



GENITOURINARY SYSTEM

SUBJECT : Male genital tract

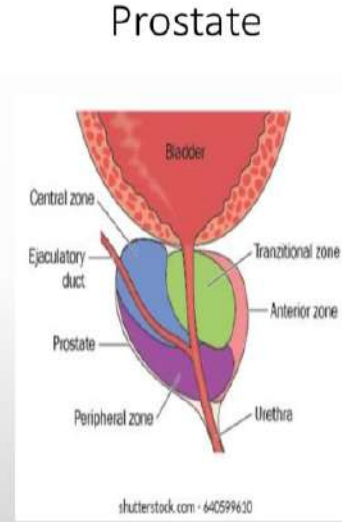
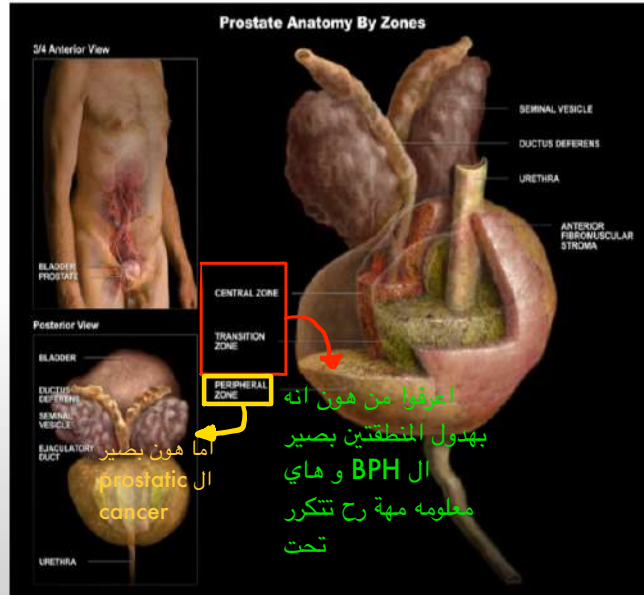
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DONE BY : Fatima Murad

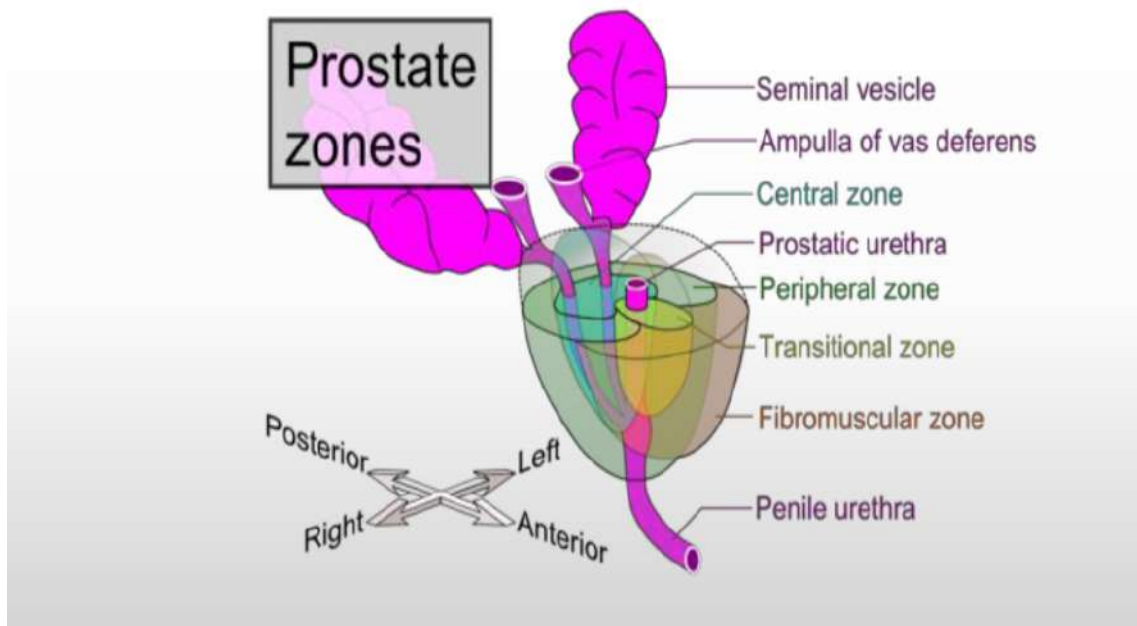
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prostate is a small gland located below the bladder and in front of the rectum in males. Its main function is to produce fluid that nourishes and transports sperm. The size of the prostate can vary with age, and it often becomes enlarged as men get older, leading to common issues like benign prostatic hyperplasia (BPH) or prostate cancer



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كالعادة اقرأوا المقدمة
وانزلوا للسلایدات
لتسهيل المواضيع

Prostatitis overview

Urologic conditions involving inflammation of the prostate

It could be infectious or noninfectious

Risk factors ; bladder outlet obstruction , UTI , catheter , etc...

Prostatitis

Acute bacterial infection

- Caused by ascending UTI
- E.coli → most common
- Symptoms ; Cardinal signs of inflammation
Urgency , frequency, dysuria
- Develop suddenly

Chronic bacterial infection

- Caused by recurrent UTI
- No acute symptoms but there is urgency frequency and dysuria , pain during and after ejaculation ,sexual dysfunction infertility
- Develop gradually

Granulomatous prostatitis

- Benign
- Most cases idiopathic
- Mimics prostate cancer(hard nodular)
Caused by prosthetic duct obstruction
- نوع من انواع chronic ال



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PROSTATE

❖ **Prostatitis** may be acute or chronic.

- **Acute bacterial prostatitis** is caused by the same organisms associated with other acute UTI, particularly **E. coli & other gram-negative rods**.
- Most patients with acute prostatitis have concomitant infection of the urethra & bladder; in which organisms may **reach** the prostate by **direct extension** from the urethra or bladder or, by **vascular channels** from more distant sites.

Morphology

اعراض المعتاده لل acute bacterial infection من حرارة و حتى الم بالبروستات في يكون في حرقه بالبول

Histopathology :Acute prostatitis characterized by congestion, edema & acute neutrophilic inflammatory infiltrate; initially most conspicuous within the prostatic glands, but, as the infection progresses, the inflammatory infiltrate destroys glandular epithelium & extends into the surrounding stroma, resulting in the formation of **microabscesses**.

Grossly

visible abscesses are uncommon but can develop with extensive tissue destruction, e.g. in DM.



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▪ Chronic prostatitis.

(1) may follow clinical episodes of acute prostatitis,

(2) may develop insidiously, without previous episodes of acute infection.

❑ In some cases it is (1) **chronic bacterial prostatitis**, in which there is an increase number of WBCs in prostatic secretions together with bacteria (similar to those responsible for acute bacterial prostatitis) which can be isolated, however...

(2) **most cases are chronic abacterial prostatitis**, with only an increase number of WBCs in prostatic secretions; but bacteriologic findings are negative.

chronic prostatitis features are **nonspecific** & include lymphoid infiltrate, glandular injury, fibroblastic proliferation &, frequently, concomitant acute inflammatory changes.

نوع من انواع ال chronic prostatitis

Granulomatous prostatitis is may be encountered with systemic inflammatory processes (e.g., TB, sarcoidosis, & fungal infections).

It may also occur as a nonspecific reaction to inspissated prostatic secretions & after transurethral resection (TUR) of prostatic tissue.

❑ Clinical Features

• The clinical manifestations of prostatitis include

• **dysuria, urinary frequency, lower back pain, & poorly localized suprapubic or pelvic pain.**

❑ On Per-Rectal (PR) examination, the prostate may be enlarged & tender, particularly in acute prostatitis, in which local symptoms are often accompanied by (fever & leukocytosis) ~ acute اذا كان

❑ **Complications:** Chronic prostatitis, even if asymptomatic, may serve as a reservoir for organisms capable of causing UTI. **Chronic bacterial prostatitis, therefore, is one of the most important causes of recurrent UTI in men.**

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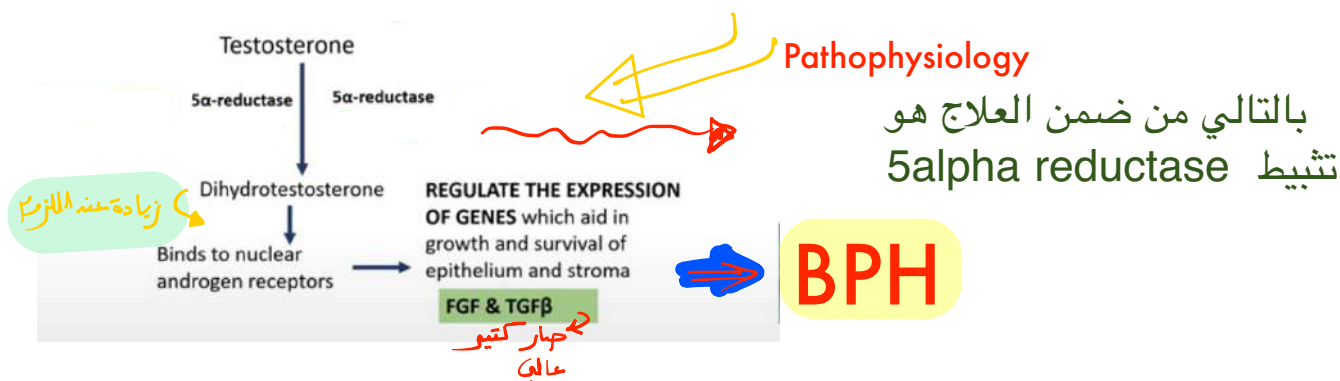
Nodular hyperplasia overview

also known as benign prostatic hyperplasia (BPH), characterized by the **non-cancerous** enlargement of the prostate gland

Mostly affect older men >50 YO and be sure that nodular (senile) hyperplasia is **not** considered as pre-malignant *

BPH can lead to complications such as (sudden inability to urinate), UTI, bladder stones, etc...

Androgen (mainly dihydrotestosterone (DHT)) dependent proliferation of glands and stroma

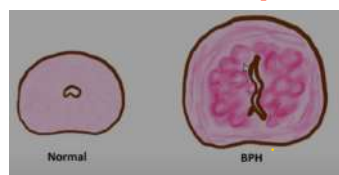


Clinical Presentation:

✦ compression of the prostatic urethra and consequent bladder outlet obstruction.

✦ Urinary frequency nocturia

✦ High risk for developing bacterial infections in bladder and kidney



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Nodular Hyperplasia (NH) of the Prostate (P)

- Normal Prostate consists of glandular & stromal elements surrounding the urethra.
It can be divided into periurethral, central, transitional, & peripheral, zones.
- **Most (70%-80%) carcinomas arise in the peripheral zones; Most NH lesions arise in the central & inner transitional zones of the Prostate.**
Urinary symptoms like recurrence UTI dysuria associated with BPH rather than cancer
- NH is an extremely common abnormality of the P, frequency rises progressively with age reaching 90% by the eighth decade.
- NH is characterized by proliferation of both stromal & epithelial elements, with resultant enlargement of the P gland which in some cases UT obstruction

❖ Pathogenesis: ارجعوا على صفحة ال overview شوفوا المخطط

- although the cause of NH remains incompletely understood, it is clear that **androgens have a central role in its development, as:**
 - (1) NH **does not occur in males castrated before the onset of puberty** or in men with genetic diseases that block androgen activity.
 - (2) **Dihydrotestosterone (DHT)**, an androgen derived from testosterone through the action of 5 α -reductase, & its metabolite, 3 α -androstane-20-one **seems to be major hormonal stimuli for stromal & glandular proliferation in men with NH**
- DHT binds to nuclear androgen receptors stimulating the synthesis of DNA, RNA, GFs, & other cytoplasmic proteins, leading to hyperplasia.
- **This forms the basis for the current use of 5 α -reductase inhibitors in the treatment of symptomatic NH**



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❖ Morphology of NH

- ❑ GROSSLY, NH arises most commonly in the **inner, periurethral glands** of the P, particularly from those that lie above the verumontanum.
- ❑ The P is enlarged from its normal 20 gm to 300 gm or more in severe cases.
- ❑ Prostate C/S shows many **well-circumscribed nodules** that bulge from the cut surface, most pronounced in **the inner(central & transitional) region.**
- ❑ Nodules may be solid or may contain cystic spaces (due to the dilated glandular elements seen histologically).
- ❑ The urethra is usually compressed by the hyperplastic nodules, often to a slit like orifice.

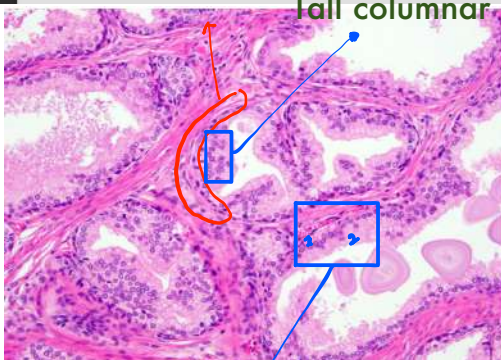
■ Microscopically : the hyperplastic nodules composed of:

- (1) hyperplastic glands lined by characteristic **dual (double) cell population**, a central tall columnar epithelial cells; crowding of which results in the formation of papillary projections & a peripheral layer of flattened **basal cells.**
- The glandular lumina often contain inspissated, proteinaceous secretory material, termed **corpora amylacea.**
- The hyperplastic glands are surrounded by proliferating stromal elements. Some nodules composed predominantly of spindle-shaped stromal cells & connective tissue.

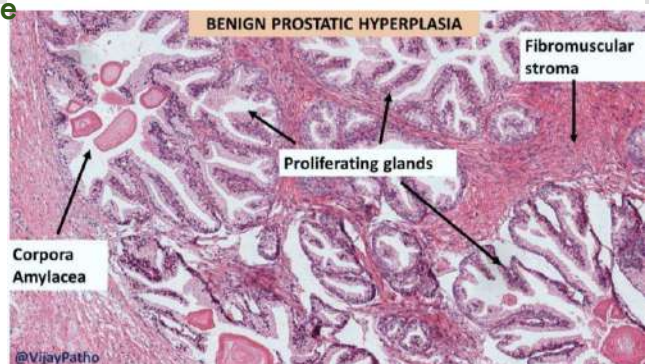
Basal cells

Tall columnar epithelial tissue

Nodular prostatic hyperplasia.



طبقتين

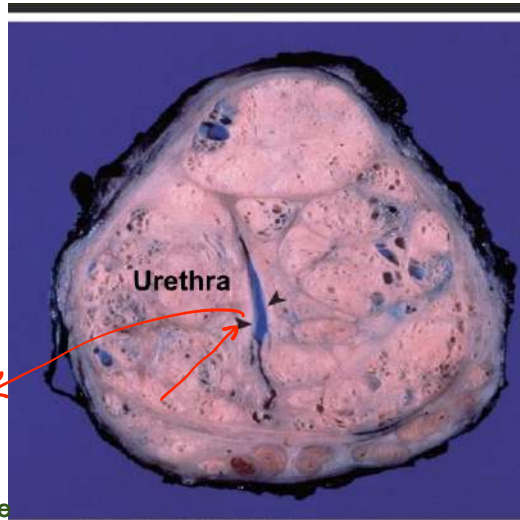


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عدد ال glands زاد و لاحظوا ال papillary projections



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Nodular hyperplasia (NH) of the prostate

Well-defined nodules, with cystic spaces, compress the urethra (arrowheads) into a slitlike lumen.

compression لاحظوا ال

عشان هيك بكون عندهم

urinary symptoms مثل

incomplete evacuation of bladder

Causing dribbling of urine

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11.6 Adenomatous hyperplasia: prostate

Adenomatous hyperplasia: Prostate.

C/S of both lateral lobes of a very nodular prostate.

The creamy-white

nodules vary in size & are separated by delicate

greyish-white septa. ¶ The spongy hyperplastic

nodules have compressed the surrounding gland into a 'capsule' (top).

Benign prostatic hyperplasia

nodules لاحظوا ال



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- Clinical manifestation of P, NH occur in only about 10% of men with the disease.

Diagnosis is based primarily on digital rectal examination and symptoms; cystoscopy, transrectal ultrasonography, urodynamics, or other imaging studies may also be needed. As NH preferentially involves the inner portions of the P, NH most common manifestations are those of lower UT obstruction;

including difficulty in starting the stream of urine (hesitancy) & intermittent interruption of the urinary stream while voiding .

- ❑ Some men may develop complete urinary obstruction, with resultant painful distention of the bladder, if neglected, bilateral hydronephrosis & RF.
- ❑ Urinary urgency, frequency, & nocturia, all indicative of bladder irritation.
- ❑ The combination of chronic obstruction and residual urine in the bladder increase the risk of UTI.
- ❑ Treatment options include 5 alpha-reductase inhibitors, alpha-blockers, tadalafil, and surgery.

→ Treatment of choice in severe cases

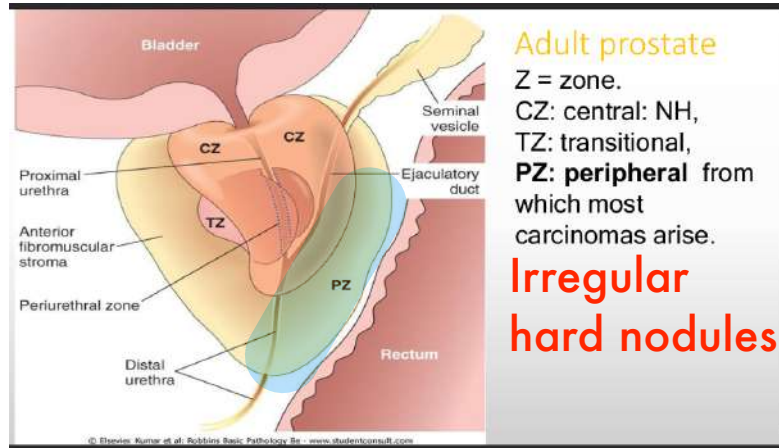
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Prostatic carcinoma overview

اقرأوا الصفحة
كويس و انزلوا
للسلايدات



- prostate cancer, is a malignancy that develops in the cells of the prostate gland (**adenocarcinoma**). It is one of the most common types of cancer in men, especially in older age.
- In general there is **NO** urinary manifestations unless it become bigger and compress the urethra
- Prostate cancer typically **grows slowly** so latent prostatic carcinoma are even more common than the clinical apparent prostatic carcinoma
- One of its **risk factors** is a diet rich in **animal fat**
- individuals with **Lynch syndrome** have an elevated risk of developing prostatic cancer compared to the general population

❗ The commonly used method for P ca histologic grading is the

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Prostatic carcinoma (Pca)

- P ca is the ^{Second} most common visceral cancer in males (in the West), & ranks 2nd (after ca lung) ^{Most common} as the most common cause of cancer-related deaths in men older than 50 y.
- P ca is a disease of older males, with a peak incidence between the ages of 65 & 75 years.
- * Latent (Hidden) P ca are even more common than the clinically apparent P ca, with an overall frequency of more than 50% in men older than 80 years of age. →

* اما بال BPH كانت النسبه اكثر من 90% →

كونه بصير بال
peripheral zone

- Although the cause of Prost ca remains unknown, clinical & experimental observations suggest that hormones, genes, & environment all have a role in its pathogenesis.
- **Hormones:** the androgens contribution to the development of P ca is suggested by: Since testosterone plays a crucial role in the development and growth of the prostate gland and prostate cancer, reducing its levels by castration can inhibit the progression of prostate cancer.
 - (1) Prost ca does not develop in males castrated before ↑ puberty.
 - (2) the fact that the growth of many Prost ca can be inhibited by orchiectomy or by the administration of estrogens such as diethylstilbestrol. → Removal or suppression of testis

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- **Hereditary:** there is ↑ risk of P ca among first-degree relatives of patients with P ca
- **Racial:** Symptomatic Prost ca more common & occurs at an earlier age in American blacks than in whites, Asian and others.
- **Genes.** Much effort is focused on finding Prost ca genes, but no definitive data are available. Overexpression of two ETS family transcription factors (which are also involved in Ewing sarcoma) were implicate in the pathogenesis of Prost ca.
- **Inherited mutations** of the BRCA1 or BRCA2 genes, which are linked to an increased risk of breast and ovarian cancers in some families, can also increase prostate cancer risk in men (especially mutations in BRCA2).
- **Men with Lynch syndrome** (also known as hereditary non-polyposis colorectal cancer, or HNPCC), a condition caused by inherited gene changes, have an increased risk for a number of cancers, including prostate cancer

Environmental influences is suggested by the

- ❖ (1) ↑ frequency of Pca in certain **industrial settings**&
- ❖ (2) significant **geographic** differences in the incidence of the Pca,
- ❖ **Males is immigrating** from low-risk to high-risk areas maintain a lower risk of P ca; the **risk is intermediate** in subsequent generations, in keeping with an environmental influence on Pca development.
- ❖ **Among environmental influences, a diet high in animal fat has been suggested as a risk factor.**

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GROSSLY, 70% to 80% P ca arise in the prostate peripheral zone & hence may be palpable as **irregular hard nodules** by PR examination, & because of this peripheral location, **early Pca is less likely to cause urethral obstruction than is NH.**

- Early **Prost ca** typically appears as hard, ill-defined subcapsular masses, C/S appear **firm, gray-white to yellow** lesions that infiltrate the adjacent gland .

- Locally advanced ca often **infiltrate** the (1) periurethral zones of the prostate, (2) seminal vesicles & (3) may invade bladder wall.

Denonvilliers fascia, the connective tissue layer separating the lower genitourinary structures from the rectum, usually **prevents** growth of the **P ca posteriorly** resulting in **the infrequent Prost ca invasion of the rectum.**

بس مش مستحيل

- **Metastases** to regional pelvic LNs may occur early.

Mostly Acinar type

- **Microscopically:** most **Prost ca** are **adenocarcinomas** exhibiting variable degrees of differentiation.

- The **well differentiated Prost ca** composed of small glands that infiltrate the adjacent stroma in an irregular, haphazard fashion.

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السلاليد بفرق بيت الكانسرو و BPH (سلاليد مفر)

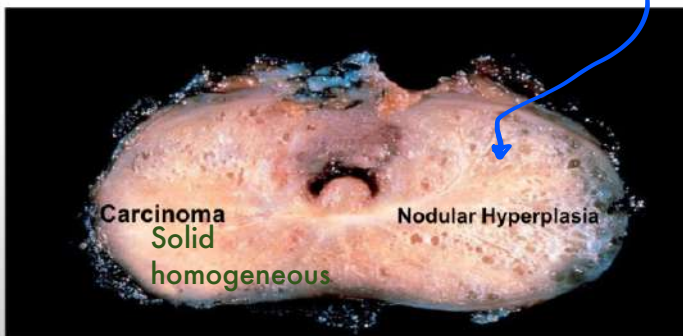
- In contrast to normal & hyperplastic prostate:
 - (1) Due to scant stroma, the glands in **Prost ca** lie back to back & appear to dissect sharply through the stroma,
 - (2) in **Prost ca**, the glands are lined by a **single layer of cuboidal cells with absence of the basal cell layer** seen in normal or NH glands
 - (3) cell nuclei show **conspicuous nucleoli**.

Prominent

Atypia
High N:C

With increase **degrees of anaplasia**, irregular, ragged glandular structures, **papillary or cribriform** epithelium & in extreme cases, **sheets of poorly differentiated cells** are present.

Prostatic adenocarcinoma. Carcinomatous tissue is seen in the lower left as...Subscapular solid whiter cancer in contrast to the Spongy benign peripheral zone on the other side



Adenocarcinoma: prostate. Diffusely enlarged malignant prostate.

Note: (1) absence of nodularity, & (2) yellow-orange color, with yellowish areas of necrosis. Remember: Prostatic carcinoma is hard in consistency on P/R exam.

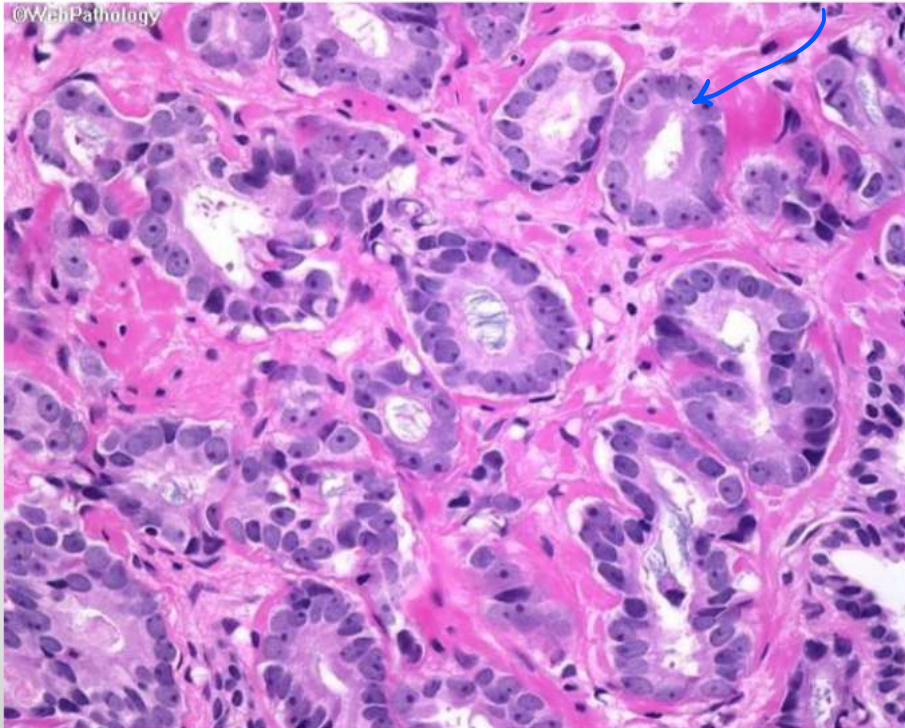


11.10 Adenocarcinoma: prostate



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Fused, cribriform Malignant glands
No stroma in between



- This focus of prostate cancer has all the essential histologic features - small crowded glands lined by a single layer of cells, nuclear enlargement and hyperchromasia, prominent nucleoli, and intraluminal blue mucin. A benign gland is partially visible at the lower right side of the image. Contrast its nuclear size to those of adjacent malignant glands.

Prostatic Intraepithelial Neoplasia (PIN):

is a **non-cancerous** condition characterized by the abnormal growth of prostate gland cells **within** the ducts and acini (small sacs) of the prostate gland. It is classified into two main types: low-grade PIN (LGPIN) and high-grade PIN (HGPIN), based on the degree of cellular abnormalities.

□ Because of its frequent coexistence with infiltrating Pca, **PIN** has been suggested as a probable precursor to P ca.

على عكس ال BPH

PIN (prostatic intraepithelial neoplasia) has been subdivided into **high- & low-grade patterns**, depending on the degree of atypia.

□ Importantly, **high-grade PIN** shares **molecular changes with invasive Pca**, supporting the argument that **PIN** is an intermediate between normal & frankly malignant P tissue.

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□ Clinically, **Prost ca** is often clinically:

(1) silent, particularly during their early stages.

10% of localized Prost ca are discovered unexpectedly, during histologic examination of P tissue removed for NH, while in autopsy studies, the incidence approaches **30%** in men between 30 and 40y.

- As most Prost ca begin in the peripheral regions of the prostate, they may be discovered during routine PR exam.

(2) Extensive disease may produce "**prostatism**", i.e., local discomfort & evidence of lower **UT obstruction**, & with hard, fixed prostate on PR examination.

(3) Regrettably, an uncommon mode of presentation is evidence of **metastases**.

Distraction in bones

- Bone metastases, particularly to the axial skeleton, are common & may cause either **osteolytic** or, more commonly, **osteoblastic** presence of which in an older male is strongly suggestive of advanced P ca) lesions.

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High-grade Prostate Adenocarcinoma (PAC) is an aggressive cancer arising from the

High-grade Urothelial Carcinoma (UC) originates from the urothelial cells lining the urinary bladder and can invade neighboring structures, such as the prostate gland.

distinguishing between these two types of cancer based on their pathological features (as seen under a microscope) can be challenging so we turn to markers

- The pathologic distinction between high-grade prostate adenocarcinoma (PAC) involving the urinary bladder and high-grade urothelial carcinoma (UC) infiltrating the prostate can be difficult. However, making this distinction is clinically important because of the different treatment modalities for these two entities. ازا طلعت +ve معناها النسيج جاي من البروستات رايح للمثانة (ve PAC+)
- **Prostatic and urothelial markers, including PSA, NKX3.1, + AMACAR, p63, thrombomodulin, GATA3 and High molecular weight cytokeratin are very useful for differentiating PAC from UC.** +ve UC النسيج جاي من المثانة رايح باتجاه
- The optimal combination of prostatic and urothelial markers could improve the ability to differentiate PAC from UC pathologically.



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Not specific cause we can't find it in NH and prostatitis

- ❖ Many prostate cancers are detected on the basis of elevated plasmatic levels of **prostate-specific antigen (PSA > 4 ng/mL)**, **glycoprotein normally expressed by prostate tissue**.
- ❖ However, because men without cancer have also been found with elevated **PSA**, **a tissue biopsy** is the standard of care to confirm cancer's presence.


- Prostate-specific antigen (PSA) and prostate acid phosphatase (PAP) have been known to assist in verifying the prostatic lineage in cases of metastatic carcinoma of unknown origin. However, in poorly differentiated carcinomas, the sensitivities of PSA and PAP decrease.
- PSA is a proteolytic enzyme produced by both normal & neoplastic prostatic epithelium. Assay of serum levels of prostate-specific antigen (PSA) has gained widespread use in the diagnosis of early P ca.
- Traditionally, a serum PSA level of 4.0 ng/L has been used as the upper normal limit.

- When doctors encounter metastatic carcinoma with an unknown origin, they may test for PSA and PAP levels in the blood. If PSA and/or PAP levels are elevated, it suggests that the cancer may have originated in the prostate gland.
- However, in cases where the cancer cells are poorly differentiated, the sensitivity of PSA and PAP tests decreases. This means that PSA and PAP may not accurately reflect the presence of prostate cancer in these cases.

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- PSA diagnostic value is enhanced considerably, however, when it is used in conjunction with other procedures, such as **(1) PR examination, (2) transrectal sonography, & (3) needle biopsy**.  مثل ما حكينا انها most reliable to confirm
- In contrast to its limitations as a diagnostic screening test, serum PSA concentration is of great value **in monitoring** patients after treatment for P ca, **with rising levels after ablative therapy indicative of recurrence and/or the development of metastases**



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Table 18-3 TNM Staging of Prostatic Adenocarcinoma:

T1-Clinically Inapparent Lesion By Palpation/Imaging Studies.

T1a -Involvement of $\leq 5\%$ of resected tissue

T1b -Involvement of $>5\%$ of resected tissue

T1c -**Ca present on needle biopsy**(following elevated PSA)

T2-Palpable Or Visible Cancer Confined To Prostate

T2a -Involvement of $\leq 50\%$ of one lobe

T2b -Involvement of $>50\%$ of one lobe, but unilateral

T2c -Involvement of both lobes

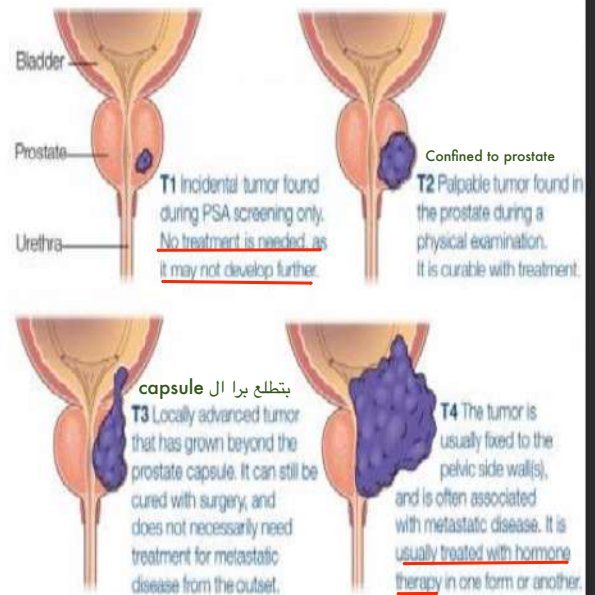
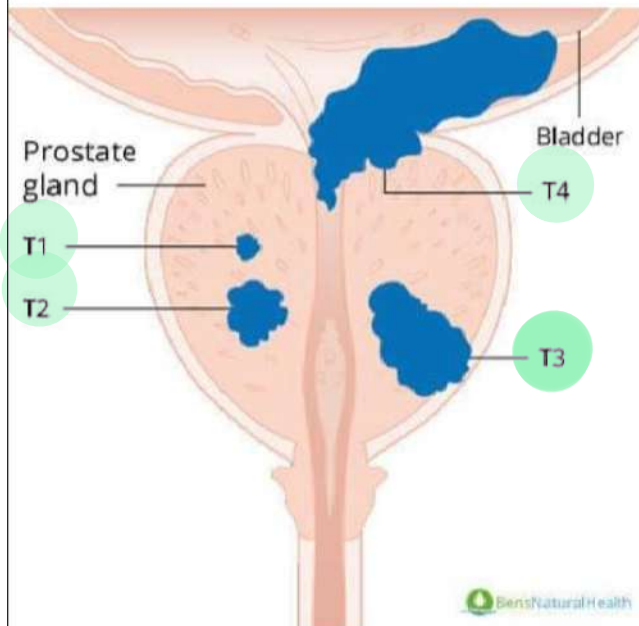
T3-Local Extraprostatic Extension

T3a-Extracapsular extension

*T3b-Seminal vesical invasion ~~١٣-١٤~~

T4-Invasion of Contiguous Organs And/Or Supporting Structures Including Bladder Neck, Rectum, External Sphincter, Levator Muscles, Or Pelvic Floor

Prostatic cancer stages



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Status of Regional Lymph Nodes (N)

N0 -No Regional LN Metastases N1

-Metastasis In Regional LN

Distant Metastases (M)

M0 -No Distant Metastases

M1 -Distant metastases present

- ❑ Anatomic staging of **Pca** (by clinical examination, surgical exploration, radiographic imaging techniques) & in some systems, & the histologic **grade** of the T & levels of T markers has an important role in the evaluation & treatment of Pca & correlate well with prognosis.

ال treatment ما بهم الدكتور كثير

- ❖ Prostatic ca is treated with various combinations of **surgery, radiation therapy, & hormonal** manipulations.
- ❖ Localized disease is usually treated with **surgery, external-beam, or internal radioactive seeds radiation therapy**.
- ❖ **Hormonal therapy** has a central role in the treatment of advanced ca. Specifically, most **Pca are androgen sensitive** & are inhibited to some degree by androgen ablation, & therefore surgical or **pharmacologic castration, estrogens, & androgen receptor-blocking agents** have all been used to control the growth of disseminated Prost ca.
- ❖ **Prognosis: 90% of patients with stage T1 or T2 lesions survive 10 years or longer. The outlook for patients with disseminated disease remains poor.**

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Question 4

A 70-year-old healthy man has a routine check-up. On physical examination there is a firm nodule palpable in the prostate via digital rectal examination. A magnetic resonance imaging scan confirms the presence and location of a posterior 0.4 cm nodule. Prostate biopsies are performed and on microscopic examination show small, crowded glands containing cells with prominent nucleoli within the nuclei. Which of the following is the most likely diagnosis?

- A Adenocarcinoma
- B Nodular hyperplasia
- C Chronic prostatitis
- D Urothelial carcinoma
- E Recent infarction

Answer

(A) CORRECT. Such a nodule at that age strongly suggests carcinoma. Most carcinomas of the prostate arise in the posterior portion of the gland where they can be palpated on digital rectal examination. Microscopically, prostatic adenocarcinomas have irregular glands without intervening stroma. Large nucleoli are a characteristic microscopic feature.

Question 12

A 77-year-old man has a routine check-up by his physician. The only physical examination finding is slight nodularity of his prostate on digital rectal examination. Laboratory studies show a serum prostate specific antigen of 6 ng/mL. A prostate biopsy is performed and on microscopic examination shows prostatic intraepithelial neoplasia (PIN). Which of the following is the best medical care option to offer this man?

- A Radical prostatectomy
- B Multiagent chemotherapy
- C Transurethral prostate resection
- D Monitoring PSA levels
- E Nothing

Answer

(C) CORRECT. Most prostatic adenocarcinomas arise in the peripheral zone posteriorly where they can potentially be palpated by digital rectal examination.

Answer

(D) CORRECT. PIN is a potential precursor of prostatic adenocarcinoma, but by itself does not warrant therapy.

Question 27

A pathologic study is performed in men ranging from 50 to 100 years of age who had serum prostate specific antigen levels above 15 ng/mL and who underwent prostatectomy following biopsies in which there was adenocarcinoma on microscopic examination. The resected prostates were examined pathologically and the sites of the adenocarcinomas mapped within the prostate. In which of the following regions of the prostate are these adenocarcinomas most likely to arise?

- A Anterior fibromuscular stroma
- B Central zone
- C Peripheral zone
- D Periurethral zone
- E Transitional zone

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Question 22

A 55-year-old man has experienced pain with urination for the past week. On physical examination his prostate is slightly enlarged and mildly tender to palpation on digital rectal examination. His temperature is 37.5°C. Laboratory studies show his WBC count is 12,910/microliter. Urine culture grows >100,000/mL *Escherichia coli*. His serum prostate specific antigen is 7 ng/mL. He receives antibiotic therapy and improves. This condition recurs 5 times in the next 6 months. Which of the following diseases is he most likely to have?

- A Nodular prostatic hyperplasia
- B Prostatic adenocarcinoma
- C Chronic bacterial prostatitis
- D Urothelial carcinoma

Question 23

A 95-year-old man has had difficulty with urination for the past 15 years. On examination his prostate is diffusely enlarged. A transurethral resection is performed. On microscopic examination there is glandular hyperplasia and a focus of grade 1,2 adenocarcinoma. Which of the following is the next most appropriate treatment plan for this man?

- A Chemotherapy
- B Alpha blocker therapy
- C Radiotherapy
- D Anti-androgen therapy
- E No further therapy

Answer

(C) CORRECT. Chronic bacterial prostatitis should be considered in men who have a history of recurrent bacteriuria. A chronically infected prostate can serve as the source of pathogens for recurrent UTIs. A pattern of relapsing UTIs in a middle-aged man strongly suggests chronic bacterial prostatitis. *E. coli* is a typical organism associated with urinary tract infection. The PSA can be slightly elevated with prostatic inflammation.

Answer

(E) CORRECT. A Gleason 1,2 adenocarcinoma is so low grade that it is unlikely to progress. At least half of men his age probably have a focus of prostatic adenocarcinoma.

Question 31

A double blind study is conducted involving men who have been symptomatic from urinary frequency and hesitancy for 5 or more years. One group men receive a pharmacologic agent designed to reduce the synthesis of dihydrotestosterone in prostatic stromal cells. Another group receives a placebo. The group receiving the drug has a statistically significant decrease in symptoms. Which of the following enzymes is this pharmacologic agent most likely to block?

- A 5-alpha-reductase
- B Aromatase
- C 17-alpha-hydroxylase
- D Desmolase
- E 11-beta-hydroxylase

Answer

(A) CORRECT. Dihydrotestosterone (DHT) is synthesized from circulating testosterone by the action of 5-alpha-reductase type 2. It is DHT which binds to nuclear antigen receptors to stimulate cell growth and proliferation in the prostate.



كل التوفيق

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