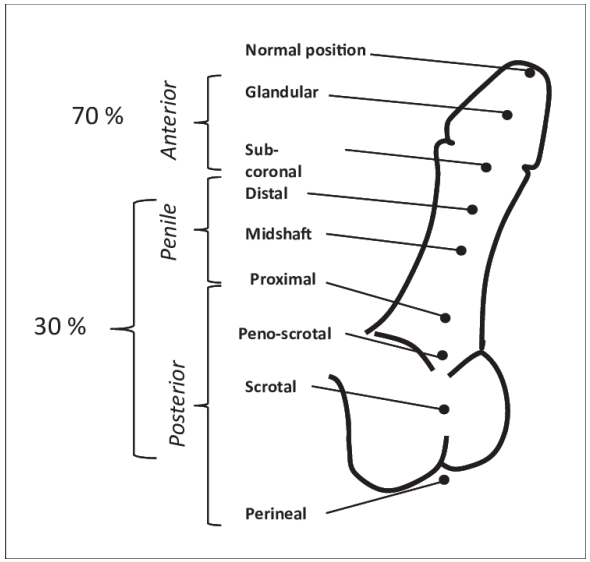
PATHOLOGY OF MALE GENITAL SYSTEM

PENIS



1. Malformations:

APHALLIA: Agenesis of penis caused by failure in embryologic development of genital tubercle

- Very rare, incidence of 1 per 10 million male births; < 100 cases reported

DIPHALLIA: Duplication of penis

- Occurs in 1 per 5 million male births

HYPOSPADIASIS: Urethra opens onto ventral surface of penis or scrotum

- Due to failure of fusion of urethral folds
- Urethral opening is usually near glans
- Most common congenital abnormality of male external genitalia other than cryptorchidism
- 3 - 5/1000 live male births

EPISPADIASIS: Urethra opens onto dorsal surface of penis

2. Inflammatory and other Lesions

BALANITIS: local inflammation of glans penis

POSTHITIS: local inflammation of the overlying perpuce (*foreskin*)

BALANOPOSTHITIS: Infection of glans and foreskin

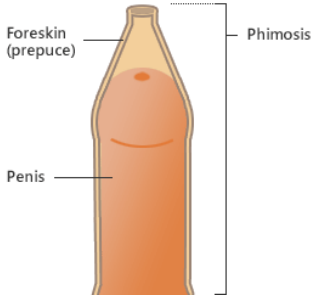
- Due to Candida albicans, Gardnerella, anaerob bacteria, pyogenic bacteria
- Common in uncircumcised newborns or uncircumcised men with poor hygiene and accumulation of *smegma*.

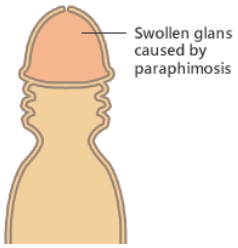
PHYMOSIS: Condition in which the foreskin cannot be retracted due to a small orifice

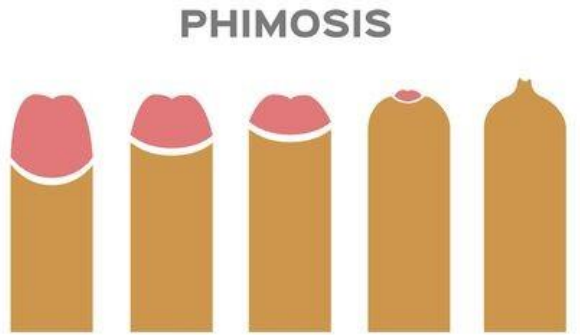
- Most young boys who present with tight foreskins have physiologic phimosis, which will generally resolve by adolescence with proper foreskin hygiene
- most cases stem from scarin
- Most cases are from scarring of the foreskin cased by balanoposthitis

PARAPHIMOSIS: Condition in which the foreskin cannot be easily advanced over glans and becomes trapped between coronal sulcus and glans corona

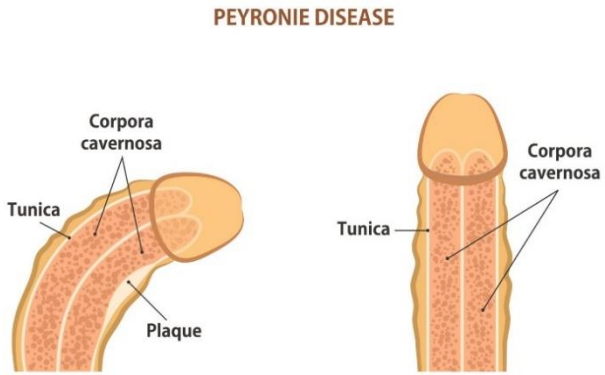
Prevention: CIRCUMCISION: Surgical excision of foreskin







PEYRON-DISEASE (*induratio penis plastica*): a penile fibromatosis. Fibrous thickening of dermis and Buck's fascia between corpora cavernosa and tunica albuginea causing abnormal curvature towards side of lesion and restricting movement of these structures during erection and intercourse. May be associated with beta blockers, thiazides, hypertension, diabetes, immune reactions and Dupuytren contracture.

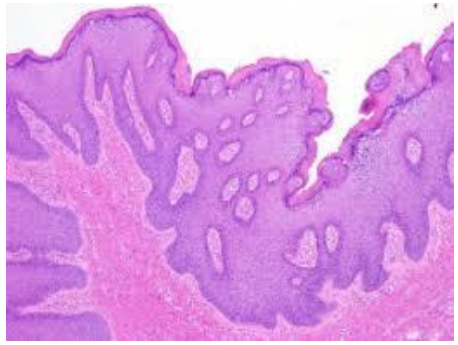


PRIAPRISM: Prolongation of penile erection without sexual stimuli for more than 4 hours.
Etiology: Usually due to vascular diseases (sickle cell disease, leukemia, thalassemia, Fabry disease) or neurological disorders (spinal cord lesions/trauma) or medications (treatment for erectile dysfunction, antihypertensives, antipsychotics, antidepressants, blood thinners), adult movie actor's side effect…

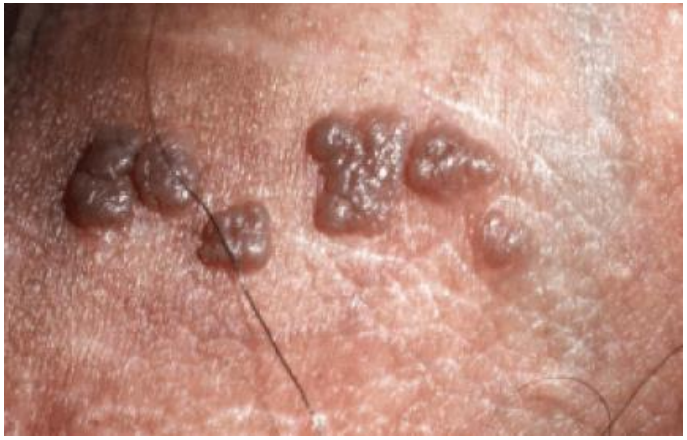
3. Neoplasms

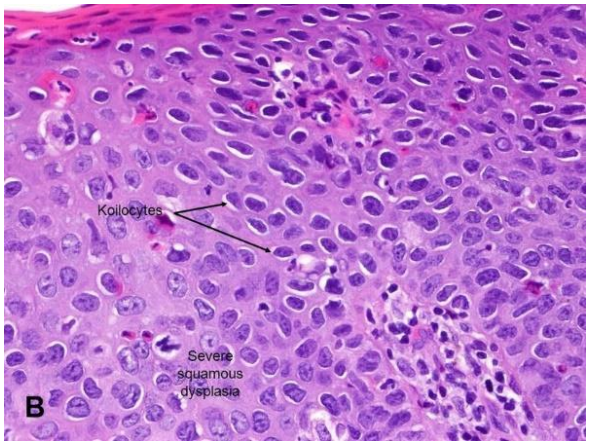
1. Benign tumor

CONDYLOMA ACUMINATUM: Contagious HPV related lesion with a clear predilection for anogenital area. Genital wart. Most common sites (in decreasing frequency) are glans, foreskin, meatus and shaft, often near coronal sulcus and inner surface of foreskin. Most frequently caused by HPV genotypes 6 and 11.



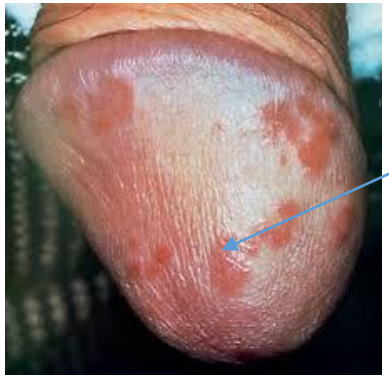
BOWENOID PAPULOSIS: Benign HPV related condition characterized by multiple soft papules, most commonly in the skin of the shaft, that usually regress spontaneously. Preferentially affects sexually active young males (mean age 30 years). Sexually transmitted disease associated with HPV 16 or 18. Clinically resembles condyloma but histologically resembles Bowen disease. Usually regresses spontaneously (mean duration of disease is 2 months), leaving no sequelae. Either macular or papular, less than 1% progress to penile cancer.

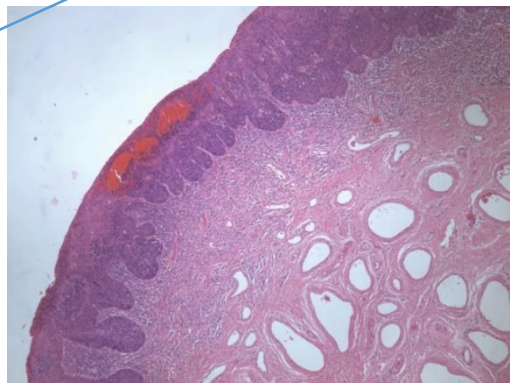




2. Penile intraepithelial neoplasia

ERYTHROPLASIA QUEYRAT: clinical designation of carcinoma in situ located in the glans, usually erythematous

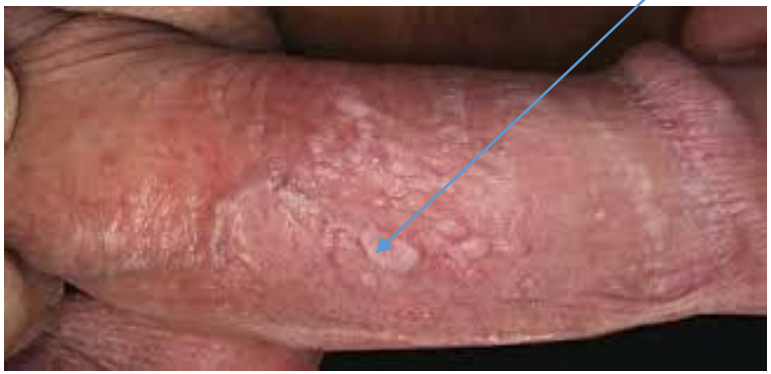


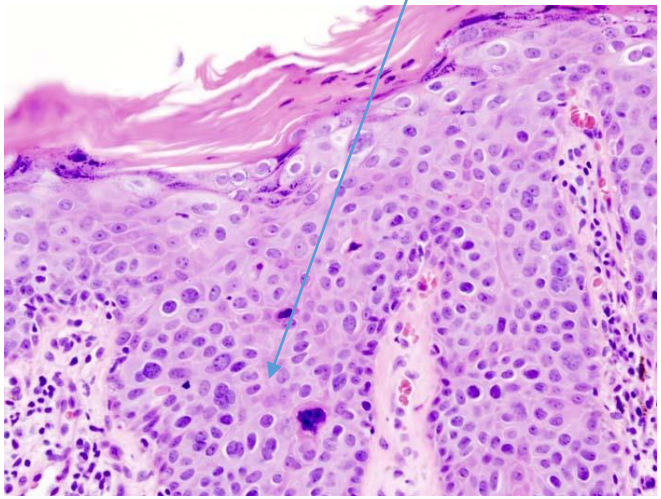


BOWEN Disease: clinical designation of carcinoma in situ located in the shaft

Intraepithelial squamous cell atypia and alteration in squamous cell maturation

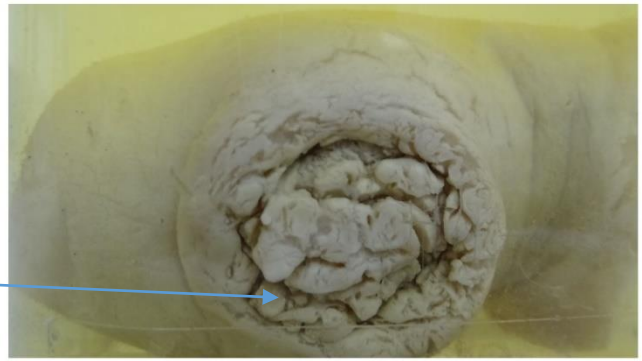
Both of them *carcinoma in situ*





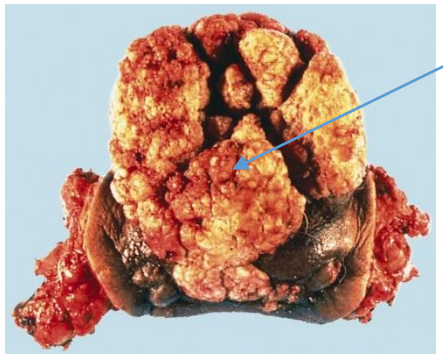
3. Malignant tumors

Invasive squamous cell carcinoma



- rare, under 1 %. But: in Asia, Africa, Southern-America 10-20%
- Mean age 45-60 years
- Glans is the preferred site but extension to coronal sulcus and inner foreskin is common
- Predominant growth patterns are vertical and superficial spreading
- Infiltration produses indurated, ucerated lesions with irregular margins
- Inguinal nodal metastases in 28 - 39% and recurrences in 28% of all cases
- Histologic: Usually keratinized squamous with moderate differentiation
- 25% of cases are HPV 16, 18+, additional carcinogen effect of smegma
- Circumsision of the lack of circumsision has been imlicated in the pathogenesis

VERRUCOSUS CARCINOMA: Also called Buschke-Löwenstein tumor, or Giant-condyloma. Verruciform, slow growing, extremely well differentiated variant of squamous cell carcinoma with low malignant potential. Consistently HPV-, No inguinal nodal metastases and no death due to disease in pure verrucous carcinoma

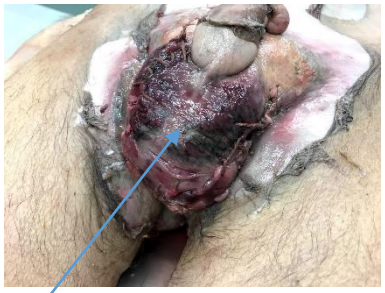


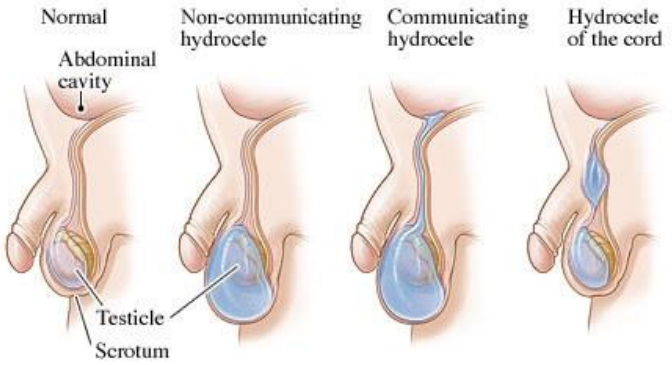
OTHER MALIGNAT TUMOR: melanoma malignum, Kaposi-sarcoma, fibrosarcoma, leimyosarcoma

SCROTUM

1. Malformations

- Both testis are in different scrotum
- groove in the scrotum (pseudohermaphroridism)
- ectopic scrotum
- srotum hypoplasis (crypthorchysmus)



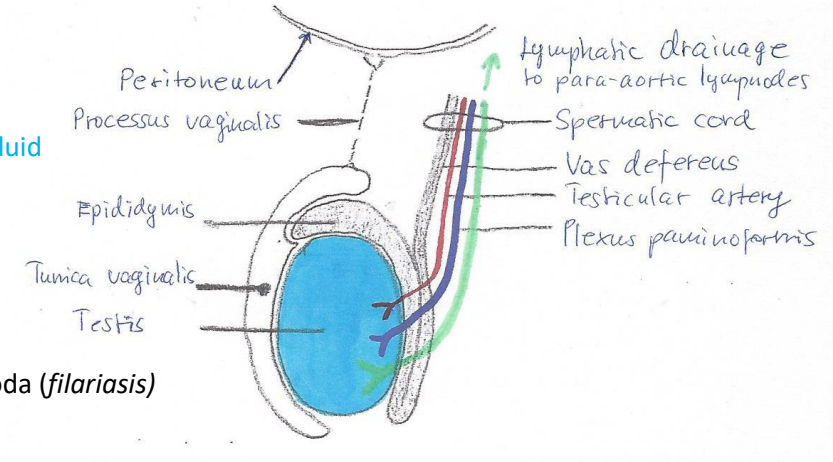


2. Inflammatory process

- scabies, local fungal infectoin, syphilis
- systemic dermatoses (psoriasis)
- *Fournier-gangraena:*
  - Serious life threatening condition characterized by necrotizing fasciitis of genitalia and perineum
  - Risk factors: trauma, burns, anorectal disease, diabetes, leukemia and alcoholic cirrhosis

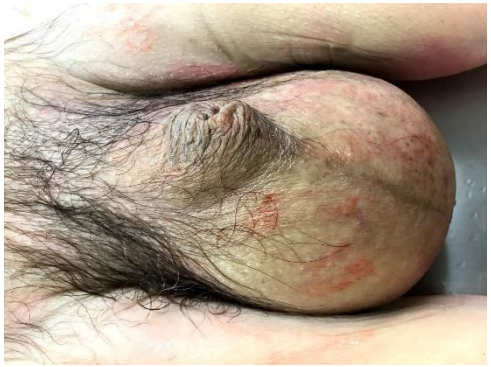
3. Swelling of the srotum (independent of the testis)

- Hyrdocele: accumlation of serous fluid within the tunica vaginalis, TRANSLUMINESCENS!
  - congenital: direct communication between t. vaginalis and abdominal cavity
  - infantile: particular enclosement of the funiculus, no communication of the fluid
  - acquaired: cogestive heart failure, inflammation, trauma, tumor
- Haematocele: blood in tunica vaginalis
  - maemorrhagic diseases, testicular neoplasm, local trauma
- Pyocele: pus into the tunica vaginalis
- Chylocele: accumlation of lymphatic fluid into the tunica vaginalis
- Elephanhiasis: extreme enlargement of the scrotum due to lymphatic obstruction by nematoda (*filariasis)*

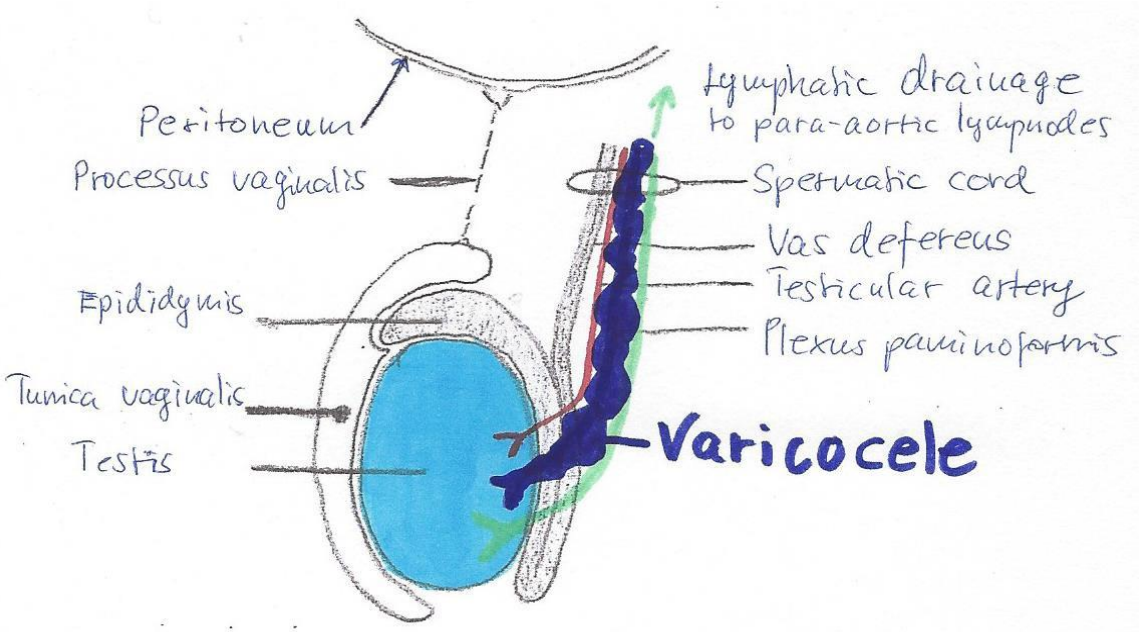


4. Neoplasms

- most common is the squamous cell carcinoma
- well differentiated, slow growing, metastasis into the inguinal lymph nodes
- it represents the first human malignancy associated with environmental exposures in chimney sweeps
- Malignant mesothelioma: tunica vagnalis



SPERMATIC CORD



1. Malformations

- congenital agenesis of funiculus spermaticus
- atresis of ductus deferens
- both results sterility

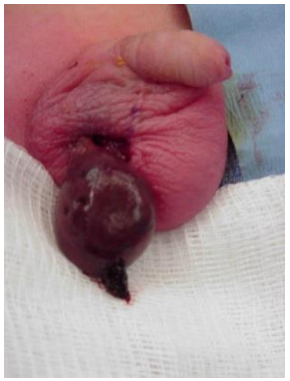
2. Inflammation

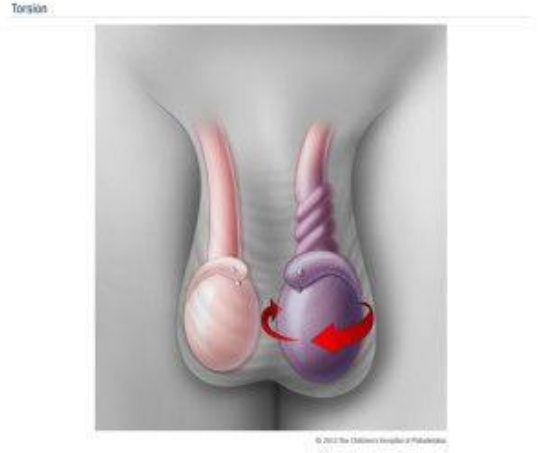
- *vasitis or deferentitis*: inflammation of ductus deferens
- *funiculitis*: inflammation of spermatic cors
- progression of the inflammation of testis and epididimys
- tuberculosis

3. Vascular Disturbances

- Varicocele: varicosity of pampiniform plexus. Veins are dilated, enlarged and tortuous
- primary: no obvious cause, more common on the left side, young age
  secundary: result of venous obstraction (portal hypertension, neoplasm)

- Torsion: sudden twising of the spermatic cord, results of the testicular veins strangulation.
  - neonatal torsion: shortly after birth, no congenital anatomical defect
  - adult torsion: adolescence, bilateral congenital anomaly (bell clapper abnormality)
  - urologic emergencie – haemorrhagic infarction
  - perecvent the torsion: orchiopexy

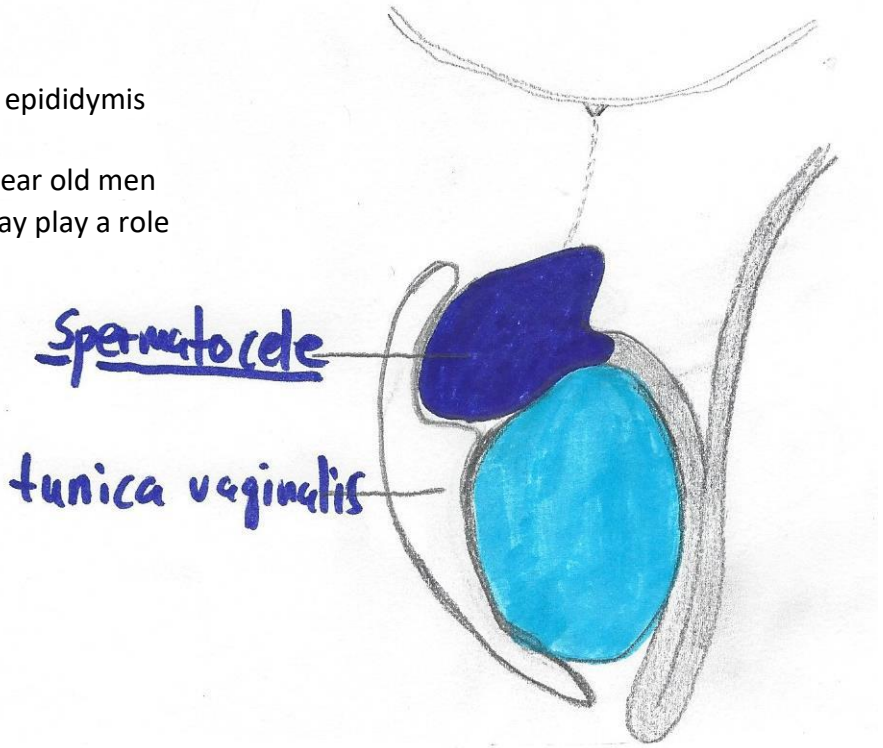




4. Neoplasm like lesion

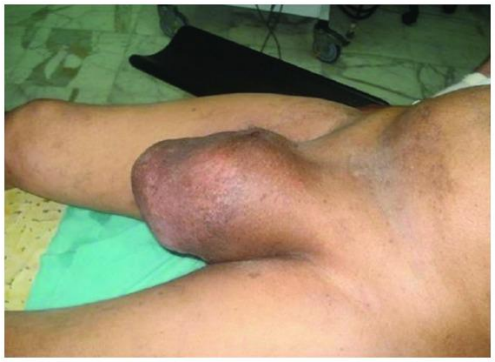
Spermatokele: Dilatation of the efferent ductules in the rete testis or head of epididymis

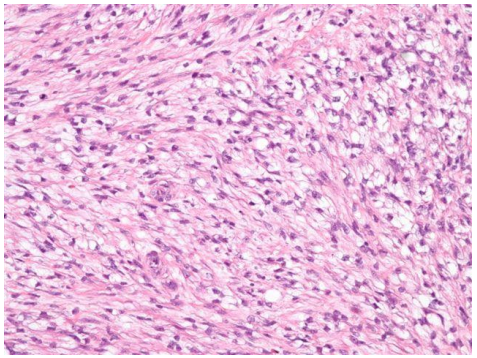
- Painless bulging
- All ages affected, but typically occur in 20 - 50 year old men
- Usually idiopathic but obstruction of outflow may play a role

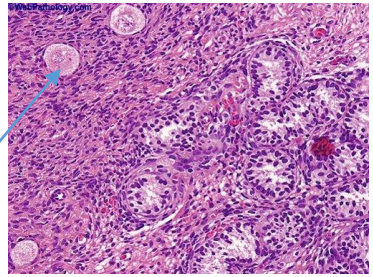


5. Neoplasm

- lipoma
- embrional rhabdomyosarcoma (young age) 1 per 20 million/year/male





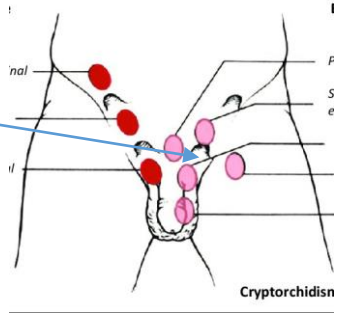


TESTIS AND EPIDIDYMIS

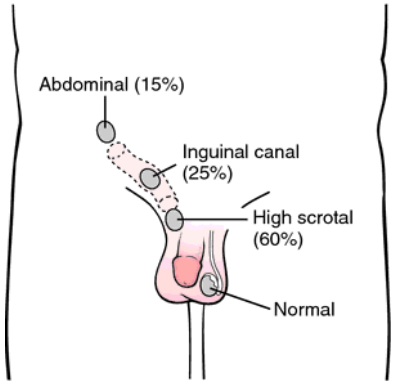
1. Malformations

anorchia: agenesis of both testes

- **monorchia:** agenesis of one testis
- **polyorchia:** multiple testes within a scrotal sac
- **ectopia testis:** testis is situated away from normal path of descent, differs from undescended testicle
- **fusio testis:** fusion of the testis
- **Abnormal sexual development (intersexuality):**
    - True hermaphroditism: *ovotestis*: both testicular and ovarian tissue develops in the same individual
    - Pseudohermaphroditismus: external and internal genital organs are different
        a) Male: XY, testes present, phenotype ambiguous or female
        b) Female: normal ovarium , rudimental vagina, clitoral hypertophy – Congenital adrenal hyperplasia



- **Cryptorhidism:**
- Absence of one or both testes in the scrotum
- Most common congenital abnormality of the genitourinary tract
- 3% in full term newborns, decreases to 1% by the first year , 10 % bilateral
- More common in preterm (30%)
- Associated with infertility and subfertility, testicular germ cell tumor, testicular torsion and inguinal hernia



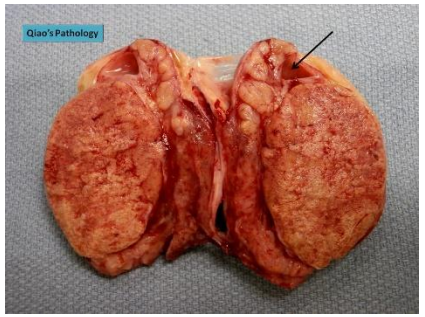
2. Inflammation

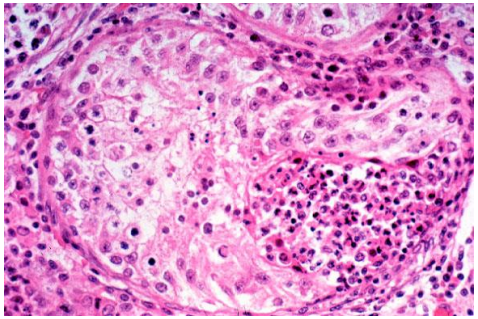
- Terminology: *orchitis, epididymitis, epididymoorchitis*
- **Non-specific**

Acute: ascending pyogenic urinary tract infections or via blood

Mumps: Testicular infections rare in infected children (prepubertal)

- but occur in 15 - 40% of postpubertal men one week after parotiditis
- Usually unilateral (bilateral in 15 - 30%);
- 1/3 of infected postpubertal men develop testicular atrophy,
- 2 - 10% become infertile, Incidence increasing, due to reduced use of vaccine





- **Chronic**
    - Healing acute inflammation
    - Specific
        - Tuberculosis: usually begins in epididymis and spreads to testis, prostate and seminal vesicles are usually also infected
        - Granulomatosus orchitis: trauma
        - Spermagranuloma: extravasation of sperm from the tubules into the epididymis resulting a non-necrotizing granuloma reaction
        - Syphilis: Testis usually involved first. Discrete gummas contribute to enlarged, irregular testis

          Gummas: diffuse interstitial inflammation with edema, eitheloid cells, lymphocytes and plasma cells, with obliterative endarteritis and perivascular cuffing

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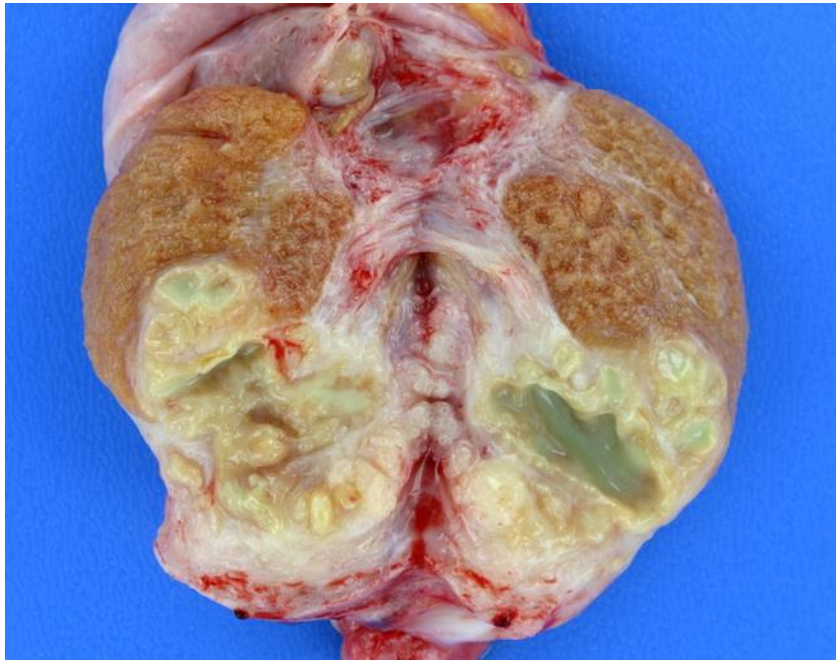
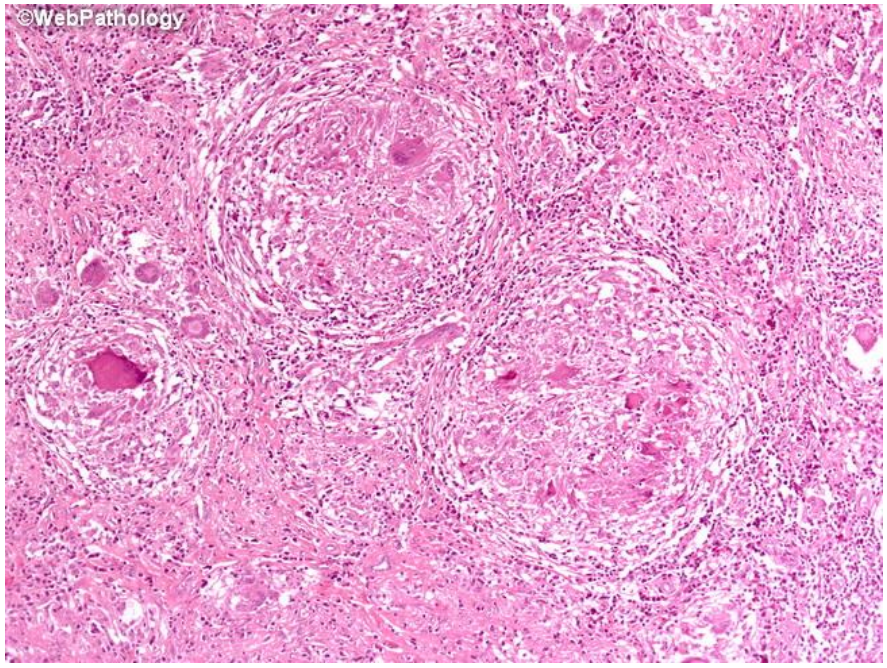
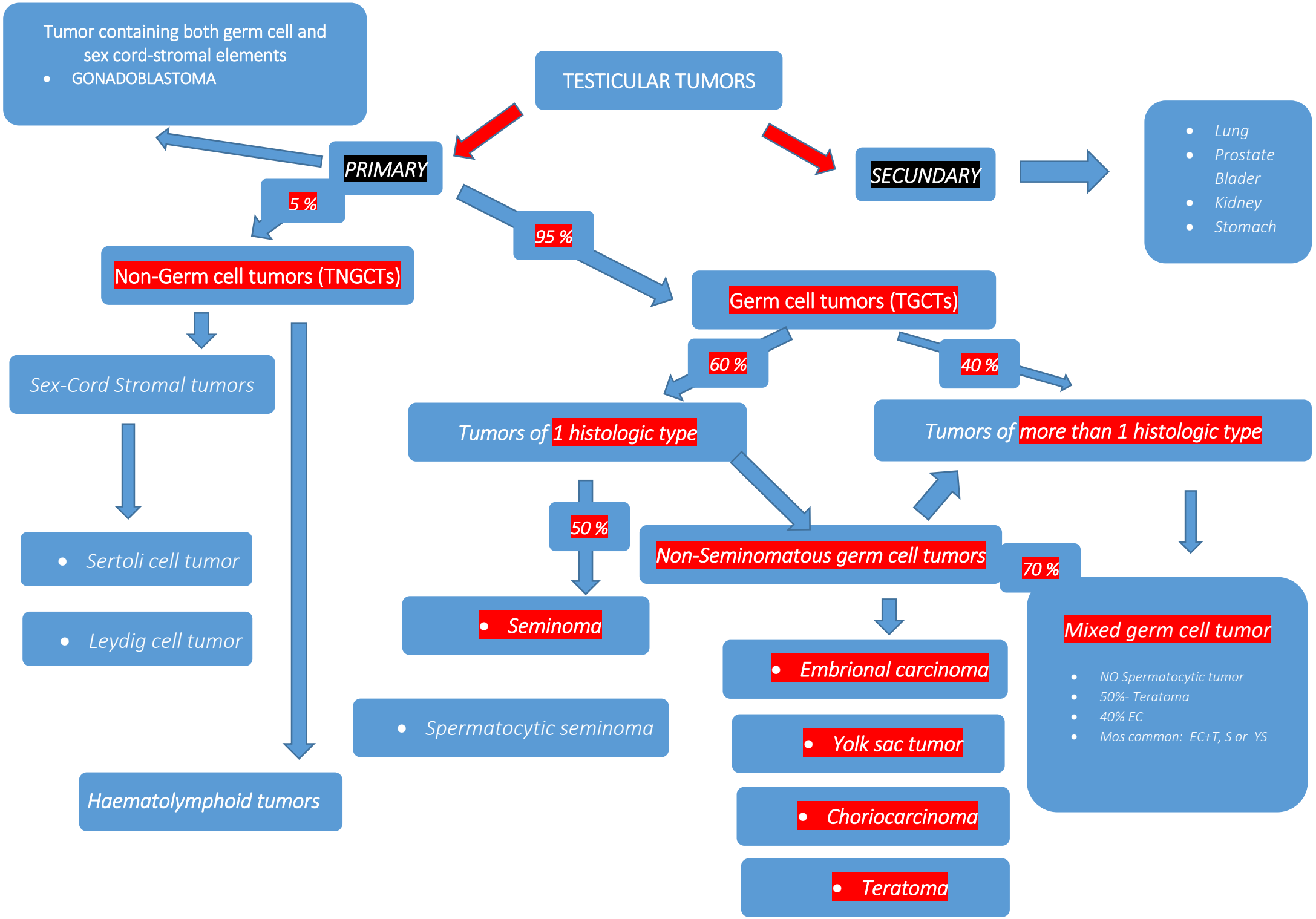





Tumor containing both germ cell and sex cord-stromal elements
GONADOBLASTOMA
TESTICULAR TUMORS
PRIMARY
SECUNDARY
Lung
Prostate
Blader
Kidney
Stomach
5 %
95 %
Non-Germ cell tumors (TNGCTs)
Germ cell tumors (TGCTs)
60 %
40 %
Sex-Cord Stromal tumors
Tumors of 1 histologic type
Tumors of more than 1 histologic type
50 %
Non-Seminomatous germ cell tumors
70 %
Sertoli cell tumor
Leydig cell tumor
Seminoma
Mixed germ cell tumor
NO Spermatocytic tumor
50%- Teratoma
40% EC
Mos common: EC+T, S or YS
Spermatocytic seminoma
Embrional carcinoma
Yolk sac tumor
Choriocarcinoma
Teratoma
Haematolymphoid tumors

TESTICULAR NEOPLASMS - General

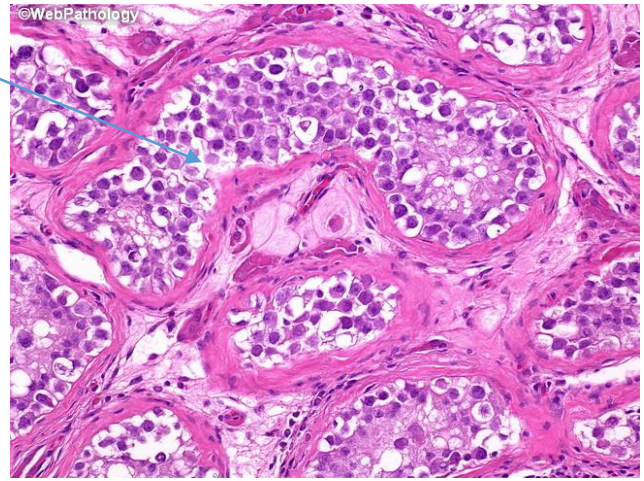
- occur in 6 per 100,000 males
- 95% of all testicular tumors are germ cell tumor
- Peak age 30 years; usually 20 - 50 years
- 1 - 2% are bilateral; 15% are bilateral if two undescended testes
- Arises from seminiferous epithelium; has totipotent properties

Predisposing Factors

- Crypthorchidism, Testicularis dysgenesis , Orchitis
- Genetics (Whites have 5 × risk of Blacks)
- Isochromosome 12p or extra 12p seen in almost all germ cell tumors
- Extra copies of 12p associated with tumor progression and treatment failure, particularly in nonseminomatous germ cell tumors
- p53 mutations are common
- GCNIS: In situ stage of germ cell neoplasia; the common precursor of seminomas and nonseminomas

Clinical features

- Usually presents as slowly enlarging painless testicular mass
- 10% shows acute urologic emergencie
- Lymphatic spread common to periaortic, iliac, mediastinal and supraclavicular nodes but not to inguinal nodes
- Hematogenous spread to liver, lungs, brain, bones
- 2-10% gynecomastia

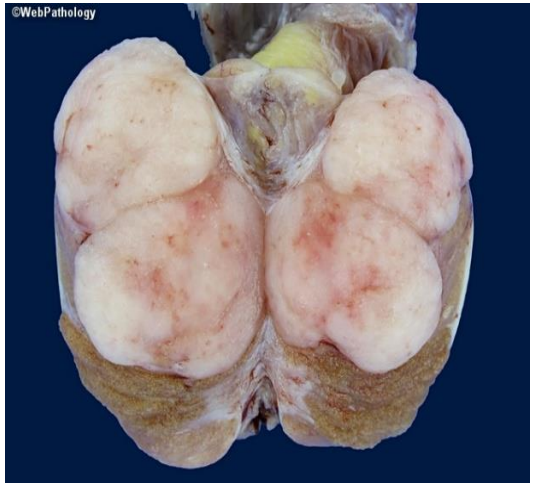


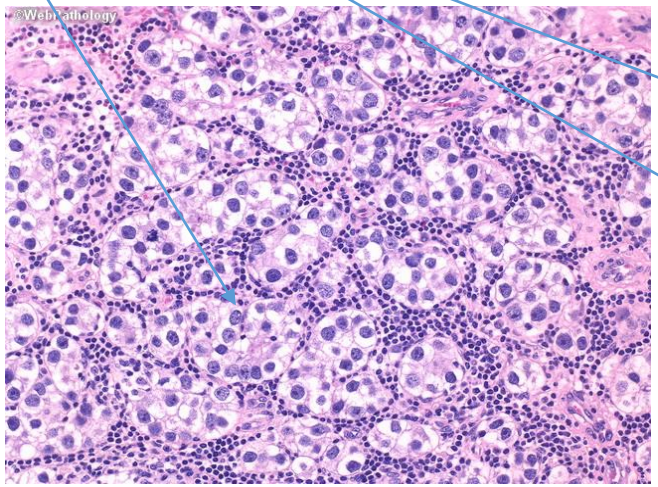
Diagnosis

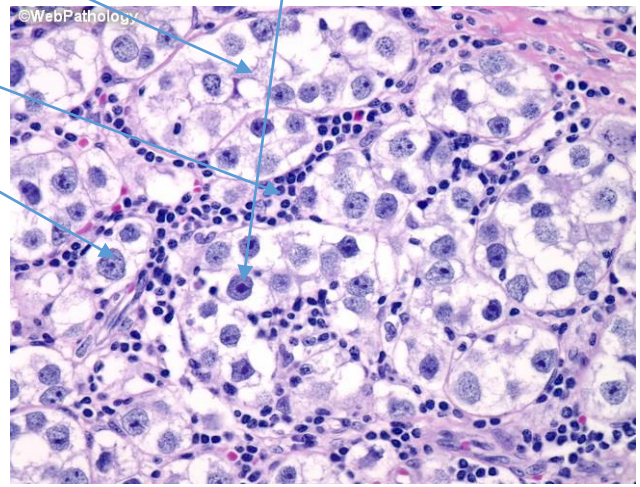
- Physical exem., Testicular ultrasound, Chest Xray or CT (staging)
- Radical orchiectomy – NO biopsy!
- Serum LDH, AFP and hCG performed

SEMINOMA

- Most common type of testicular germ cell tumor (up to 50%) and may occur as component of mixed germ cell tumor
- Presents in young men (30 - 49) with unilateral palpable mass
- Soft, well-demarcated, gray-white tumor that bulges from the cut surface of the affected testis
- Derived from transformed gonocytes - Arises from germ cell neoplasia in situ (GCNIS)
- Necrosis minimal, hemorrhage and cysts usually absent
- Typically a well demarcated, uniform neoplasm with characteristic cytological features and background of fibrous septae and lymphocytes:
    - Sheets or lobular configuration of tumor with fibrous septae
    - Cells are typically pale (glycogen) but may be eosinophilic
    - Cell membranes are well defined with distinct cell boundaries
    - Nuclei are polygonal and may have a flat edge giving a squared off appearance; they contain one or more prominent central nucleoli
    - A lymphocytic infiltrate is present (T lymphocytes) with plasma cells; germinal centers may occur
    - Granulomas noted in up to 50% of cases
    - Multinucleated syncytiotrophoblasts can be seen in 20% of tumors and can produce hCG
- Metastases are initially retroperitoneal and then progress to mediastinal and cervical nodes; visceral metastases develop late
- Surgery (radical orchiectomy) for primary and Radiation (very radiosensitive tumor)

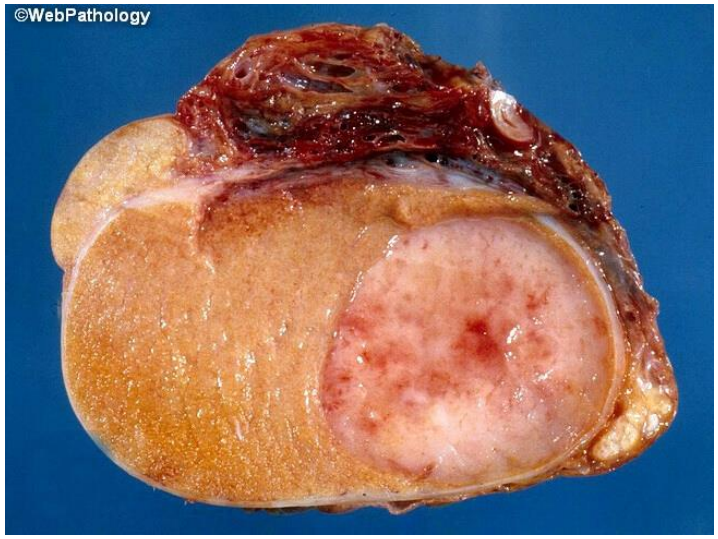


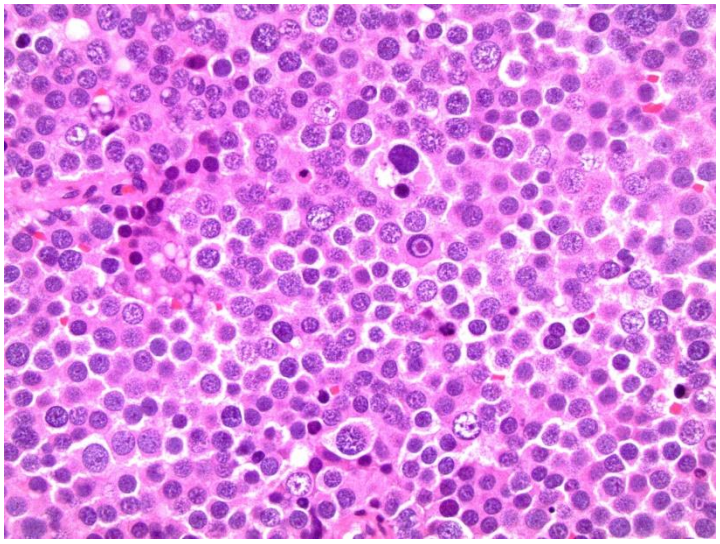




SPERMATOCYTIC TUMOR (spermatocytic seminoma)

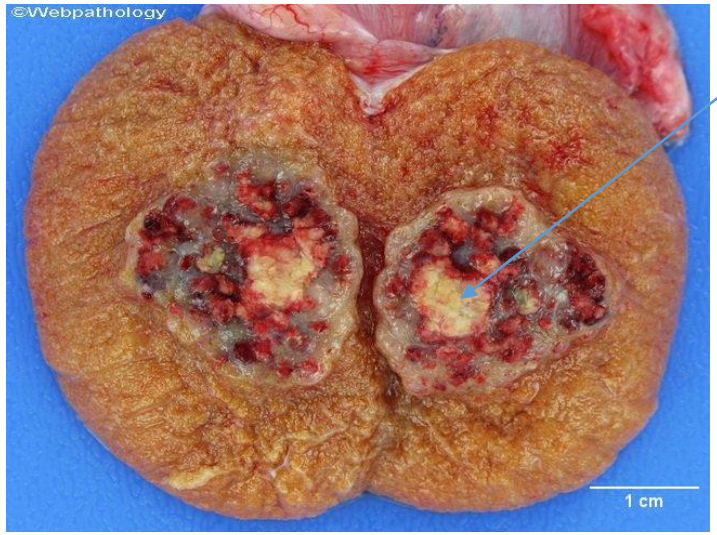
- distinct clinical and histologic entity
- Rare; 1 - 4% of all seminomas
- Only occurs in descended testes
- Mean age 55 years– Painless swelling of the testis
- In contrast with seminomas:
  - Unlike classic seminoma, does not arise from intratubular germ cell neoplasia
  - lack lymphocytic infiltrates, granulomas, and syncytiotrophoblasts
  - are not admixed with other germ cell tumor histologies
  - are not associated with germ cell neoplasiain-situ
  - do not metastasize
- comprises polygonal cells of variable size that are arranged in nodules or sheets.

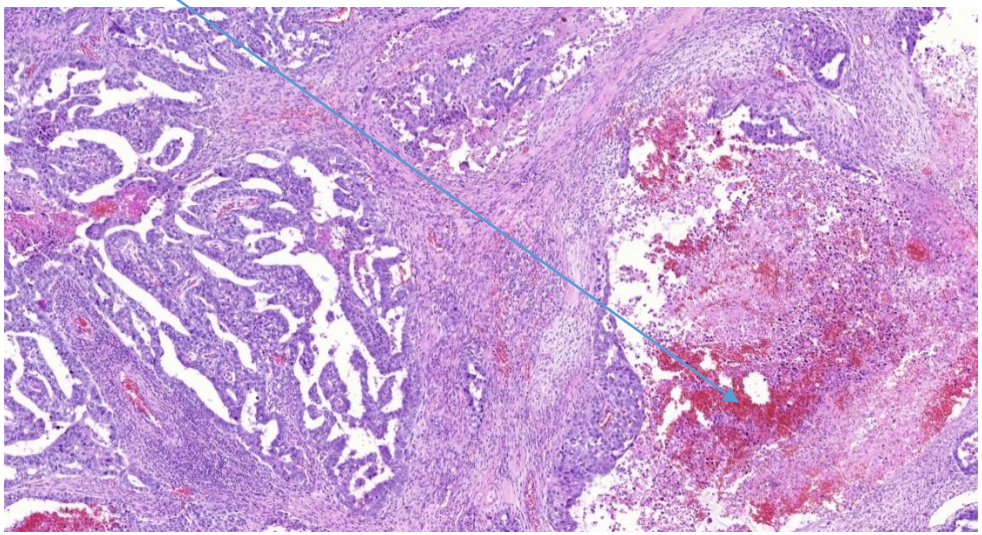




EMBRIONAL CARCINOMA

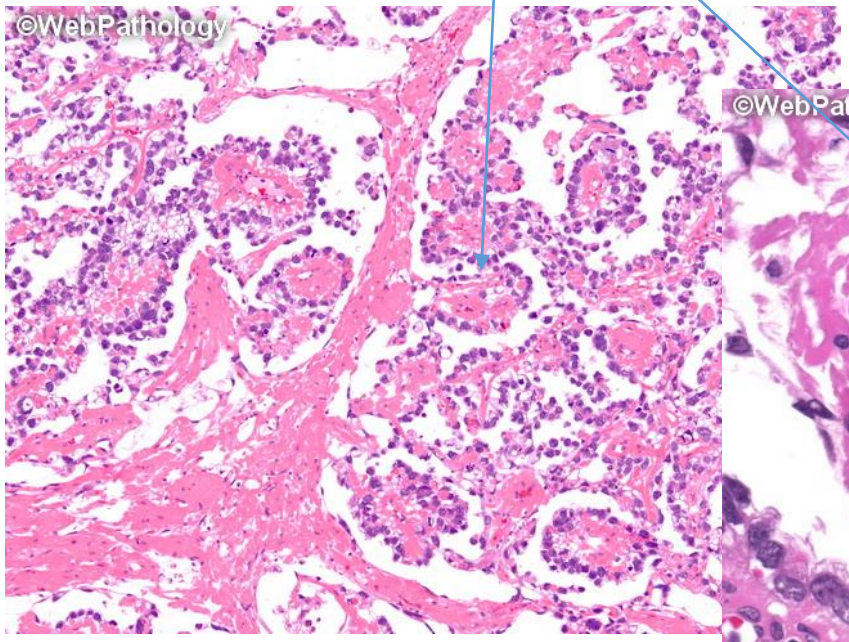
- Malignant germ cell tumor composed of primitive epithelial tumor cells recapitulating early stages of embryonic development
- Second most common GCT after the seminoma
- Rare in pure form, 2% of all GCTs, Common as a component of mixed germ cell tumors (MGCTs) (40% of all mixed GCTs)
- Peak age is 30 years, 10 years younger than seminoma but rare in prepubertal children
- Metastases are common at presentation (60%)-symptoms releated to metastasis
- Infiltration of the tunica albuginea, epididimis leading to disrupton the shape of the testis and pain is common
- Soft, tan white, poorly circumscribed, with hemorrhage and necrosis.
- Radical orchiectomy in all patients and Multidrug chemotherapy

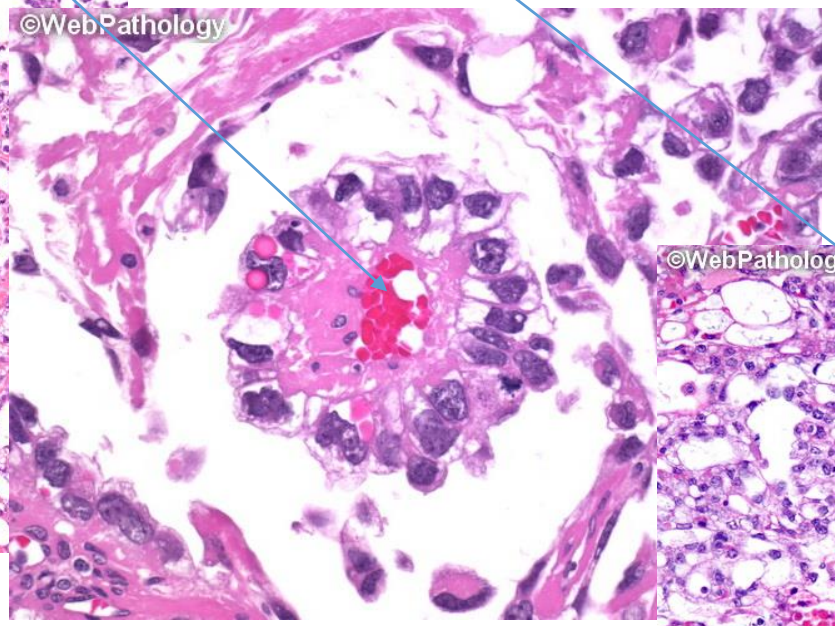


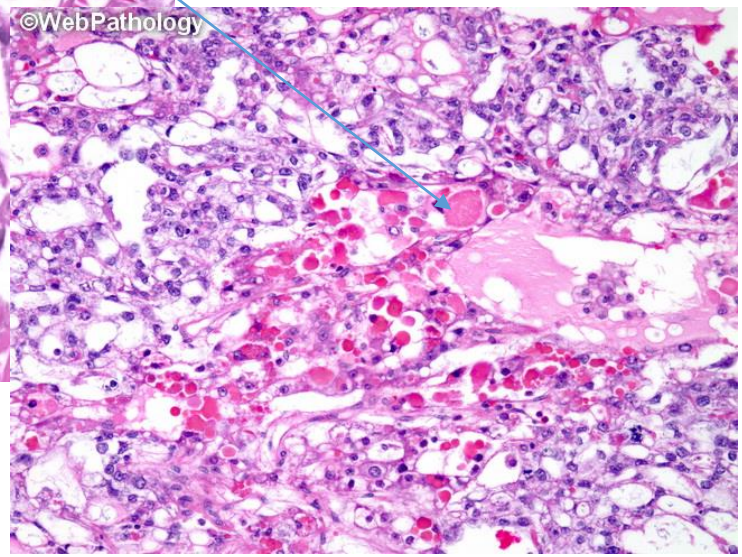


YOLK-SACK TUMOR (Postpubertal type)

- Germ cell neoplasm composed of cells / structures reminiscent of embryonic / fetal yolk sac, allantois and extraembryonal mesenchyme.
- Pure form exceedingly rare (0.6% of testicular germ cell tumors)
- Almost always part of mixed tumors (44% of nonseminomas)
- Most common primary testicular neoplasm in children younger than 3 years of age- good prognosis
- Remarkable heterogeneity, multiple patterns, often combined glandular, reticular or papillary pattern
- Characteristic pattern: : Schiller-Duval bodies and hyalin globules (intra- and extracytopasm)
- Elevated serum alpha fetoprotein (AFP)

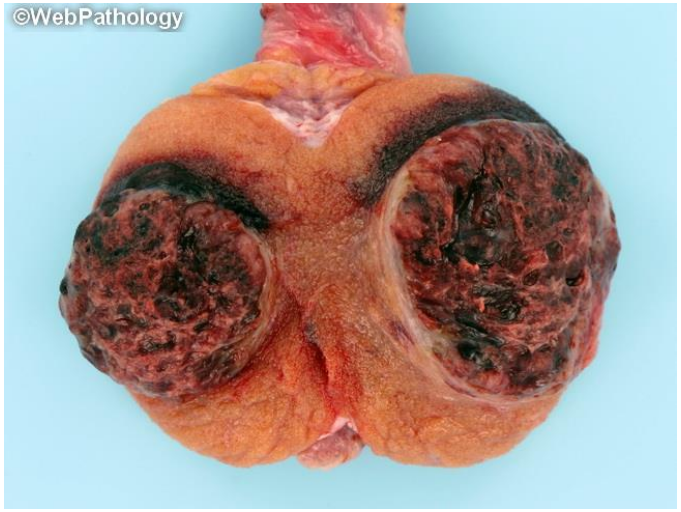


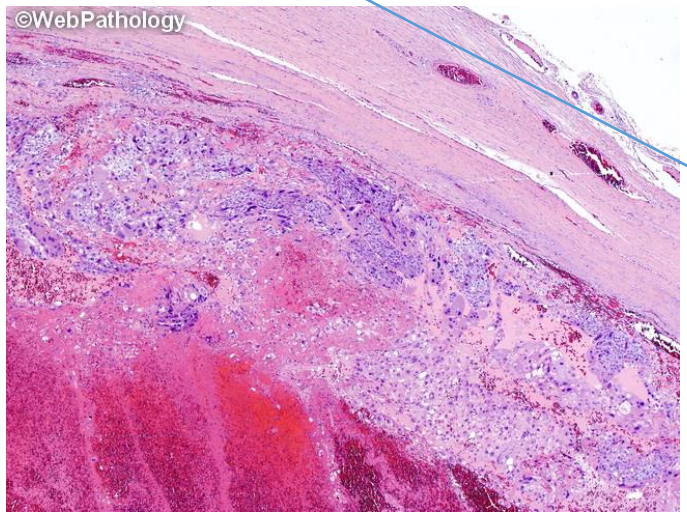


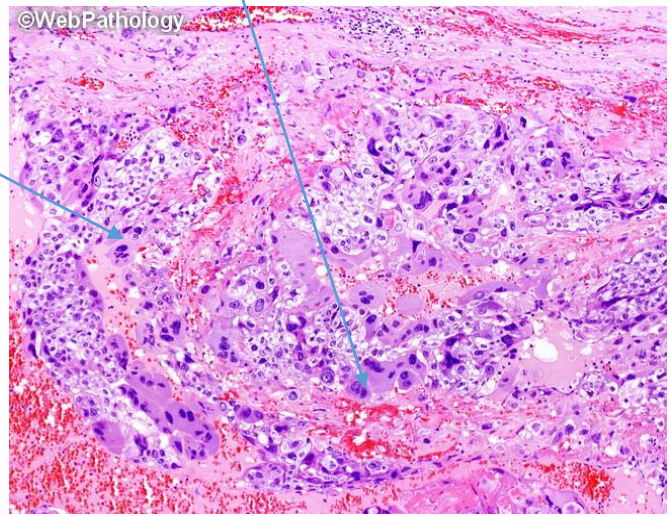


CHORIOCARCINOMA

- Malignant germ cell tumor composed of syncytiotrophoblast, cytotrophoblast and intermediate trophoblast cells
- Poor prognosis if pure, the most malignant GCT
- 0.3 - 1% of germ cell tumors are pure choriocarcinoma but mixed tumors are more common (15%)
- Young men, 25 - 35 years old
- Early hematogenous spread to lungs, liver and brain wih extensive metastatic disease
- Hemorrhagic tumor with necrosis
- Tumor is composed of varying amounts of syncytiotrophoblast cells: large multinucleated cells with large irregular nuclei and cytotrophoblast cells: pale cytoplasm with single large nucleus and prominent nucleolus
- High hCG levels (greater than 100,000 mIU/ml) – produced by the syncytiotrophoblasts (gynecomastia)
- Surgery and chemotherapy







TERATOMA

- Tumor originating from germ cells with more than one embryonic germ layer
- Currently accepted categories of teratoma: **Prepubertal and Postpubertal type teratoma**
- Teratoma is second most common germ cell tumor type in pediatrics, after yolk sac tumor
- Postpubertal teratoma more frequent that prepubertal teratoma
- Pure teratomas (5%) are more rare than mixed germ cell tumors
- Infatnts and children: 40 %
  Either category may occur in either age group

I. Associated with germ cell neoplasia in situ (GCNIS) and chromosome 12p amplification

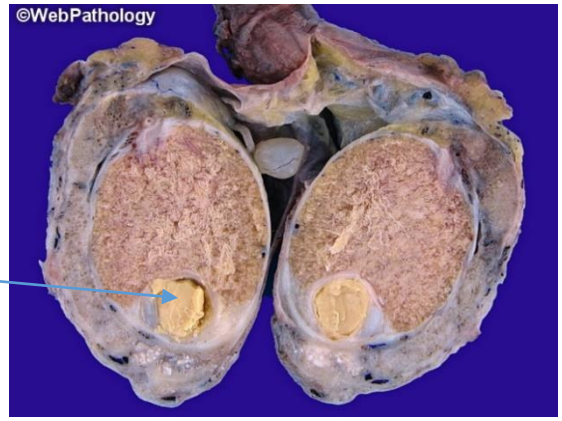
1., Postpubertal type– malignanat germ cell tumor with the presence of the next elements

- Elements are ***mature****:* resembling various tissues within the adult
- Elements are ***immature****:* sharing histologic features with fetal or embryonal tissues (undifferentiated primitive neuroectoderma, primitive chondroid or mesenchimal elements)

2., With a secondary somatic type malignant component: between the mature and immature elemenets a somatic malignancy arising. Sarcoma is most prevalent somatic type malignancy but other tumor types occur, including adenocarcinoma, squamous cell carcinoma

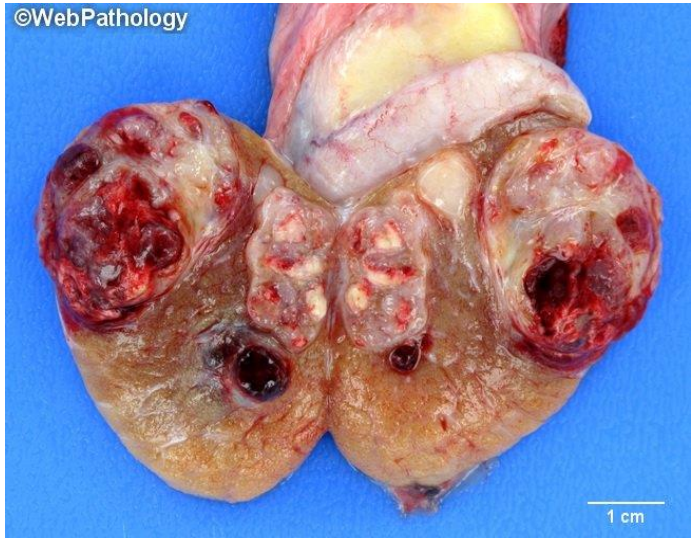
II. NOTassociated with GCNIS or chromosome 12p amplification

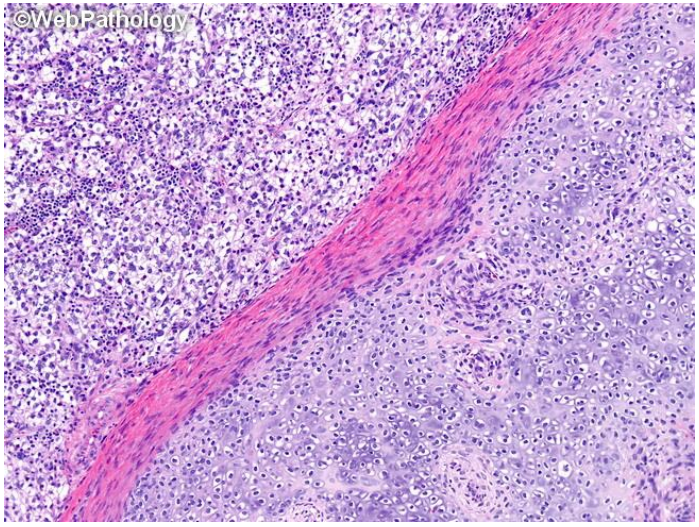
- Prepubertal type teratoma
- Most common is prepuberty, under 6 years old.
- Dermoid cysts are specialized variants
- No cytologic atypia, GCNIS or necrosis; no metastasis or recur.

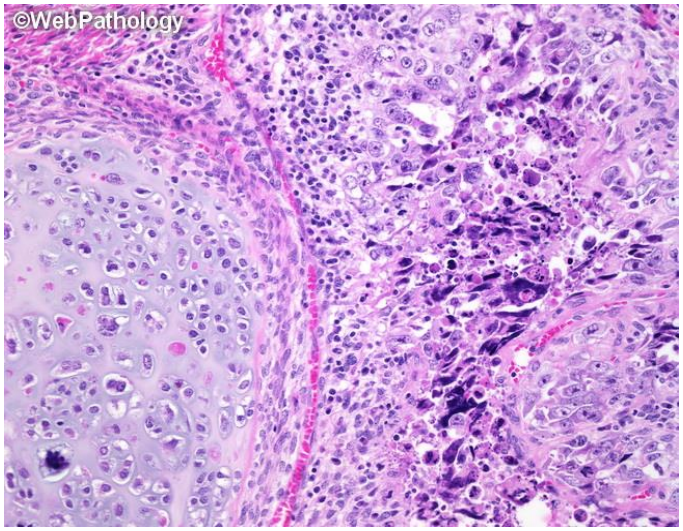


NON-semitomatous germ cell tumors of more than one histological type – mixed germ cell tumors (GCTs)

- Malignat tumors with more than one GCT component
- Accont for the majority (70%) of all non-seminomatous tumors
- Average patient age is 30 years
- Prepubertal patients with mixed GCT are exteremly rare
- Clinically regareded as non-seminoma, regardless of the presence or abscence of a seminoma component.
- Seminoma with syncytiotrophoblast cell are NOT mixed GCTs
- Large tumors, depending on the presence of different components: solid, cystic, necrosis or haemorrhage
- More common combination include: Embrional carcinoma with Teratoma, Seminoma or Yolk-sac tumor
- Serum marker elevation are often present and reflect the tumor components: AFP=YST and HCG=choriocarcinoma
- Any of the component may present at metastatic sites an may becomes dominat element
- Embrional carcinoma, Choriocarcinoma, vascular invasion: higher risk of metastasis
- Presence of Teratoma, Yolk-sac tumor component: lower risk of metastasis

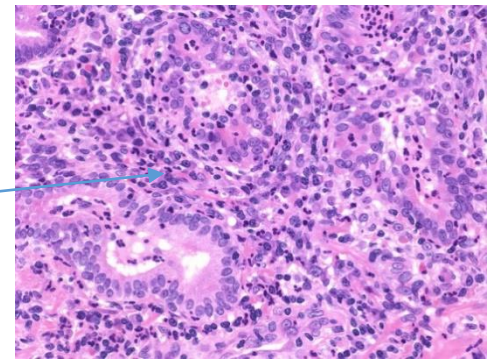




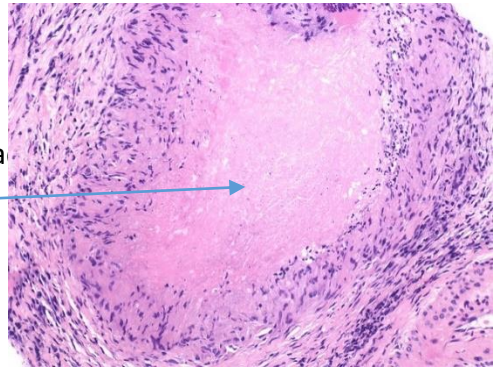


PROSTATE

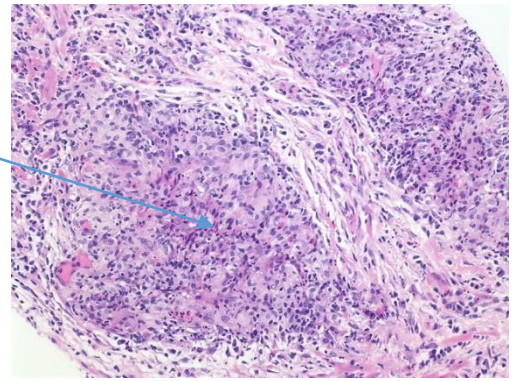
I. Inflammation of the Prostate: *Prostatitis*



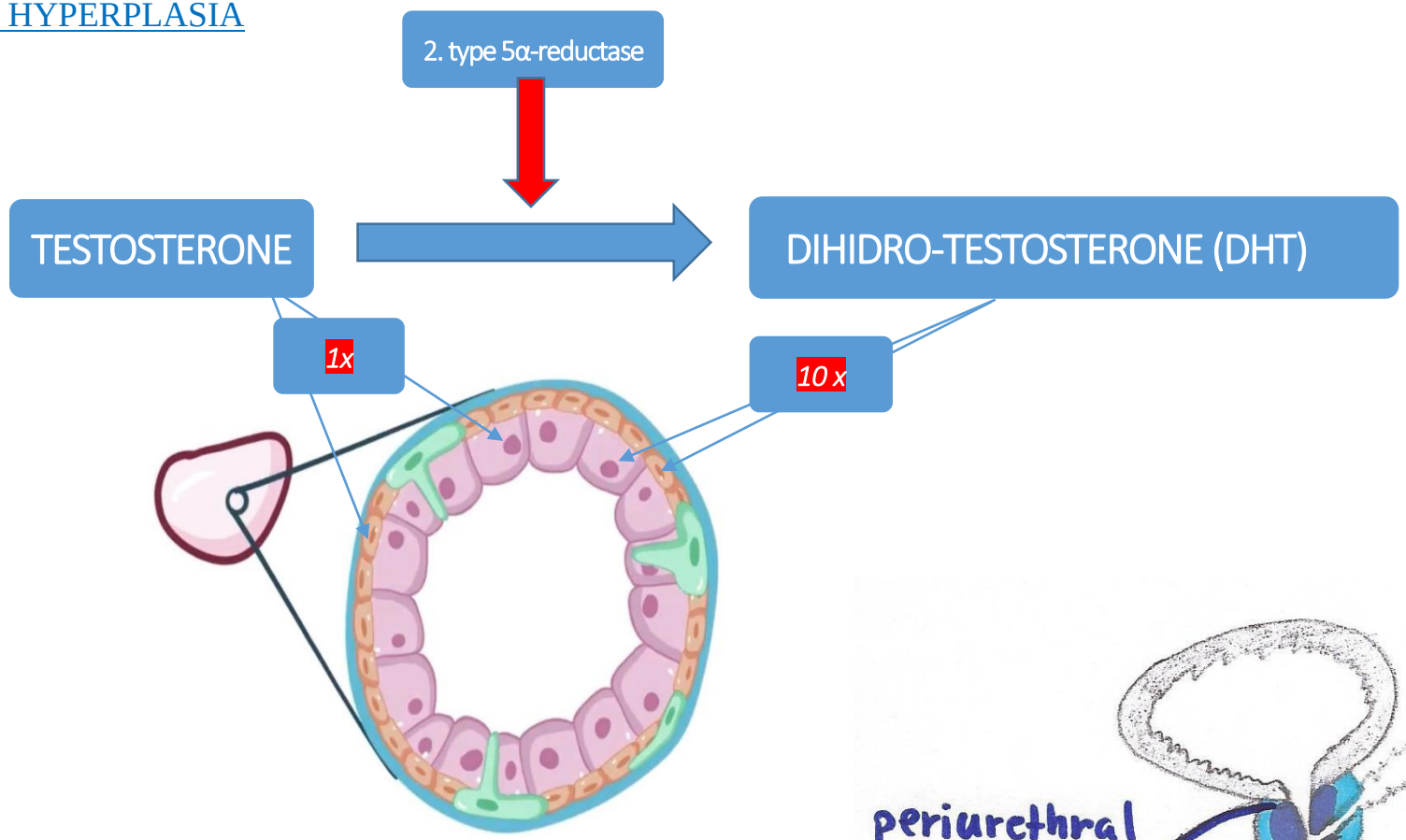
1. Acute bacterial prostatitis (2-5%)
    - due to reflux, also following surgical manipulation or sexually transmitted disease
    - Same bacteria types as urinary tract infections (*E. coli*, gram negative rods, enterococci, staphylococci)
    - dysuria, fever, urosepsis, RDE: painfull, soft BUT contraindicated-case bacteriemia
    - Histology: granulocyte, abscess
2. Chronic bacterial prostatitis (2-5%)
    - uropathogens – may behind unknown infective focus
    - Often have history of urinary tract infection by same organism
    - Symptoms of low back pain, dysuria, perineal and suprapubic discomfort
    - recurrent urinary tract infections bracketed by asymptomatic periods
3. Chronic granulomatosus prostatitis
    - non specific (non-necrotizing) – reactive: fluids that leak into tissue from ruptured prostatic ducts and a
        - Differentialdiagnostic problem: histology: Tb, clinical: prostate carcinoma
    - specific (necrotizing) granulomatosus – TB
        - rare miliary dissemination
        - installation *bacillus Clamette-Guerin* (BCG)
        - Fungal – immuncompromised host

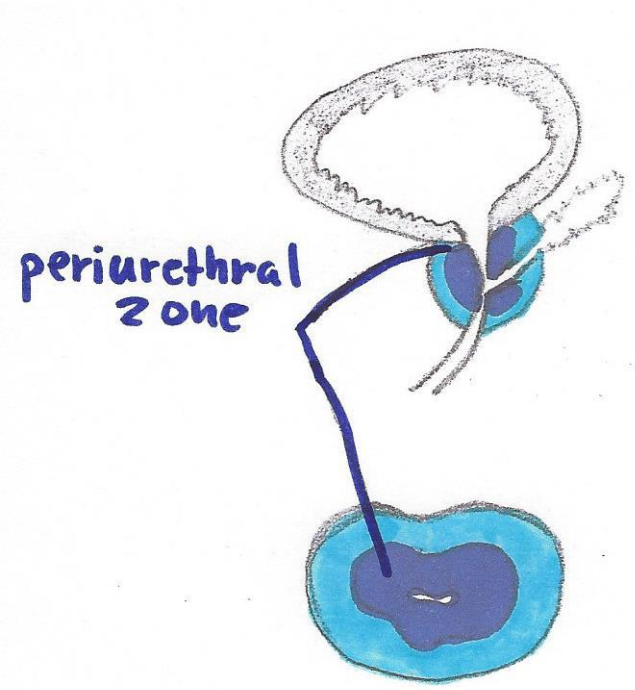


4. Chronic pelvic pain syndrome (90-95%)
    - no pathogen, but local symptoms
    - Diagnosis of exclusion: collect the urine and the prostate secretion befoe, under and after RDE
5. Symptomless inflammatory prostatitis
    - no pathogens, only leukocytes in the serum

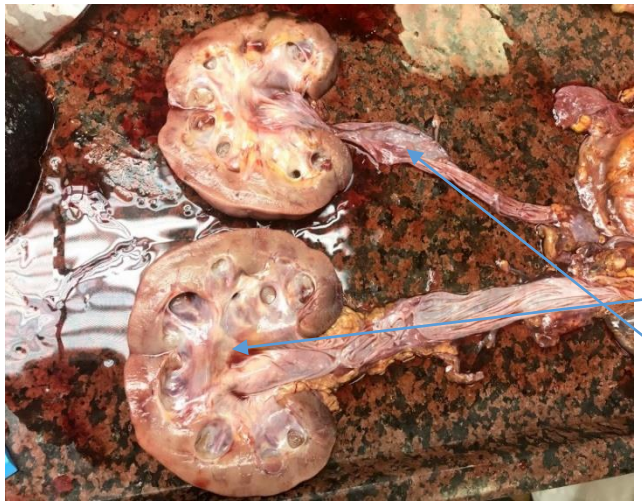


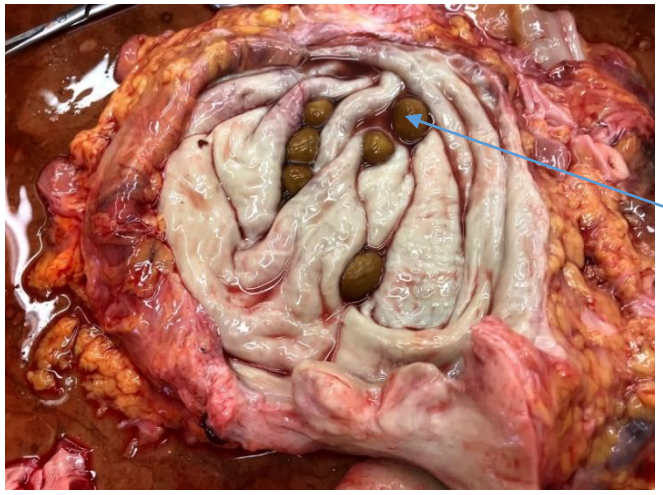
II. BENIGNUS PROSTATIC HYPERPLASIA

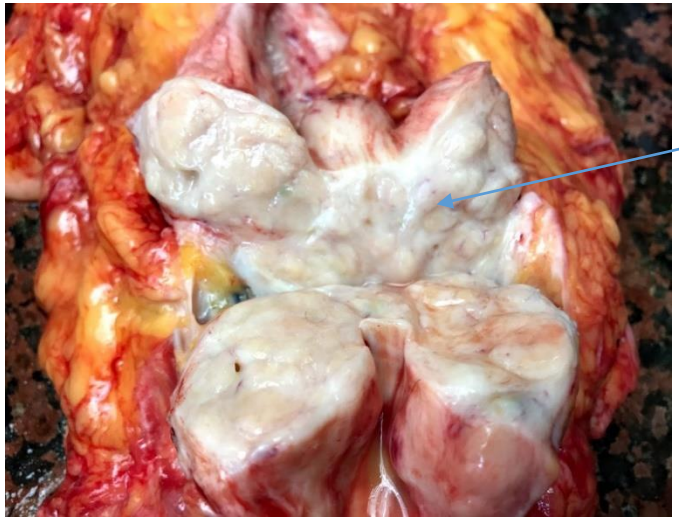


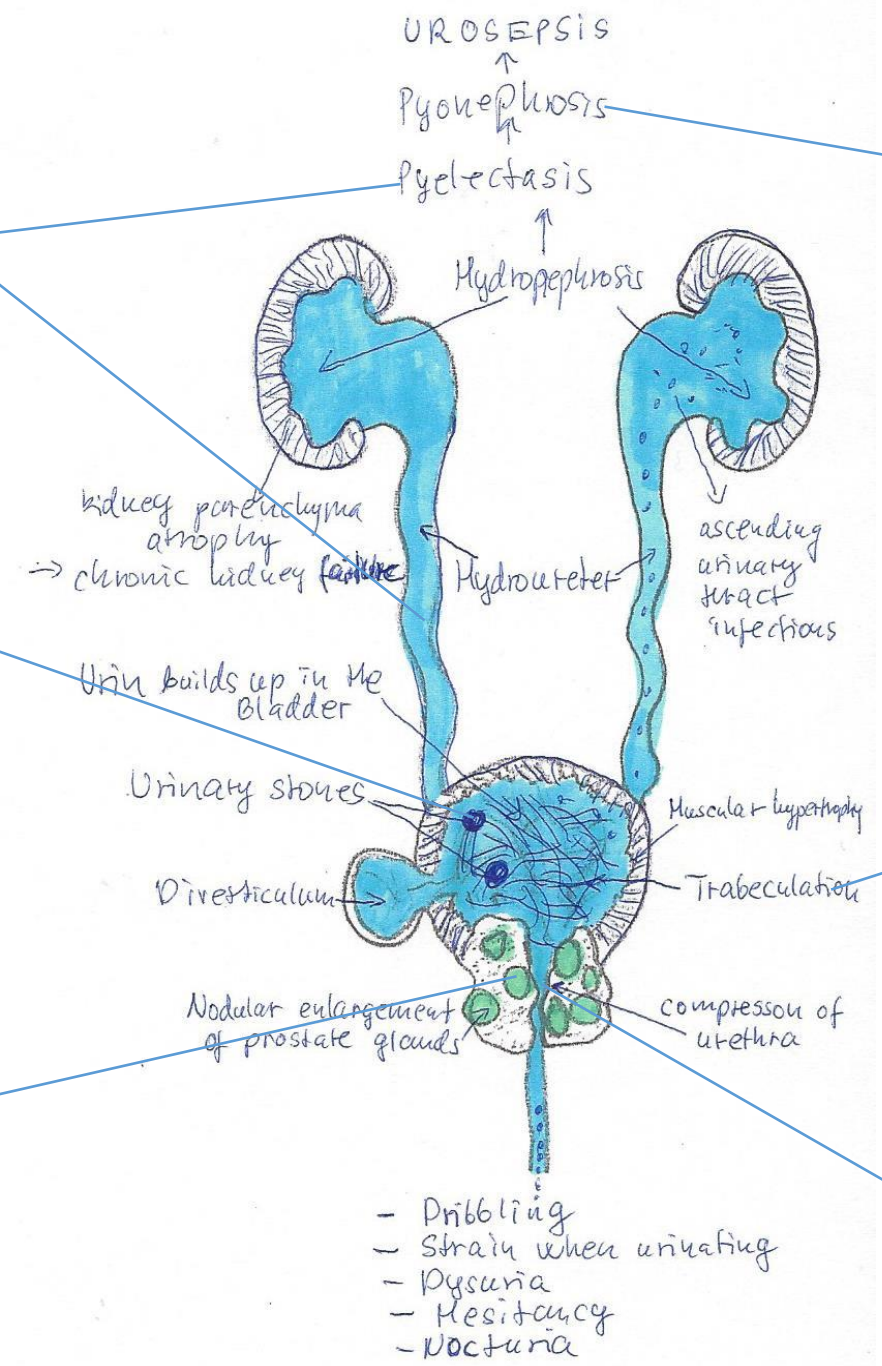


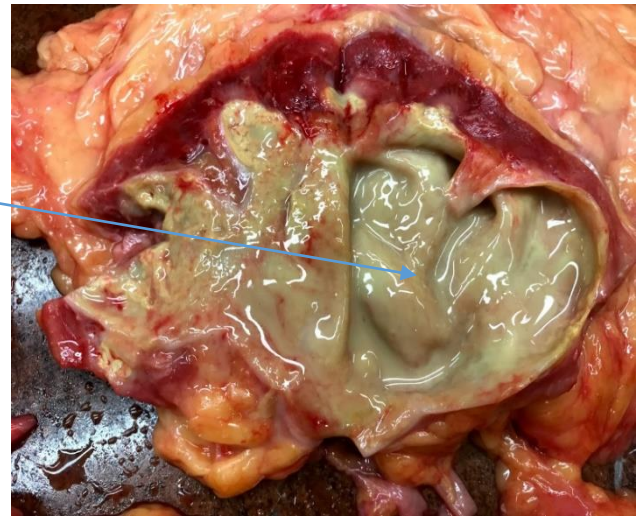
- Basalis cells and luminal cells are androgendependent
- Requires intact testes - Testosteron
- Prostate stromal cells produce **2. type 5α-reductase** (converts testosterone to DHT)
- DHT, 10x more potent than testosterone because it dissociates from receptor more slowly
- T, DHT Bind nuclear androgen receptors in stromal and epithelial cells, causing growth factor activation
- Result: Hyperplasia of glandular and stromal tissue with papillary buds, infoldings and cysts
- Periurethral (transitional zone) nodules may compress urethra and cause obstructive symptoms
- Estradiol, increased in aging men, may also increase androgen receptors
- After 30 years 1 % less Testosterone is produced per year, BUT
- Activity of **2. type 5α-reductase,** increased in aging men: increased DHT!

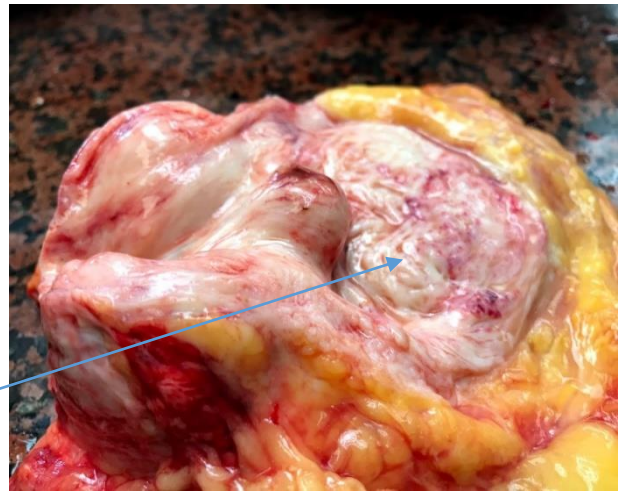


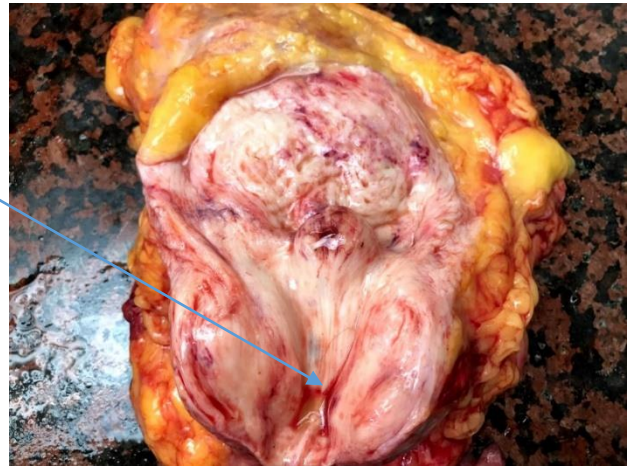





UROSEPSIS
Pyonephrosis
Pyelectasis
Hydronephrosis
kidney parenchyma atrophy
→ chronic kidney failure
Hydroureter
ascending urinary tract infections
Urin builds up in the bladder
Urinary stones
Muscular hypertrophy
Trabeculation
Diverticulum
Nodular enlargement of prostate glands
compression of urethra
- Dribbling
- Strain when urinating
- Dysuria
- Hesitancy
- Noctura

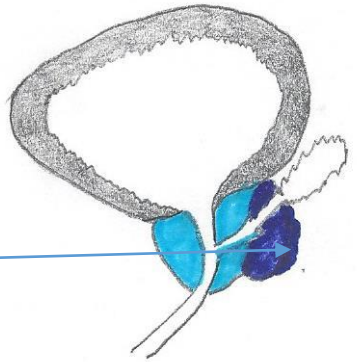


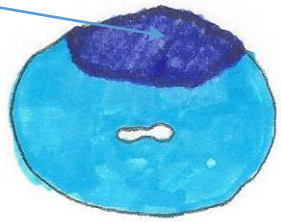




III. CARCINOMA OF THE PROSTATE

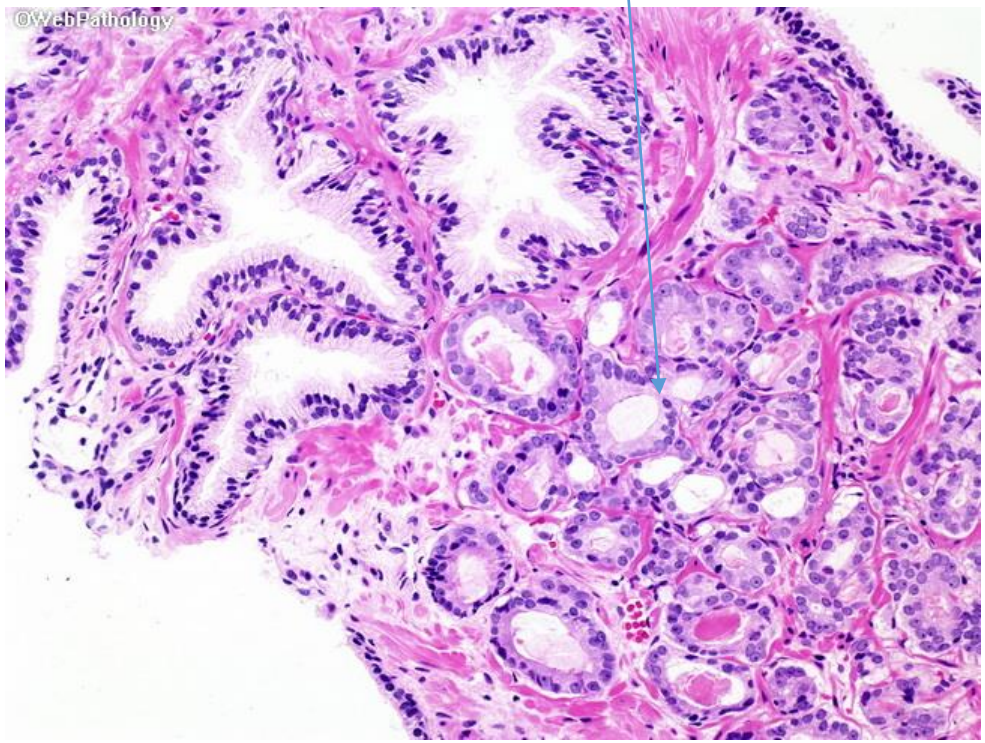
- 99% with clinical disease are age 50+
- 95% of prostate cancer is acinar type adenocarcinoma
- 70% arises from peripheral zone (posterior and lateral)
- 95% subcapsular localisation

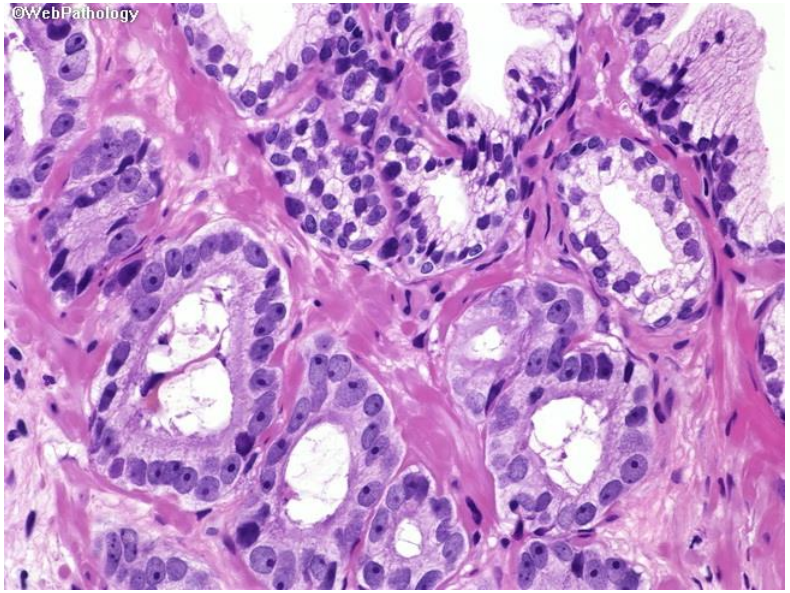




Terminology

Latent carcinoma: during the autopsy procedure
Incidental carcinoma: in the samples of TUR due to BPH
Occult carcinoma: clinical metastatic symtops
Clinincal carcinoma: DRE+biopsy





Epidemology

I. Endocrine

- Androgens are of cental importance: somehow provide the soil, the cellular context within a cancer develops

II. Genetic

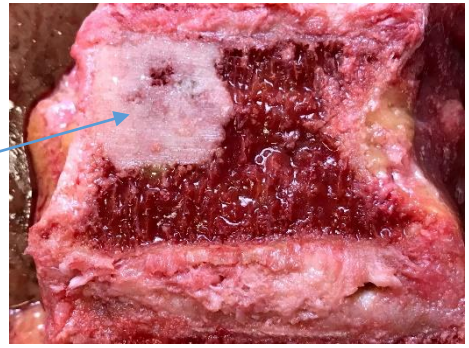
- Heredity: increased risk among first-degree relatives of patients with prostate cancer
- Clinical disease is rare in Asians (3 - 4 / 100,000) vs Higher rates in Scandinavians and African-Americans (50-60/100.000)
- Acquired genetic aberrations, somatic mutations
  - African-Americans: gene mutation in 8q24 chromosome region close to MYC onkogene
  - US whites: 1q24-q24 is a propens locus
  - Gene rearrangement: fusion genes consisting of the androgen regulated promoter of the TMPRSS2 gene and the coding sequence of ETS family transcription factors: TMPRSS2-ETS fusion gene: found in 40-50% Caucasian prostate cancer
  - Other mutation: loss of function mutation involving the PTEN tumorsupressor gene inacativation which act to enhance oncogene PI3K/AKT signaling, which promotes tumor cell growth and survival.

III. Environmenrtal factors

- not associated with STD, smoking, BPH, maybe diet

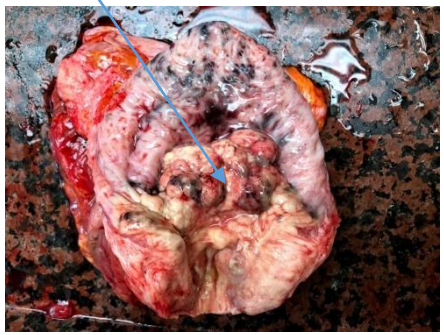
Clinical features

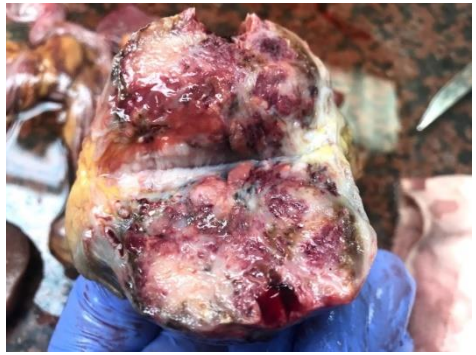
- Early stage: unfortunatley no symptoms: periherial zone is far from uerthra
- If clinical sympromps: same like BPH
- Late stage: anaemia, bone pain – metastasis (osteoblastic)



Tumor extension

- Local invasion (EPE): seminal vesicles, bladder base, later the rectum
- Lymphatic spread: regional lymph nodes
- Haematogenous spread: type v. cava to the lung and retrograde type (Bathson-vein): to lumbosacral spine
- Perineural invasion: presents is cases 85%





Diagnosis

I. Detected by digital rectal exam (DRE) – recommendation that men aged 55-69 be offered biennial (every 2 year) screening

II. Serum prostate-specific antigen (PSA): biomarker for diagnosis and management

- Prostate carcinomas secrete 10x the PSA of normal tissue (normal level: 4 ng/ml.)
- Prostate specific but NOT cancer specific!
- The prostate size (BPH) and the patient age (0.75 ng/ml/year) shall be taken as a correction factor
- If PSA level increases 3 consecutive times significantly: PSA value is not be counted
- Free PSA fraction / plasamprotein-binded PSA ratio (normal: 0,15 ng/ml) decreases in cancer
- Most important: Use PSA to monitor tumor response. Rising PSA level: dissemination

III. Needle biopsy

IV. Transurethral resection (TUR) - either extensive spread by conventional carcinoma or central carcinoma

V. Transrectal ultrasound is standard, CT, MR, radionuclid bone scans for detect osteoblastic metastasis

Prognostic factors

- Pathologic stage, Clinical stage (TNM) and the Grade (Gleason-system)
- Grading of prostate cancer by the **Gleason system** correlates with pathologic stage and prognosis.
- 1966, Dr. Donald Gleason based on glandular architecture and microscopic appearance using a 4X - 10X objective eyepiece, that were shown to predict outcome in prostate cancer. Updated in 2014.
- According to this system, prostate cancers are stratified into **five grades** on the basis of glandular patterns of differentiation.
- Grade 1 represents the most well differentiated tumors, and grade 5 tumors show no glandular differentiation.
- Gleason **score** is the sum of the two most prevalent Gleason **grades**: primary and secondary, designated according to separate rules for biopsy and prostatectomy.
- Gleason score of 2 (1+1) excellent prognosis, and the least differentiated tumors merit a score of 10 (5+ 5) poor prognosis.