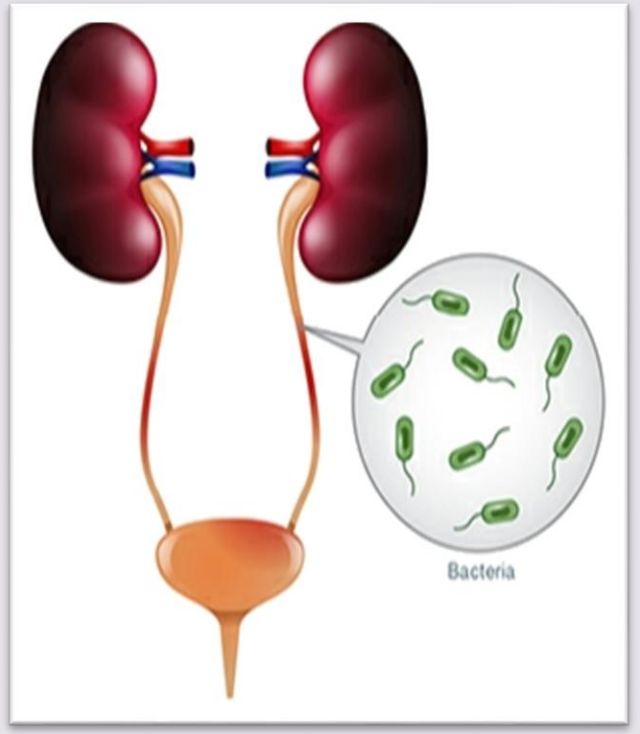
PARUL UNIVERSITY

RAJKOT HOMOEOPATHIC MEDICAL COLLEGE

PYELONEPHRITIS



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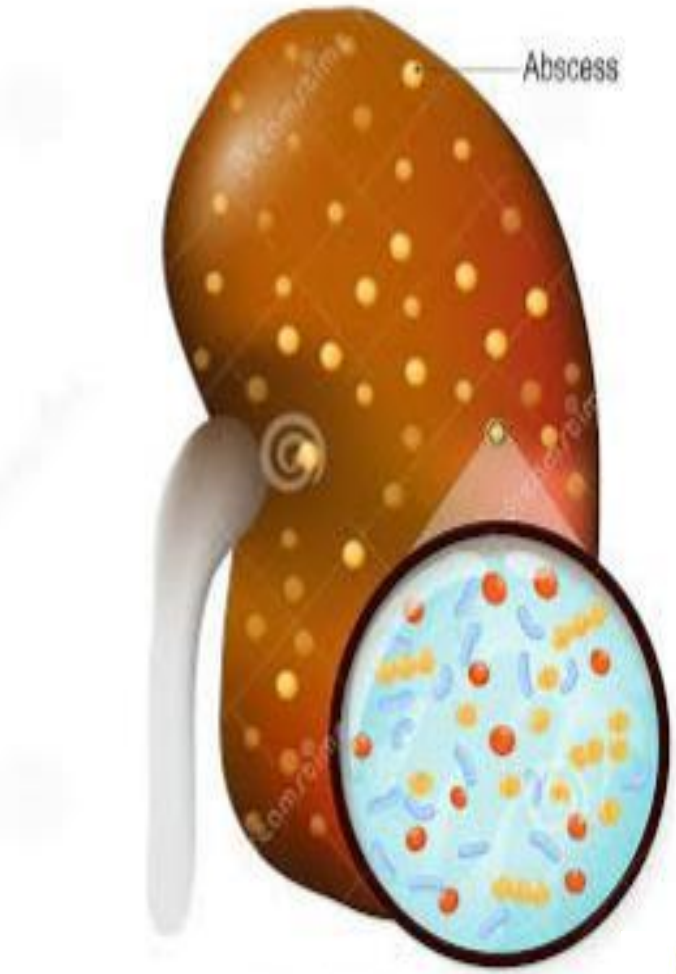
3RD YEAR B.H.M.S.

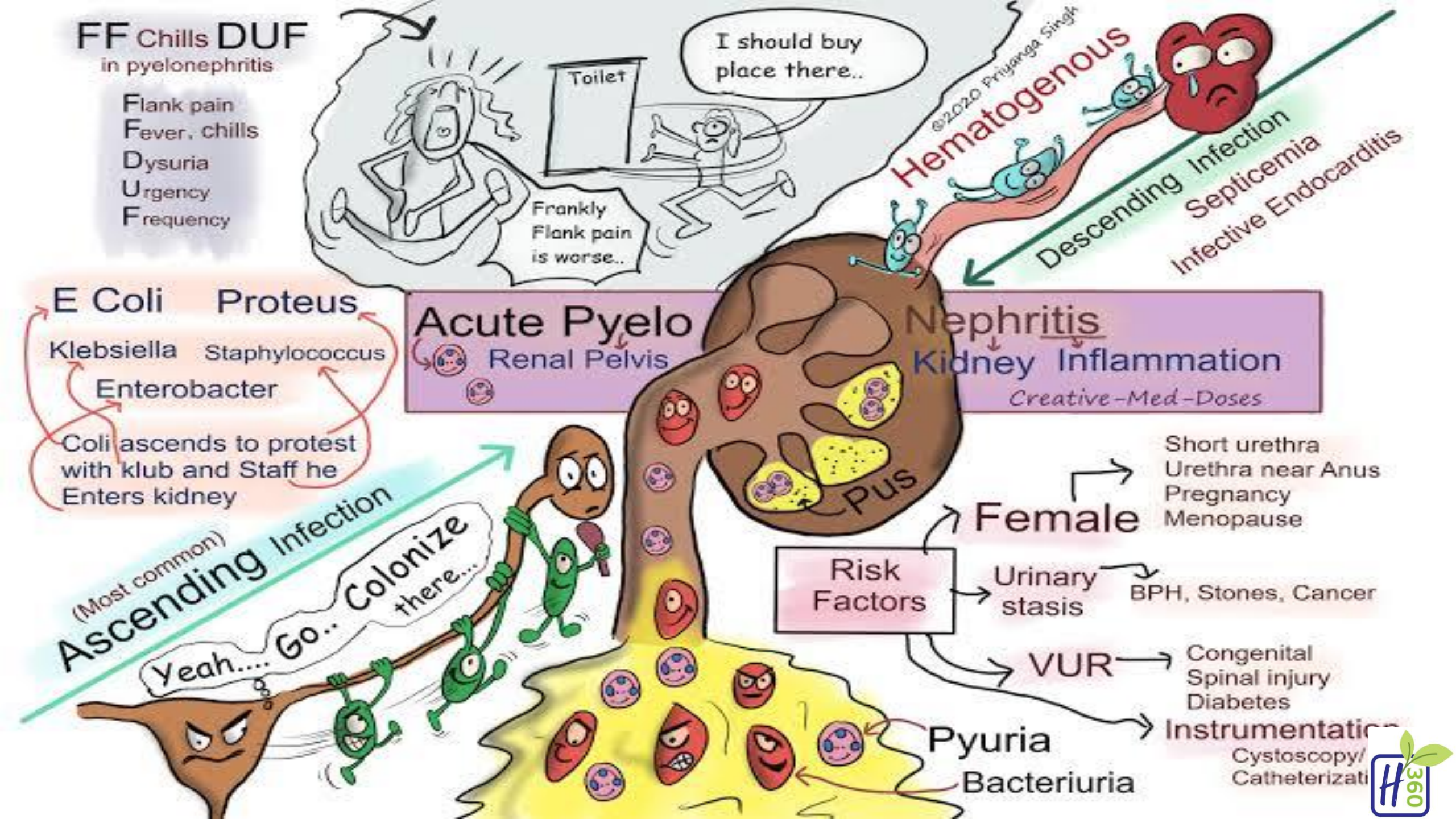
ACUTE PYELONEPHRITIS

- The term '**pyelonephritis**' means **inflammation of the kidney and renal pelvis**. The term 'pyelitis' means inflammation of the renal pelvis only, but it is doubtful whether such condition can exist alone or not.

Normal kidney



Acute pyelonephritis


FF Chills DUF
in pyelonephritis
Flank pain
Fever, chills
Dysuria
Urgency
Frequency
Toilet
I should buy place there..
Frankly Flank pain is worse..
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Hematogenous
Descending Infection
Septicemia
Infective Endocarditis
E Coli
Proteus
Klebsiella
Staphylococcus
Enterobacter
Coli ascends to protest with klub and Staff he Enters kidney
Acute Pyelo Nephritis
Renal Pelvis
Kidney Inflammation
Creative-Med-Doses
Pus
(Most common)
Ascending Infection
Yeah.... Go.. Colonize there...
Female
Short urethra
Urethra near Anus
Pregnancy
Menopause
Risk Factors
Urinary stasis
BPH, Stones, Cancer
VUR
Congenital
Spinal injury
Diabetes
Instrumentation
Cystoscopy/
Catheterizati
Pyuria
Bacteriuria

PATHOGENESIS

- In this condition bacteria reach the kidney either through the **blood stream or by ascending infection.**
- **(A)ASCENDING INFECTION**.— In majority of cases acute pyelonephritis develops from infection in the bladder through the mechanism of **vesicoureteral reflux**. Prone to this reflux causes recurring of infections. Acute pyelonephritis is quite common after marriage **(‘Honey-moon pyelitis’)** and during pregnancy.

- **(B)HAEMATOGENOUS INFECTION.—** Pyogenic cocci are more often seen in haematogenous infections, though **E.coli** is the commonest infecting organism in all cases of pyelonephritis. In case of haematogenous infection element of obstruction is of greatest importance.

PATHOLOGY

- **MACROSCOPIC FEATURES**.— The affected kidney is usually **swollen and congested** and the **pelvis is bright red with pus** inside. The surface of the kidney becomes dull. Under the capsule there are numerous yellow spots representing areas of suppuration.
  ●**On cut surface** the sharp demarcation between the cortex and the medulla is lost. Patchy areas of suppuration are seen which are spherical in the cortex and linear in the pyramids. **Wedge shaped areas** of larger size are suggestive of **infarcts**, and represent upward extension of infection. Multiple small abscesses may also be seen.
  ●The outline of the calyces is destroyed and the resulting **distortion is seen in X-ray film**, which is an important feature of diagnosis.

MICROSCOPIC FEATURES

- There are many small abscesses with widespread **interstitial infiltration with polymorphonuclear leucocytes**.
- There is diffuse or spoty inflammation characterised by oedema and small haemorrhagic areas.
- There are also linear round cell infiltration with admixture of **polymorphonuclears**. It is the renal tubules which bear the major brunt.
- There is **destruction of the renal tubules with gradual replacement by scar tissue**. Many tubules are filled with **pus cells**.

- In the renal pelvis there is **round cell infiltration and fibrosis.**

CLINICAL FEATURES

- Acute pyelonephritis is more common in females particularly during pregnancy and soon after marriage, Which is popularly known as **‘honeymoon pyelitis’.**
- Affects right side more often than the left but it may be bilateral.
- (i) **Constant ache over one or both kidneys** is the most frequent complaint. The pain may radiate to the lower abdomen or to the groin mimicking ureteric colic.
- (ii) Children often complain of **vague abdominal discomfort** instead of localised renal pain.
- (iii) **Increased frequency of micturition,** urgency, nocturia and burning sensation on urination are the complaints due to cystitis which is often accompanied with.
- (iv) **Prodromal symptoms** e.g. headache, lassittude, nausea, vomiting and prostration are often complained of.
- (v) **Rigor alongwith high temperature** is quite common.

PHYSICAL SIGNS

- (i) Among general signs increased temperature, which often shoots upto 104° F, increased pulse rate (which may vary according to the type of infecting organism; In **E.coli infection** the pulse rate may be only **90/min**. In **Staphylococcal** infection pulse rate may be as high as **140/min**).
- (ii) In local examination, **tenderness at the renal angle.**
- (iii) **Percussion** over the renal angle may be **painful**.
- (iv) Abdominal distension with quiet intestine revealed by auscultation can be elicited in acute cases.
  Rebound tenderness may also be elicited if there is intraperitoneal infection.

PYELONEPHRITIS OF PREGNANCY

- Pyelonephritis of pregnancy usually occurs between the fourth and sixth month of gestation in women who have a past history of recurrent uri- nary infection.
- In about 10 per cent of cases the disease runs a severe and protracted course and occasionally leads to abortion or premature birth.

SPECIAL INVESTIGATIONS

- 1. **BLOOD EXAMINATION** — reveals **high neutrophil count**. The **E.S.R is increased**. .
- 2. **URINE** is usually scanty and highly concentrated. It is usually cloudy. **Protein** content becomes **high**.
  Urine contains **large amounts of pus and bacteria**. A few **red cells** may be noted in the urine.
  Bacteriological examination of the urine Culture of the specimen and sensitivity of the organism to antibiotics are highly important to find out proper chemotherapeutic agent.
- 3. X-RAY
- 4. Radionuclide imaging

COMPLICATIONS

- 1. If **diagnosis is delayed and treatment is inadequate**, the condition may turn to be **chronic**. Such chronic form may gradually lead to (i) renal insufficiency, (ii) renal ischaemia and hypertension.
- 2. In **fulminating pyelonephritis bacteraemia or septicaemia** may be present. **Metastatic abscesses** may develop in other organs. **Bacteraemic shock** may be seen particularly when gram negative rods are the infecting organisms.

DIFFERENTIAL DIAGNOSIS.

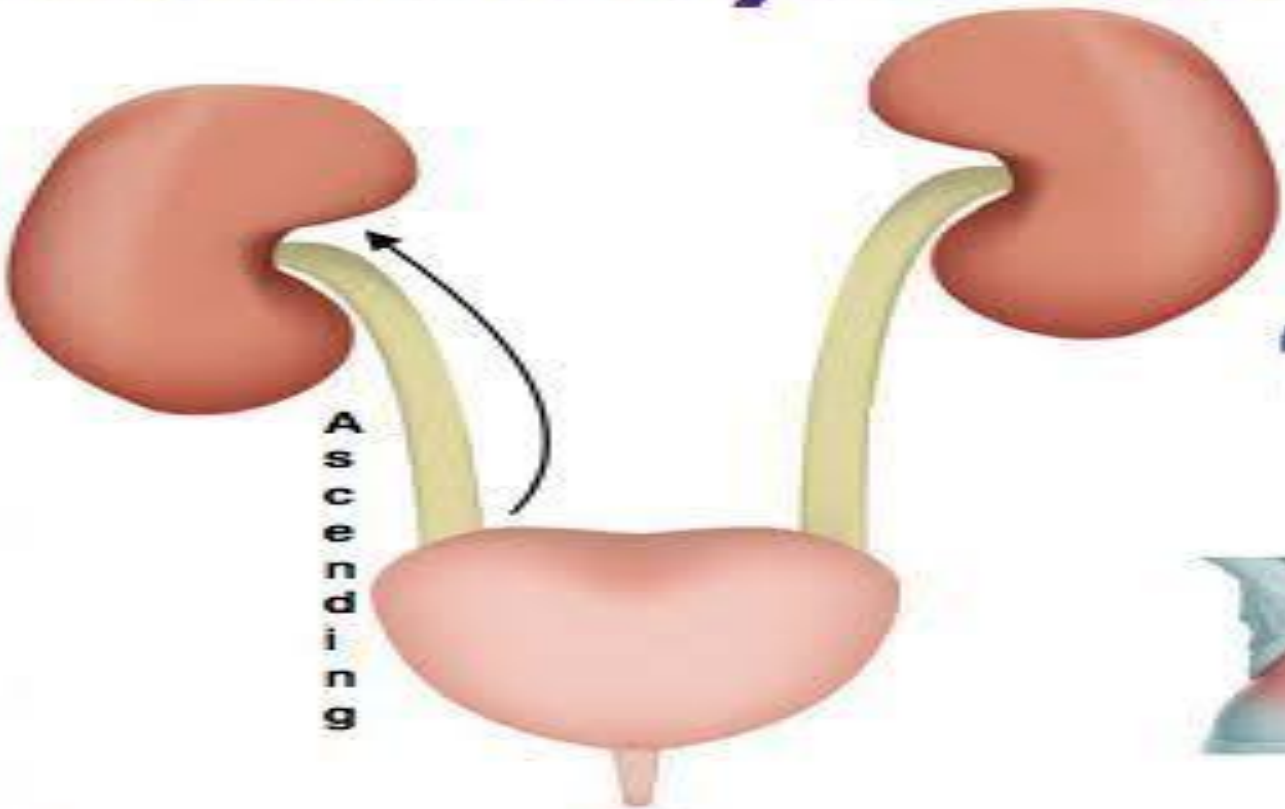
1. Acute appendicitis.
2. Acute cholecystitis.
3. Acute diverticulitis
4. Pancreatitis.
5. Basal pneumonia.
6. Herpes Zoster

TREATMENT

- **A. GENERAL MEASURES**
  1. **Pain should be relieved** with antispasmodics such as belladonna or phenobarbital. Morphine or pethidine may be prescribed in intractable cases.
- 2. **Bed rest** is highly important as it is required in all cases of infection. Patient shoud be instructed to drink large quantities of bland fluid, at least 3 litres a day.
- 3 . If the **urine is acid,** which is common in coliform infections, alkalisation of the urine is beneficial to relieve symptoms. **Potassium citrate with hyoscyamus** in the form of mixture given 4 times a day is very useful treatment in this regard.

- **B. SPECIFIC TREATMENT**
- Preferably the antibiotic chosen should reach a high concentration in urine and renal tissue. Such antibiotics are **tetracycline, ampicillin, cotrimoxazole, polymyxin B, gentamicin. kanamycin and amoxycillin**.
- A few recently available antibiotics are quite effective and these are **carbenicillin**, **cephalosporins** (1st generation — cephalexin. 2nd generation — cefoxitin and 3rd generation — cefotaxine (claforan)), ciprofloxacin (cifran), norfloxacin (norbactin) and pefloxacin.
- **C. FAILURE OF RESPONSE**.— If no clinical improvement occurs in 2 to 3 days after offering above treatment, **excretory urograms** should be advised to detect any obstruction or vesicoureteral reflux. **Obstruction may necessitate surgical treatment** e.g. removal of a ureteral stone.

Acute Pyelonephritis



Fever
Chills

Dysuria
Frequency
Urgency

Flank pain
CVA tenderness
Nausea and vomiting

Microbiology

Ascending (most common)

- *E. coli* (75% to 95%)
- *Proteus mirabilis*
- *Klebsiella pneumoniae*
- *Staphylococcus saprophyticus*

Descending (less common)

- Septicemia
- Infective endocarditis

Management

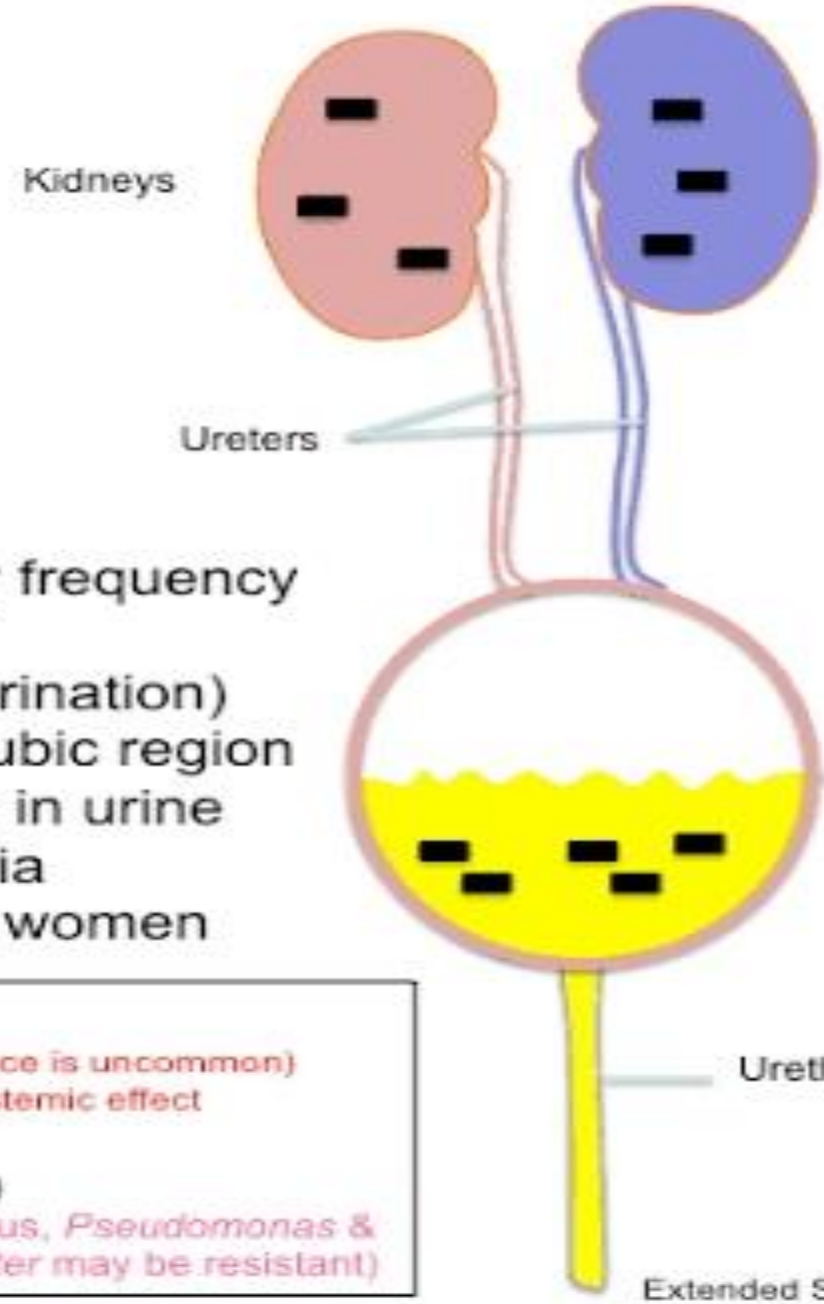
Parenteral (mild to moderate)

- Ceftriaxone
- Ciprofloxacin, Levofloxacin
- Aztreonam

Parenteral (severe)

- Cefepime
- Pipercillin-tazobactam
- Meropenem

UTIs



Cystitis

(Bladder infection)

- increased urinary frequency
- urgency
- dysuria (painful urination)
- pain above the pubic region
- WBCs & bacteria in urine
- possible hematuria
- more common in women

Empiric Rx:

Nitrofurantoin (resistance is uncommon)
- localized to urine, little systemic effect

Alternatives:

TMP/SMX (if not resistant)

Fosfomycin (less efficacious, *Pseudomonas* & *Acinnetobacter* may be resistant)

Pyelonephritis

(Kidney infection)

- **flank pain**
- **high fever**
- malaise
- WBCs & bacteria in urine
- urinary symptoms similar to cystitis

Empiric Rx:

IV ceftriaxone (3rd Gen Ceph)
- penetrates tissue, ~good spectrum

Alternative:

Piperacillin/Tazobactam (Zosyn ®)

Pathogens:

- *E. coli* (75-95%)
- *Proteus*
- *Klebsiella*
- *Enterobacter*
- *Staph* (less common)

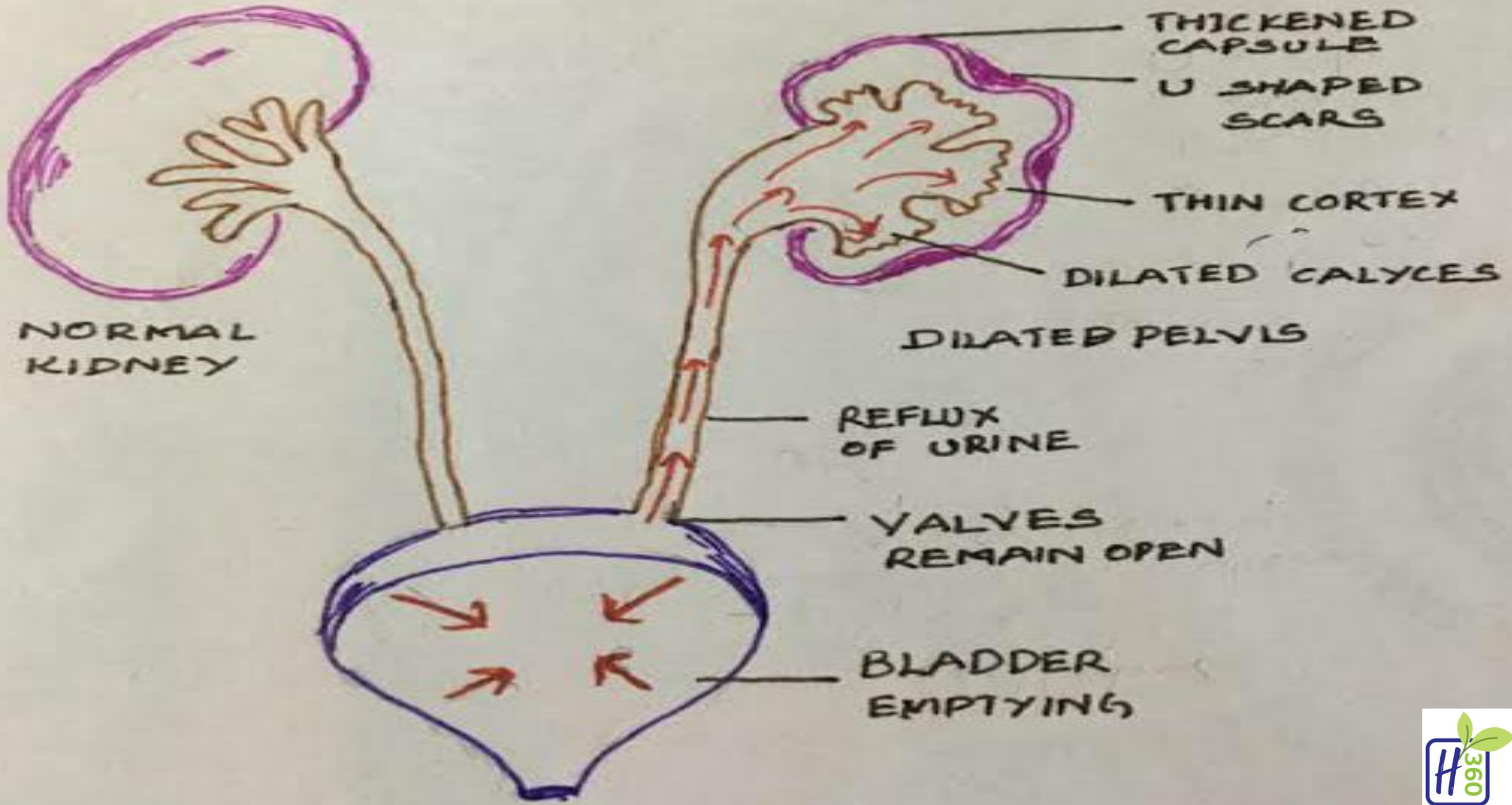
ESBLs: Rx Carbapenems
(meropenem, ertapenem)

Extended Spectrum Beta Lactamases – inactivate Pen's, Ceph's & Aztr

CHRONIC PYELONEPHRITIS

- The term chronic pyelonephritis' means **persistent presence of bacteria in the kidney.**
- **Pathogenesis**
- **I. Ascending infection**.— In majority of these cases the source of bacteria comes from the bladder by ascending infection. In **case of females** it often **comes from the urethra**. If ureterovesical junction is grossly abnormal bacteria in the bladder reach the kidney and true chronic pyelonephritis continues.
- **II. Haematogenous infection**.— When there is no ureterovesical reflux, haematogenous infection causing chronic pyelonephritis is possible. But this usually occurs **secondary to some ureteral obstruction** e.g. ureteral stone.

CHRONIC PYELONEPHRITIS



PATHOLOGY

- **MACROSCOPICALLY**, the kidney is of normal size or smaller depending on duration of the disease. The **capsule becomes pale**, yet it cannot be stripped easily. Some areas of the surface of the kidney are pitted and depressed due to **scarring**.
- The **cut surface** shows fair **demarcation between the cortex and the medulla,** but the kidney tissue is pale and fibrotic. The pelvic mucosa is also pale and fibrotic.
- **MICROSCOPICALLY**, the kidney **parenchyma is diffusely infiltrated with plasma cells and lymphocytes**.
- The renal tubules are mostly affected and these are atrophic, dilated and cystic. Considerable **thickening of the arteries and arterioles** is evident and this is the cause of **renal hypertension** which is seen in half the cases.

CHRONIC PYELONEPHRITIS

RENAL PELVIS

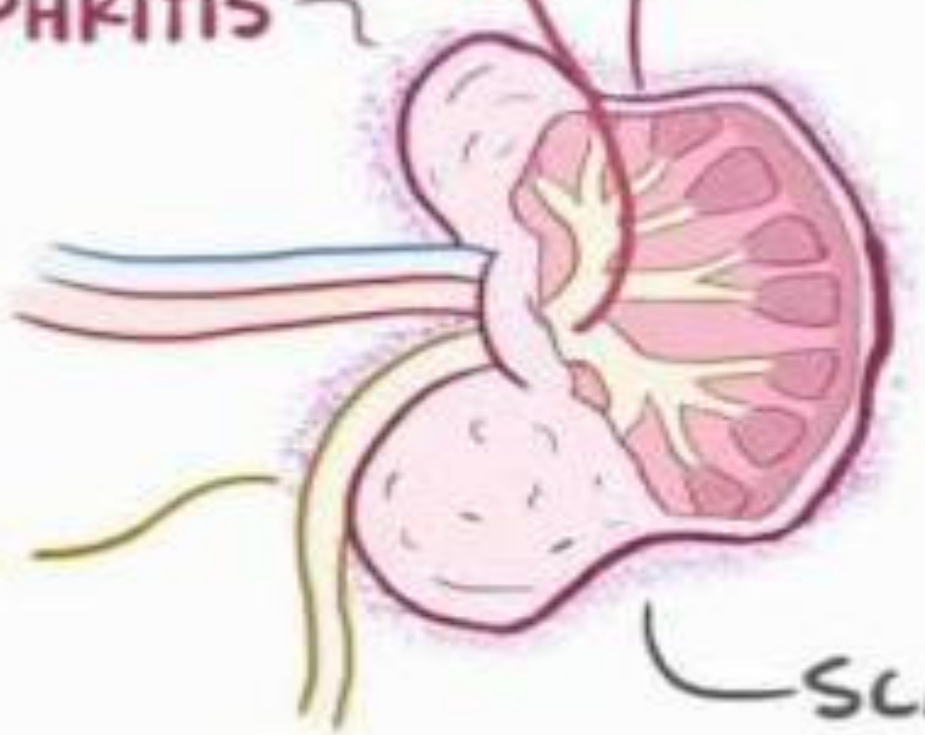
KIDNEY

INFLAMMATION

from

BACTERIAL INFECTION

RECURRENT ACUTE PYELONEPHRITIS



URETER

SCARRING

CLINICAL FEATURES

- This condition is more common in females (3:1). While majority of the **females are below 40 years** of age, majority of the **males affected are above 40 years** of age.

SYMPTOMS.— It must be confessed that chronic pyelonephritis may remain **asymptomatic** until renal insufficiency takes place.

(i) Mild **discomfort or dull pain** over the kidney is complained of in majority of cases.

(ii) **Vesical irritability** in the form of increased frequency, urgency and dysuria may be noticed.

(iii) **Hypertension** is seen in half the cases.

(iv) Vague **gastro-intestinal complaints** are often seen.

(v) **Constitutional symptoms** e.g. lassitude, headache, malaise, nausea and anorexia are seen in 40% of cases.

Anaemia is a very common accompaniment of this disease.

(vi) Pyrexia is not very important, yet this is seen in about 10 to 20% of cases.

- **PHYSICAL SIGNS.—**
  1. **Hypertension** is discovered in half the cases.
  2. Some degree of **localised renal tenderness** may be elicited
- ***Special Investigations***
  1. BLOOD EXAMINATION shows slight leucocytosis. Anaemia is present in almost all cases.
  2. URINE EXAMINATION shows decreased protein content.
  Renal function tests should always be performed.
  3. X-RAY.— Straight X-ray may show small atrophic kidney.
  Voiding cystourethrography should be performed.
  4. CYSTOSCOPY

TREATMENT

- **1. MEDICAL TREATMENT**.—
  Suitable drugs include —
- **Mandelic** acid and its salts are quite effective against coliform organisms and Strept. faecalis.
- **Ammonium chloride** of about 2 g may be given together with the previous drug 6 hourly.
- **Sulphonamides e.g. urolucosil. septran (sulphonamide mixed with trimethoprim)** are quite effective in controlling **E.coli infection** and some strains of **Proteus Furadantin (nitrofurantoin**) is a synthetic antibacterial agent which is particularly effective against E.coli.
- **Co-trimoxazole** (Bactrim or Septran) is a combination of **trimethoprim and sulphamethoxazole** which
  together block two steps in the bacterial synthesis of folic acid
- **Nalidixic acid** is active against E.coli, Proteus. Klebsiella.
- **Alkalising agents** provide symptomatic relief by raising the pH of urine. **Phenazopyridine hcl.** is helpful in relieving pain during urinary infection (urinary tract analgesic).

2. SURGICAL TREATMENT

- (i) If any **obstruction is detected**, this should be **removed surgically**.
- (ii) If vesicoureteral reflux has been demonstrated and is considered to be the cause of lingering chronicity, **repair of the ureterovesical junction** should be considered.
- (iii) If one kidney is badly damaged, **nephrectomy** should be considered.
- (iv) When the hypertension has become malignant type and the cause is chronic pyelonephritis, if the other kidney is normal, **nephrectomy of the affected kidney is** curative
- (v) **Partial nephrectomy** of a badly damaged portion of the kidney may be necessary.
- (vi) When this condition affects both the kidneys badly with uncontrolled hypertension, **transplantation of kidney or recurrent dialysis** should be considered

HOMOEOPATHIC THERAPEUTICS

1. Apish Mellifica
2. Staphysagria
3. Cantharis
4. Terebinthina
5. Sarsaparrilla
6. Berberis vulgaris
7. Chimaphila Umbeliata
8. Eucalyptus globulus

1. APISH MELLIFICA

- Burning and soreness when urinating.
- Suppressed, loaded with casts; frequent and involuntary; stinging pain and strangury; *scanty, high colored*.
- Last drops burn and smart.
- Coffee ground sediment.
- Cannot urinate without a stool.
- **Fever.--***Afternoon chill, with thirst; worse on motion and heat*. External heat, with smothering feeling. Sweat slight, with sleepiness.
- **Modalities.-**
- *Worse*:-heat in any form; *touch*; pressure; after sleeping; Right side.
- *Better*, in open air, uncovering, and cold bathing.

2.STAPHYSAGRIA

- Nervous affections with marked irritability, diseases of the genito-urinary tract and skin, most frequently give symptoms calling for this drug.
- Ineffectual urging to urinate in *newly married* women.
- *Sensation as if a drop of urine were rolling continuously along the channel*. Burning in urethra during micturition.
- Urging and pain *after* urinating.
- **Modalities.-**
- *Worse*:- anger, indignation, grief, mortification, loss of fluids, onanism, sexual excesses, tobacco.
- *Better*:- warmth, rest at night.

3.CANTHARIS

- *Intolerable urging* and tenesmus.
- Nephritis with bloody urine.
- Violent paroxysms of cutting and burning in whole renal region, with painful urging to urinate; bloody urine, by *drops*.
- Intolerable tenesmus; cutting before, during, and after urine.
- *Urine scalds him, and is passed drop by drop.*
- *Constant desire to urinate*.
- Membranous scales looking like bran in water.
- Pain in loins, with incessant desire to urinate.
- **Fever.--**Cold hands and feet; cold sweat. Soles burn. Chill, as if water were poured over him.
- **Modalities.--***Worse*, from touch, or approach, urinating, drinking cold water or coffee.

4.TEREBINTHINA

- Inflamed kidneys following any acute disease.
- Urine smoky with coffee ground or thick, yellow, slimy, muddy sediment, odor of violets.
- *Burning pain in region of kidneys*. Drawing in right kidney extending to hip.
- Burning pain along ureters.
- Strangury with bloody urine.
- Constant tenesmus.
- **Fever.--**Heat, with violent thirst, dry tongue, profuse cold, clammy sweat.
- **Modalities**
- Worse:- cold, night, lying, pressure.
- Better:- motion and stooping.

5.SARSAPARILLA

- Painfully urination, extorts screams, < at the close of urination.
- Pain from right kidney downward.
- Pus in urine.
- Colic and backache at same time.
- Urine scanty, slimy, flaky, sandy, bloody.
- Urine dribbles while sitting.
- Can pass urine only when standing during the day, but at night urine flows freely in bed.

6.BERBERIS VULGARIS

- It causes inflammation of kidneys with hćmaturia.
- Sticking pain from kidney, extending along ureter, or to liver, stomach, spleen, arresting breathing.
- Urine is thick, turbid, yellow, red, mealy, sandy or slimy sediment.
- Pain in thighs and hips on urinating.
- Burning, soreness or bubbling in kidney region.
- Sensation as if some urine remained after urinating.
- **Fever.--**Cold sensation in various parts, as if spattered with cold water. Warmth in lower part of back, hips, and thighs.
- **Modalities.--***Worse*, motion, *standing*.

7.CHIMAPHILA UMBELLATA

- Urine turbid, scanty, offensive, containing ropy or bloody mucus, and depositing a copious sediment.
- Burning and scalding during micturition, and straining afterwards. *Must strain* before flow comes.
- Fluttering in region of kidney.
- Acute inflammation of urinary tract.
- Clots of blood pass with urine.
- Urging to urinate.
- Unable to urinate without standing with feet wide apart and body inclined forward.

8.EUCALYPTUS GLOBULUS

- *Acute nephritis complicating influenza*.
- Hæmaturia.
- Suppurative inflammation of kidneys.
- Urine contains pus and is deficient in urea.
- Fevers of a *relapsing* character.
- Urine has the odour of violets.

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Thank you