-classification

2-Tumor markers in diagnosis

3-Morphology of

a) Seminoma
b) Embryonal carcinoma
c) Yolk sac tumor

4-Cryporchidism