



GENITOURINARY SYSTEM

SUBJECT : Pathology

LEC NO. : 4

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GENITOURINARY SYSTEM

اللون الأخضر : شرح الدكتورة

اللون الأحمر : معلومات مفيدة خارجية

الهايلايت الأصفر للأفكار الهامة

الهايلايت الأخضر لأفكار نسأل عنها بالإختبارات

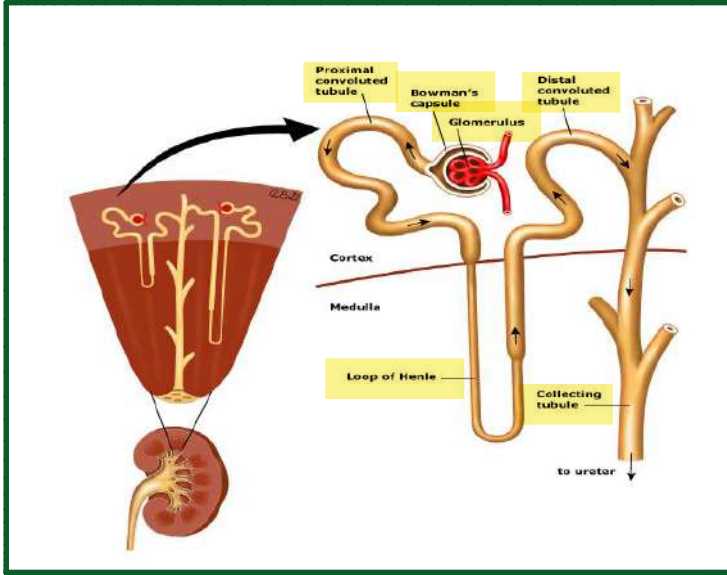
بسم الله نبدأ، لا تنسونا بصلح دعائكم، و الله يقويننا لنقدر نكمل باقي المادة

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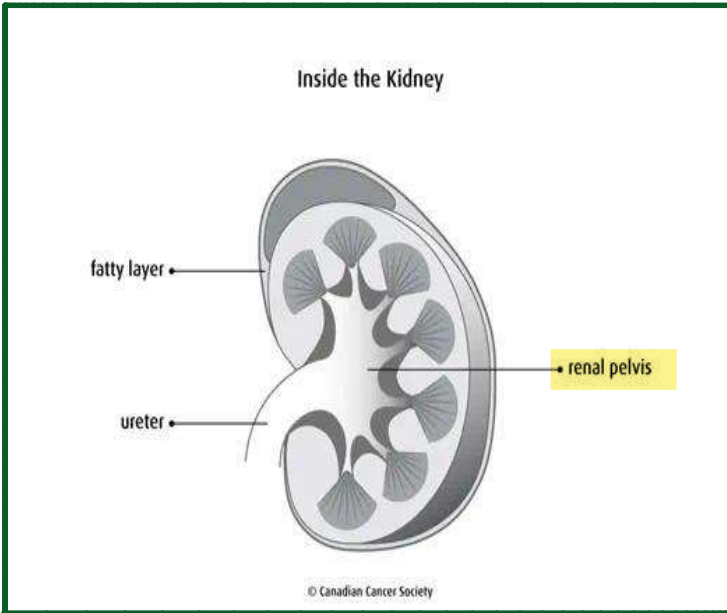


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بعد ما انتهينا من الامراض التي تصيب ال **glomeruli** ومثل ما بنعرف انه الجزء الثاني بعده هو **tubules and interstitium** واكيد بصير فيه امراض زي أي جزء خليني اذكركم بال **anatomy of nephron** وفي كم منطقة لازم تكونوا عارفينها بال **kidney** قبل ما نبدا شرح عشان تفهموا بشكل افضل



- 1- glomeruli
- 2- bowman's capsule
- 3- proximal convoluted tubule
- 4- loop of henle
- 5- distal convoluted tubule
- 6- collecting tubule



Renal pelvis will be involved in **pyelonephritis**

ورح نذكره بهاي المحاضرة

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DISEASES AFFECTING TUBULES (T) & INTERSTITIUM

Most forms of T injury also involve the interstitium,

The disease characterized either :

- (1) inflammatory involvement of the T& interstitium (**interstitial nephritis**)&
- (2) ischemic/ toxic T injury, leading to acute tubular necrosis& acute RF.

Tubulointerstitial Nephritis

▪ Causes :

- 1-bacterial infection.
- 2-drugs.
- 3-metabolic disorders
- 4-physical injury (irradiation).
- 5-immune reactions.

what are the types of disease that can affect tubules and interstitium ?

it could be :

1- inflammation (interstitail nephritis)

ممکن يضم وحدة او اكثر

2- toxic

إذا مريض تسمم او في بعض حالات الانتحار عند اخذ كميات كبيرة من الادوية بصير **toxic injury** او لما ينضرب ضربة قوية بصير **rash injury** لانه بصير عنده **large amount of muscle myoglobine** which lead to injury of the kidney او ممكن يصير **ischemic changes in tubules when there is hemorhage or shock bleeding**

طيب ليه بصير عنا كل هاي الاشياء ؟؟؟
زي ما حكينا ادوية , بكتيريا , مناعة واسباب غيرها

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- **TIN** refers to a group of primary inflammatory diseases of the renal interstitium & Tubule .
 - The G may be spared altogether or affected only late in the course.
 - The **term pyelonephritis** is used for cases of TIN caused by **bacterial infection**, with prominent involvement of the **renal pelvis**
 - The term **interstitial nephritis** is reserved for cases of TIN that are **nonbacterial in origin**, including T injury resulting from **drugs, metabolic disorders (e.g., hypokalemia), physical injury (e.g., irradiation), viral infections, & immune reactions.**
- It can be divided into
- 1- acute
 - 2- chronic categories on the basis of **clinical features & the character of the inflammatory exudate, .**

TIN=TUBULO INTERSTITIAL NEPHRITIS

the main cause of TIN is inflammation and as we said it could happen because of more than one reason

the most common reason is bacterial infection which cause ACUTE PYELNEPHRITIS if there is involvement of renal pelvis

tubules and interstitium are involved but glomeruli is spared except at late level of the disease

اسباب TIN كثيرة اهمها bacterial infection والاسباب الاخرى ممكن تكون drug ,metabolic disorder , radiation ,immune
وطبعاً مثل اي inflammation ممكن تكون acute or chronic

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Urinary tract infections

- UTIs are extremely common clinical problems, which implies involvement of the lower UT (urethritis, cystitis & prostatitis,) or upper UT (pyelonephritis), or both.

1-lower UTI (cystitis, prostatitis, urethritis).

2-upper UTI (pyelonephritis).

Infectious : Acute Pyelonephritis

- Acute Pyelonephritis is a common suppurative inflammation of the kidney & the renal pelvis caused by bacterial infection.
- It is an important manifestation of urinary tract infection (UTI),
- The great majority of cases of upper UTI are associated with lower UTI.
- However, lower UTI may remain localized, without extending to involve the kidney.

the main problem that cause TIN is UTI

حكيينا عن هاد الموضوع بالمايكرو بس رح اشرحلكم ياه سريع
في عنا نوعين من UTI ممكن يكون upper or lower

* upper UTI involve renal pelvis : pyelonephritis

* lower UTI involve

1- urinary bladder : cyctitis

2- prostate : prostaitis

3-urethra : urethritis

في قاعدة لازم تعرفوها انه ال lower بصير بالاول بعديها upper
يعني Lower UTI هو يلي بنقل ال Infection to upper UTI عشان هيك كل upper UTI بكون مع
lower UTI بس مو شرط يكون lower UTI مع upper

PYELONEPHRITIS:

BACTERIAL INFECTION of renal pelvis and minor calyces cause suppureative inflammation of kidney

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Pathogenesis

- The principal causative organisms are the enteric gram-negative rods. the most common is **Escherichia coli(E coli)**.
- Other organisms are species of **Proteus, Klebsiella, Enterobacter,& Pseudomonas**; these are usually associated with **recurrent infections**,
- especially in persons who undergo UT manipulations (e.g. catheterization & cystoscopy) or have congenital or acquired anomalies of the lower UT.

the main cause of pyelonephritis is E.COLI a gram negative microorganism

recurrent infection ممكن يكون في اسباب اخرى موجودة بالاسلايد مثل pseudomonas وغالبا يكون

يعني يكون immunocompromised او عنده DM

وحتى catheterization ممكن تكون سبب infection لانها بتكون ملوثة بالبكتيريا

Routes of acute pyelonephritis infection

- Bacteria can reach the kidneys by 2 routes:

1- Rarest is hematogenous route, through the bloodstream, results from seeding of the kidneys by bacteria in the course of septicemia or infective endocarditis.

2- Commonest & most important is ascending route by which the bacteria reach the kidney is through ascending from the lower UT....

what are the ways and routes the bacteria can reach to kidney by ??

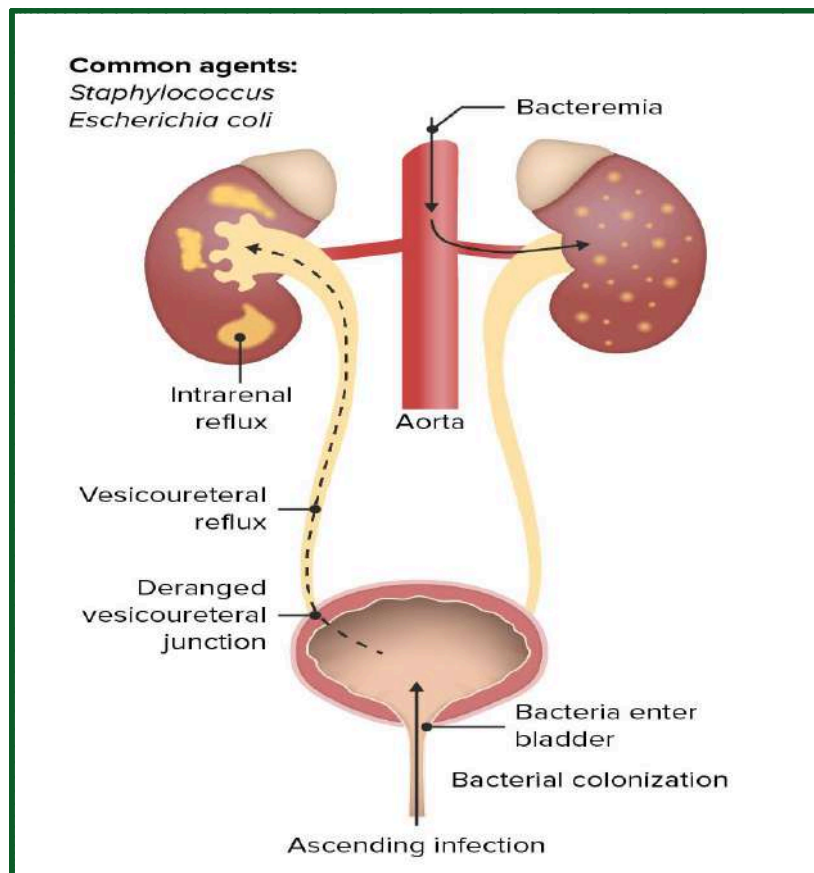
infection في اكثر من طريقة ممكن انها البكتيريا توصل فيها للكلية وتسبب

رح اشرحهم في الاسلايد يلي بعده

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- 1- اول طريقة حتى ينتقل البكتيريا الى الكلية هي **ascending infection** بحيث يتدخل الى ال **bladder** خاصة اذا كان المريض عنده **urethrovesical reflux** يعني **valve** الموجود بين **bladder** و **urethra** is damaged رح تصعد البكتيريا عن طريقه وتوصل للكلية
- 2- لطريقة الثانية بتكون عن طريق الدم لما المريض مثلا يكون عنده **septic foci as pneumonia** or **other hematogenous infection** ممكن انها تنتقل من الدم للكلية
- 3- الطريقة الثالثة بتكون عن طريق القولون لانه كثير قريب من الكلية فلما يكون **infected** ممكن انه يوصل للكلية

- **Pathways of renal infection**
- **Hematogenous** infection results from bacteremic spread. → **Commonest ascending infection**, which results from a combination of urinary bladder infection, vesicoureteral reflux, & intrarenal reflux.

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- **UTI most commonly affects females**, as colonization by enteric bacteria is favored, due to the
 - (I) **close proximity of the urethra to the rectum,**
 - (II) **the short urethra, &**
 - (III) **trauma to the urethra during sexual intercourse facilitate the bacterial entry into the bladder.**
- **Normally**, bladder urine is sterile, as a result of the:
 - (a) **Antimicrobial properties of the bladder mucosa**
 - (b) **flushing action associated with periodic voiding of urine.**
- The bladder **outflow obstruction** or **bladder dysfunction** predispose to UTI.
- Bladder obstruction results in **incomplete emptying** & increase residual volume of urine.
- In the presence of **stasis**, bacteria introduced into the bladder can multiply undisturbed, without being flushed out or destroyed by the bladder wall.

هاي السلايد بتحكي عن معلومات عامة لل UTI
اول اشئ انها بتصيب ال female اكثر لعدة عوامل مرقمين بالسلايد
طيب كيف ممكن تحمي حالها

بالطبيعي ال **urethra is sterile** يعني معقمة ما فيها بكتيريا لانه
1- فيها خاصية انها **antimicrobial**

2- اثناء التبول بصير عنا **flushing** يعني كل البكتيريا بتنزل مع البول عشان هيك لازم نشرب كمية
كبيرة من الماء حتى نتخلص من اكبر كمية من البكتيريا
طيب اذا هي بتحمي حالها من حالها ليه بصير عنا UTI ???

اولا اي **bladder obstruction** سواء بال female مثل الحمل **pregnancy** او **prolapse of urethra** او اذا كان male ممكن يكون عنده **prostatic hyperplasia** وهيك رح يصير
incomplete emptying ومجرى البول رح يصير **narrowed and stas will present** ورح
تتجمع البكتيريا في **bladder** ويسبب UTI

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PATHOGENESIS OF ACUTE PYELONEPHRITIS

- **The 1st step** in the pathogenesis of ascending UTI is **adhesion of bacteria to mucosal surfaces, followed by colonization** of the **distal urethra (& the introitus in females)**
- **in the 2nd step**, the organisms must gain access to the bladder, by expansive growth of the colonies & by **moving against the flow of urine**. This may occur during urethral instrumentation, e.g., catheterization & cystoscopy, which are important predisposing factors in the pathogenesis of UTIs
- **In the 3rd step**, the bacteria from the contaminated bladder urine **ascend along the ureters** to infect the **renal pelvis & parenchyma**.

رح نحكي عن أول و أشهر طريقه لحدوث ال Acute pyelonephritis و هي ascending UTI بحيث انه البكتيريا رح ترتبط بال mucosal Surface وبعدين تتكاثر بل إحليل من بعدها رح تطلع من الإحليل إلى المثانة عكس مجرى البول طبعاً ومن المثانة رح توصل حوض الكلية عن طريق الحالب

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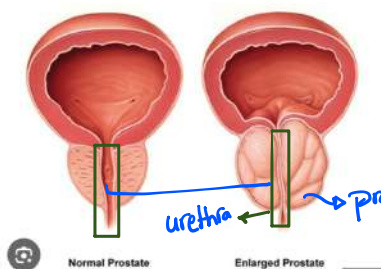


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PATHOGENESIS OF ACUTE PYELONEPHRITIS

- 1 Accordingly, UTI is common among individuals with UT obstruction, as may occur with **benign prostatic hyperplasia & uterine prolapse, & stones.**
- 2 UTI is also in **DM** because of the susceptibility to infection & **Neurogenic** bladder dysfunction, which in turn predisposes to stasis.
- 3 Although **obstruction** is an important predisposing factor in the pathogenesis of ascending infection, it is the... **incompetence of the vesicoureteral orifice** that allows bacteria to ascend the ureter into the pelvis.
- The **normal** ureteral insertion into the bladder is a competent **one-way valve that prevents retrograde flow of urine**, especially during micturition, when the intravesical pressure increase.
- An incompetent vesicoureteral orifice allows the reflux of bladder urine into the ureters, {vesicoureteral reflux = VUR }.

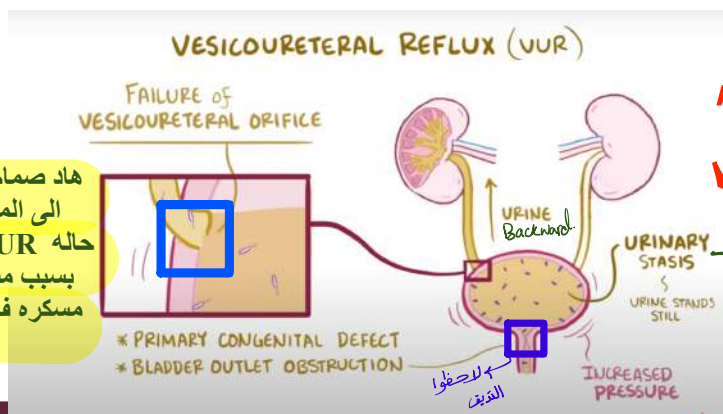
- 1- **VUR** is present in **20% to 40% of young children with UTI**, in which VUR is a **congenital defect** that results in incompetence of the ureter vesical valve.
- 2- **VUR** can also be **acquired** in individuals with a flaccid bladder resulting from **spinal cord injury & with neurogenic bladder dysfunction secondary to DM.**



1 لما يكون الشخص معه تضخم بالبروستات هاد الاشياء رح يضغط على الإحليل مما يؤدي الى

هاد الشيء بخلق بيئة مناسبة لنمو البكتيريا وتؤدي في النهاية إلى التهاب في obstruction the flow of urine ، leading to urinary retention الكلية

2 هلا نحنا بنعرف انه مريض السكري و خاصة بالحالات المتقدمة يكون عنده مشكله بالاعصاب (diabetic neuropathy) و بالتالي الاعصاب اللي بتتحكم بوظيفه ال bladder رح تكون affected و هاد الاشياء رح يار على انقباض المثانة و يؤدي الى urinary retention and incomplete bladder emptying so this will lead to urinary stasis and creating an Excellent environment to bacterial growth



3

هاد صمام يسمح بمرور البول من الحالب الى المثانة باتجاه واحد فقط ولكن في حاله VUR يكون هاد الصمام خرابان انا بسبب مشكله خلقية او بسبب انه المثانة مسكروه ف بتضغط على الصمام و بترخيه

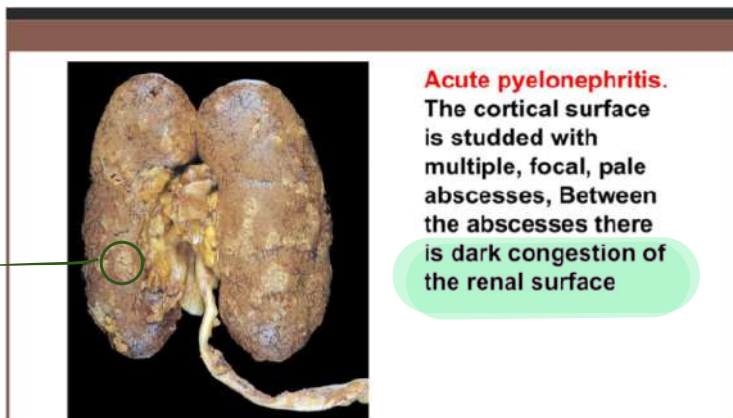
وبالتالي
Infections



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MORPHOLOGY OF ACUTE PYELONEPHRITIS

- Grossly associated with hematogenous route
 - in acute PN, one or both kidneys may be involved. The affected kidney may be normal in size or enlarged.
 - Characteristically, multiple abscesses, raised, discrete, & yellowish, are grossly apparent on the renal surface.
- Mostly associated with ascending route
- Acute Inflammation



MORPHOLOGY OF ACUTE PYELONEPHRITIS

- Microscopically**
- the characteristic histologic feature of acute PN is renal abscess formation, within the renal parenchyma.
- Early, the suppuration is limited to the interstitial tissue, but later the abscesses rupture into tubules, & the masses of intratubular neutrophils extend into the collecting ducts, giving rise to the characteristic WBC (granular) casts found in the urine.
- Typically, the G are not affected.

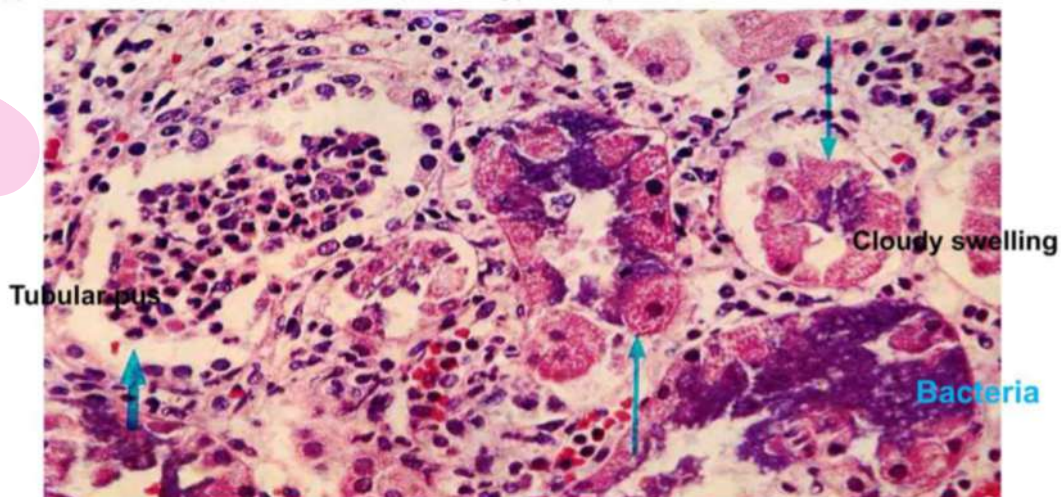
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Acute pyelonephritis: kidney X200.

(1) The interstitial tissue are infiltrated with polymorphs, lymphocytes & plasma cells, (2) some tubules show severe cloudy swelling (thin arrow), in others, tubular cells are necrotic & contain large number of bacteria (stained deep blue), & (3) some tubules are full of pus & lost most of its epithelial lining (thick arrow).



في تجمعات من
neutrophils

- The cut surface of the kidney reveals many small yellowish microabscesses in both cortex and medulla.
- This type of pyelonephritis is most typical for hematogenous dissemination of infection to the kidney, rather than the more typical ascending urinary tract infection.



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PYELONEPHRITIS (PAPILLARY NECROSIS)

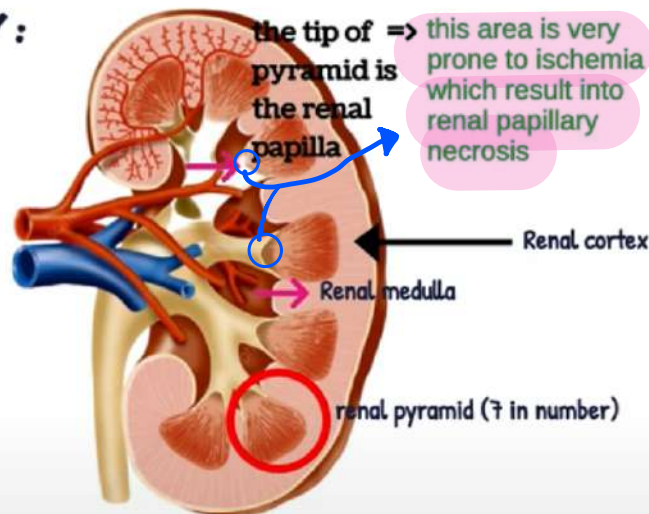
? A second infrequent form of pyelonephritis is necrosis of the renal papillae, known as **Papillary Necrosis**.

? I. This is particularly common among **diabetics** who develop acute pyelonephritis. بنلاقي جزء منها بالبول

? II. May complicate acute pyelonephritis when there is significant **UT obstruction**.

? III. It is also seen with the chronic interstitial nephritis associated with **analgesic abuse**.

THE KIDNEY :



Papillary necrosis is a specific complication of pyelonephritis characterized by the death (necrosis) of the **TIP** renal papillae as a result of severe or recurrent pyelonephritis, as well as other conditions such as diabetes mellitus, sickle cell disease, all these conditions interfere with blood supply

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CAUSES OF PAPILLARY NECROSIS

- ? In terms of cause, almost any condition that involves **ischemia** can lead to renal papillary necrosis.
- ? Pyelonephritis, obstruction of the urogenital tract, sickle cell disease, tuberculosis, cirrhosis of the liver, analgesia/alcohol abuse, renal vein thrombosis, diabetes mellitus, and systemic vasculitis. Often, a patient with renal papillary necrosis will have numerous conditions acting synergistically to bring about the disease.
- ? Analgesic nephropathy is a common cause of renal papillary necrosis (NSAID).

As NSAIDs, when used in excessive amounts or for prolonged periods, can inhibit the production of prostaglandins leading to vasoconstriction and reduce renal blood flow in renal papillae causing necrosis **as well as a analgesics can increase the risk of kidney stones and obstruct the flow of urine and contribute to ischemia and necrosis in these papillae**

PATHOPHYSIOLOGY OF PAPILLARY NECROSIS

- ? This condition is due to ischemia of the **renal papillae**, the portion of the kidney that collects urine from the **nephron**.
- ? The papillae are vulnerable to ischemia as they are supplied by small caliber arteries which are liable to obstruction, necrosis of the papillae results in sloughing into the lumen, causing hematuria.
- ? If the degree of necrosis is substantial post-renal failure may occur, though this is uncommon.

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PAPILLARY NECROSIS

- ❑ Papillary necrosis is a combination of (I) ischemic + (II) suppurative necrosis of the tips of the renal pyramids (renal papillae).
- ❑ The Pathognomonic gross feature of papillary necrosis is sharply defined, gray-white to yellow necrosis of the apical 2/3 of 1,2 or all the pyramids papillae.
- ❑ Microscopically , the papillary tips show ischemic coagulative necrosis, with surrounding neutrophilic infiltrate
- ❑ Symptoms (and signs) consistent with renal papillary necrosis are:
 - ❑ Back pain
 - ❑ Cloudy urine
 - ❑ Tissue pieces (in urine) From tip of papillae
 - ❑ Fever
 - ❑ Painful/frequent urination
 - ❑ Urinary incontinence

Why backpain ?

Necrosis --> inflammation swelling --> irritate surrounding tissues and nerves --> back pain

Why cloudy urine?

Necrotic tissue sloughs off from the renal papilla --> obstruction of urinary flow --> stasis --> stagnant urine --> concentrated and cloudy urine

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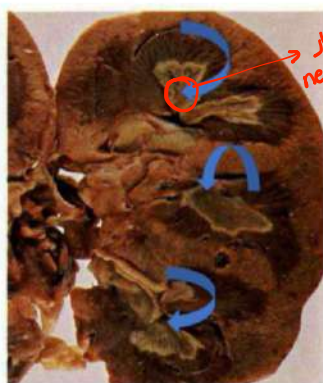


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CLINICALLY

Cardinal signs of infection cuz it's infection

- 1 The onset of uncomplicated acute pyelonephritis is usually **sudden**, with **pain** at the costovertebral angle & systemic evidence of infection (**chills, fever, & malaise**), & indications of bladder & urethral irritation (**dysuria, frequency, & urgency**).
- 2 **Diagnosis** of acute pyelonephritis is **established** by finding **"pyuria & bacteriuria"** by **urinalysis & urine culture**.
Cuz of microabscesses in the kidney *Mostly associated with E. coli*
- 3 The disease is usually **unilateral**, & individuals thus do not develop RF because they still have one unaffected kidney. In cases with predisposing influences, the disease may become **recurrent or chronic, particularly when it is bilateral**.
- 4 The development of papillary necrosis is associated with very poor prognosis. *Mostly with patients with comorbidities like DM or sickle cell anemia*



10.21 Acute pyelonephritis and papillary necrosis

Acute pyelonephritis and papillary necrosis.

★ The distal part of each of three papillae (Arrows) is necrotic, greyish-white & with a congested border.

In papillary necrosis it's unnecessary to develop renal failure if the patient got the treatment



- The pale white areas involving some or all of many renal papillae are areas of papillary necrosis.
- This is an uncommon but severe complication of acute pyelonephritis, particularly in persons with diabetes mellitus. Papillary necrosis may also accompany analgesic nephropathy.

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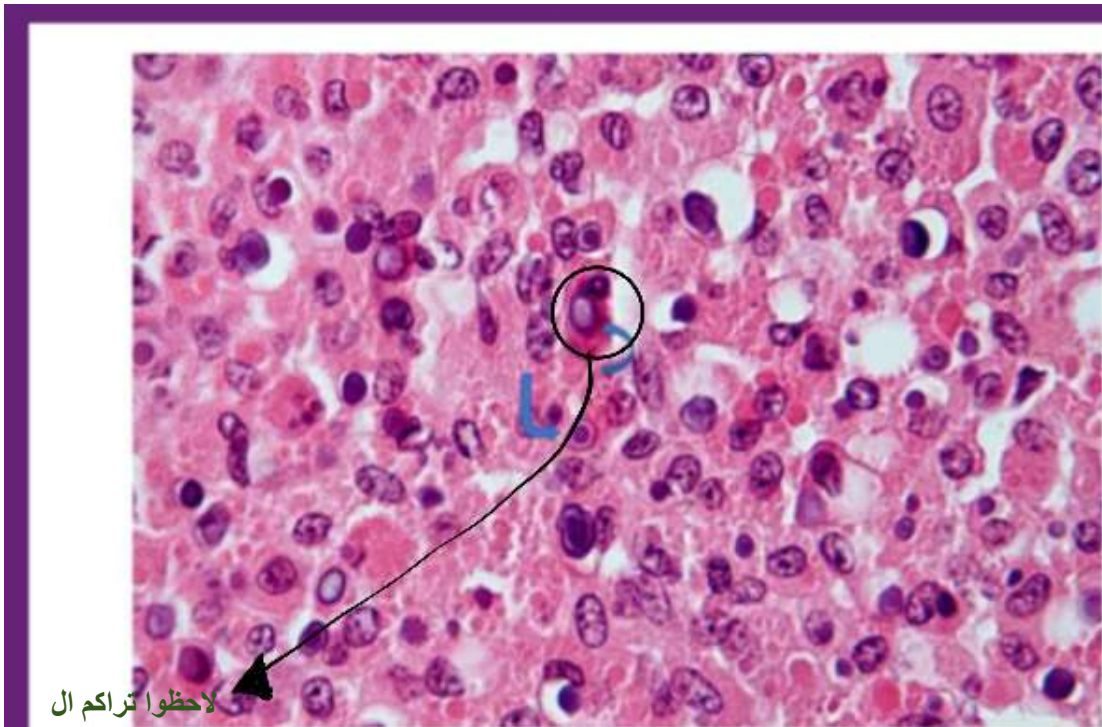
ركزوا على المخطط



- 1 Malakoplakia is an uncommon chronic granulomatous inflammatory condition. It usually involves gram-negative bacteria. *misdiagnosed with a tumor* ممكن يصير
- 2 It makes its presence known as a papule, plaque or ulceration that usually affects the genitourinary tract.
- 3 It may also be associated with other bodily organs.
- 4 *☆* Malakoplakia is thought to result from the insufficient killing of bacteria by macrophages. Therefore, the partially digested bacteria accumulate in macrophages and leads to a deposition of iron and calcium.
- 5 *33* Foamy macrophages with PAS+ granular cytoplasm due to phagosomes stuffed with bacterial debris and Michaelis-Gutmann bodies (laminated mineralized concretions) Calcium and iron

Malakoplakia

هي حالة نادرة تتميز بتكوّن تضخمات متكلّسة ممكن تصيب اي مكان بالجسم لكن عادةً في الجهاز البولي والجهاز الهضمي. **Malakoplakia** بتصير نتيجة لاضطراب في جهاز المناعة أو نتيجة لعدوى بكتيريا المزمنة



لاحظوا تراكم ال

Macrophages و بداخلها
michaelis Gutmann
bodies

و في الجهاز الهضمي



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DRUG-INDUCED INTERSTITIAL NEPHRITIS

- ? Two forms:
- ? 1-Acute Drug-Induced Interstitial Nephritis
- ? 2-chronic (Analgesic) Nephropathy
- ? Acute TIN
- ? Most common: synthetic penicillins (methicillin, ampicillin)
- ? Others: synthetic antibiotics; diuretics; NSAIDs; other drugs

ممکن شخص من جرعة واحدة يتحسس و ممکن من عدة جرعات

PATHOGENESIS OF DRUG-INDUCED INTERSTITIAL NEPHRITIS

- ? immune mechanism.
- ? type I hypersensitivity. IgE
- ? T cell-mediated (type IV) hypersensitivity reaction.
- ? Pathogenesis
- ? the drugs act as **haptens (small molecule that stimulates the production of antibody molecules only when conjugated to a larger molecule)** So during secretion of the drug by tubules, covalently bind to some cytoplasmic or extracellular component of tubular cells & become immunogenic.
- ? The resultant tubulointerstitial injury is then caused by immunological, either IgE-(Type I) or cell-mediated immune (Type IV) reactions to tubular cells or their BMs.

يعني بحفز المناعة

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MORPHOLOGY OF DRUG-INDUCED INTERSTITIAL NEPHRITIS

- by IgE ال سبب
- ? The interstitium shows pronounced (I) **edema** & (II) **infiltration** by large numbers of lymphocytes, macrophages, **eosinophils** & neutrophils.
 - ? **glomeruli are normal**, except in some cases caused by **NSAID**, when the hypersensitivity reaction also leads to podocyte foot process effacement & the development of **nephrotic** syndrome.
 - ? With some drugs (e.g., methicillin, thiazides, rifampin), interstitial non-necrotizing **granulomas** with giant cells may be seen

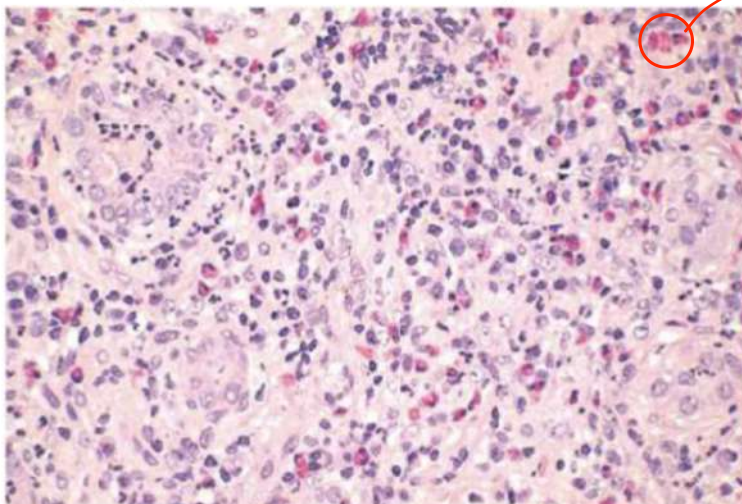
→ Maybe patient is atopic and has history of asthma or eczema ...

But not all atopic patients develop interstitial nephritis and Not all interstitial nephritis develop in atopic patient

(٢٢)

Eosinophils

Drug-induced interstitial nephritis



Infiltration of ال لاحظوا inflammatory cells

وَقُلْ رَبِّ زِدْنِي عِلْمًا



GENITOURINARY SYSTEM

CLINICALLY

- ? the disease begins 2 to 40 days (average 15 days) after exposure to the drug.
- ? is characterized by fever & rash & eosinophilia in about 25% of persons, & renal abnormalities including hematuria, mild proteinuria, & leukocyturia.
- ? A rising serum creatinine or, acute RF with oliguria, develops in about 50% of cases, particularly in older patients.
- ? withdrawal of the offending drug is followed by recovery.

رگنروا علیہ ہر

بس بضلہا مش infection

ANALGESIC NEPHROPATHY : CHRONIC DRUG-INDUCED

- ? Consumption of large quantities of analgesics over long periods may cause **chronic interstitial nephritis** often with **renal papillary necrosis**.
- ? **Aspirin and acetaminophen are common.**
- ? While they can cause renal disease in apparently healthy individuals, preexisting renal disease seems to be a necessary precursor to analgesic-induced RF.
- ? **Pathogenesis not entirely clear.**
- ? Papillary necrosis is the initial event, followed by the interstitial nephritis in the overlying renal parenchyma.

وَقُلْ رَبِّ زِدْنِي عِلْمًا



GENITOURINARY SYSTEM

Direct effect

- Acetaminophen, a phenacetin metabolite, injures cells by both, covalent binding & oxidative damage.
- The ability of aspirin to **inhibit prostaglandin synthesis** suggests that aspirin may induce its potentiating effect by inhibiting the vasodilatory effects of prostaglandin & predisposing the papilla to ischemia.

❑ Clinical Course

- Progressive renal impairment, chronic renal failure, hypertension and anemia....
- A complication of analgesic abuse is: **increased incidence of transitional-cell carcinoma** of the renal pelvis



GENITOURINARY SYSTEM

5. Nonsteroidal anti-inflammatory drugs (NSAIDs) are associated with the development of acute renal failure in patients living in states of effective volume depletion, such as heart failure, cirrhosis, and true volume depletion. What is the mechanism by which NSAIDs are believed to mediate this harmful effect on the kidney?
- (A) Increased prostaglandin synthesis constricts preglomerular vessels
 - (B) Inhibition of prostaglandin synthesis decreases glomerular capillary permeability
 - (C) Inhibition of prostaglandin synthesis decreases preglomerular resistance
 - (D) Inhibition of prostaglandin synthesis increases glomerular resistance
 - (E) The drug has direct toxic effects on the renal tubules
8. A 28-year-old woman with a history of asthma presents to the emergency department with a temperature of 38.2°C (100.8°F) and complains of shaking chills and pain on her right side, which she locates by pointing to the area above her right iliac crest. She notes that she has never had this occur before. During the examination, there is tenderness to percussion at the junction of the lower ribs and the thoracic vertebrae. Urinalysis reveals WBC casts. What is the organism most likely causing her condition?
- (A) *Escherichia coli*
 - (B) *Klebsiella pneumoniae*
 - (C) *Proteus mirabilis*
 - (D) *Staphylococcus saprophyticus*
 - (E) *Ureaplasma urealyticum*
40. A 48-year-old man is hospitalized after a motor vehicle accident. He is hypotensive and is given several units of packed RBCs by transfusion. He is kept in the intensive care unit for monitoring. On the patient's second day in the hospital, his blood urea nitrogen (BUN) and creatinine levels begin to rise and he develops pitting edema to his knees. His BUN:creatinine ratio is 12:1. A subsequent urinalysis shows numerous muddy brown epithelial and granular casts. Which of the following is another common cause of this man's condition?
- (A) Ascending urinary tract infection
 - (B) Crush injury
 - (C) Diabetes mellitus
 - (D) Nonsteroidal anti-inflammatory drug toxicity
 - (E) Septic shock

وَقُلْ رَبِّ زِدْنِي عِلْمًا