

URINARY CALCULI



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Objectives

At the end of the lecture, the students should be able to:

- 1.** Identify the main risk factors for urinary calculi formation & how the stones are formed.
- 2.** Know the types of urinary calculi
- 3.** Diagnose the condition (Hx, Physical examination, investigations, & imaging)
- 4.** Know different methods of TRT & recognize those patients with urinary calculi who need urgent intervention.
- 5.** Know the complications of urinary stones.
- 6.** Know how to prevent stone recurrence

Asymptomatic
Pain—renal colic
Haematuria
Urinary tract infection
Urinary tract obstruction
Strangury



Important historical features are as follows:

- Duration, characteristics, and location of pain
Severity of pain is related to the degree of obstruction, presence of ureteral spasm, and presence of any associated infection.
- History of urinary calculi
- Prior complications related to stone manipulation
- Urinary tract infections
- Loss of renal function
- Family history of calculi
- Solitary or transplanted kidney
- Chemical composition of previously passed stones



A 40 – Yr- old male patient visited a urology consultant clinic with dull right flank ache. He is afebrile with nausea but without vomiting. His urinalysis shows 10-15 RBCs / HPF, normal renal function test. His feet is as follow:



What are the main determinants of UA stones?

1.Urine pH < 5.5 with decrease urine volume

2.Hyperuricosuria

a. Genetic overproduction

b. Myeloproliferative disorders.

c.High purine diet.

d. Drugs.

1- What further investigations you want to do?

2.What is the management?

A 50 – Yr- old male patient with bilateral loin pain with low grade fever, nausea and vomiting. O/E he has bilateral positive renal angle tenderness. His urinalysis shows 20-30 pus cells / HPf with 20-30 RBCs / HPF. Urine PH is 7.



How Struvite Stones are Formed

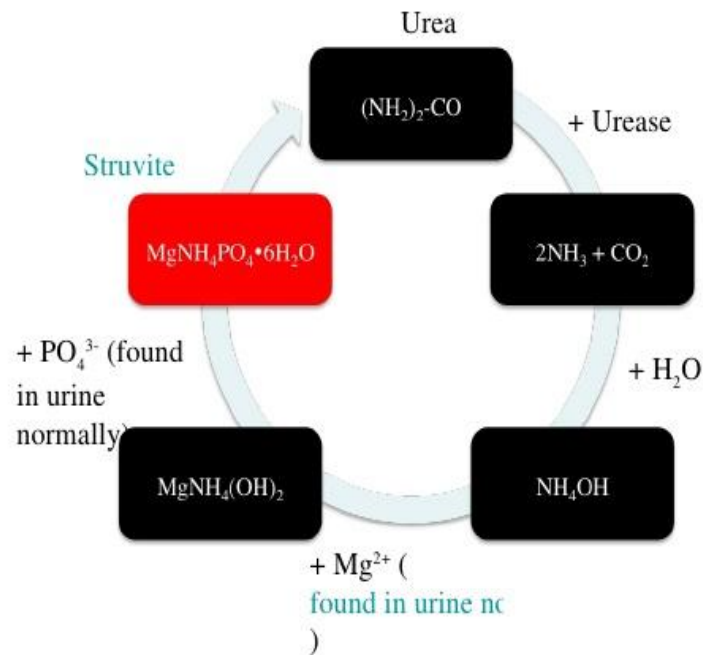
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Struvite Stones - Pathogenesis

Reference

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- Struvite stones can adhere to the urothelium without a previous nucleus (such as the [Randall plaque](#))

Urease producing bacteria

1. Proteus
2. Klebsiella
3. Staphylococcus
4. Pseudomonas
5. Providentia
6. Ureaplasma

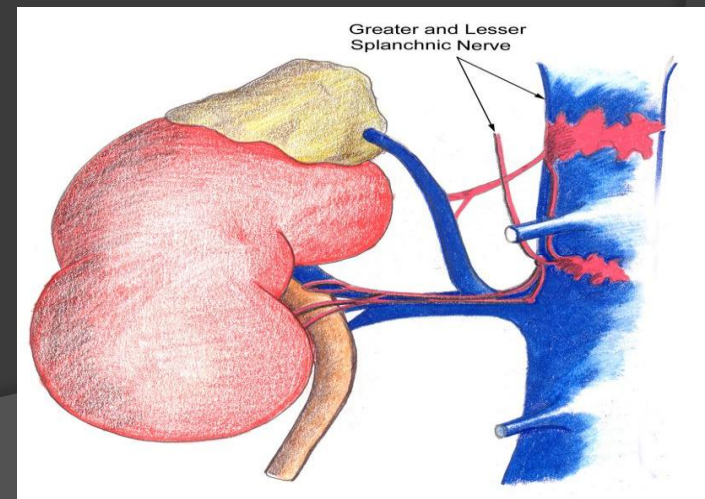
Pain from **upper ureteral stones** tends to radiate to the flank and lumbar areas.

On the right side, DDX: cholecystitis or cholelithiasis;

On the left, include acute pancreatitis, peptic ulcer disease, and gastritis.

Midureteral calculi cause pain that radiates anteriorly and caudally. DDX: appendicitis on the right or acute diverticulitis on the left.

Distal ureteral stones cause pain that tends to radiate into the groin or testicle in the male or labia majora in the female because the pain is referred from the ilioinguinal or genitofemoral nerves.





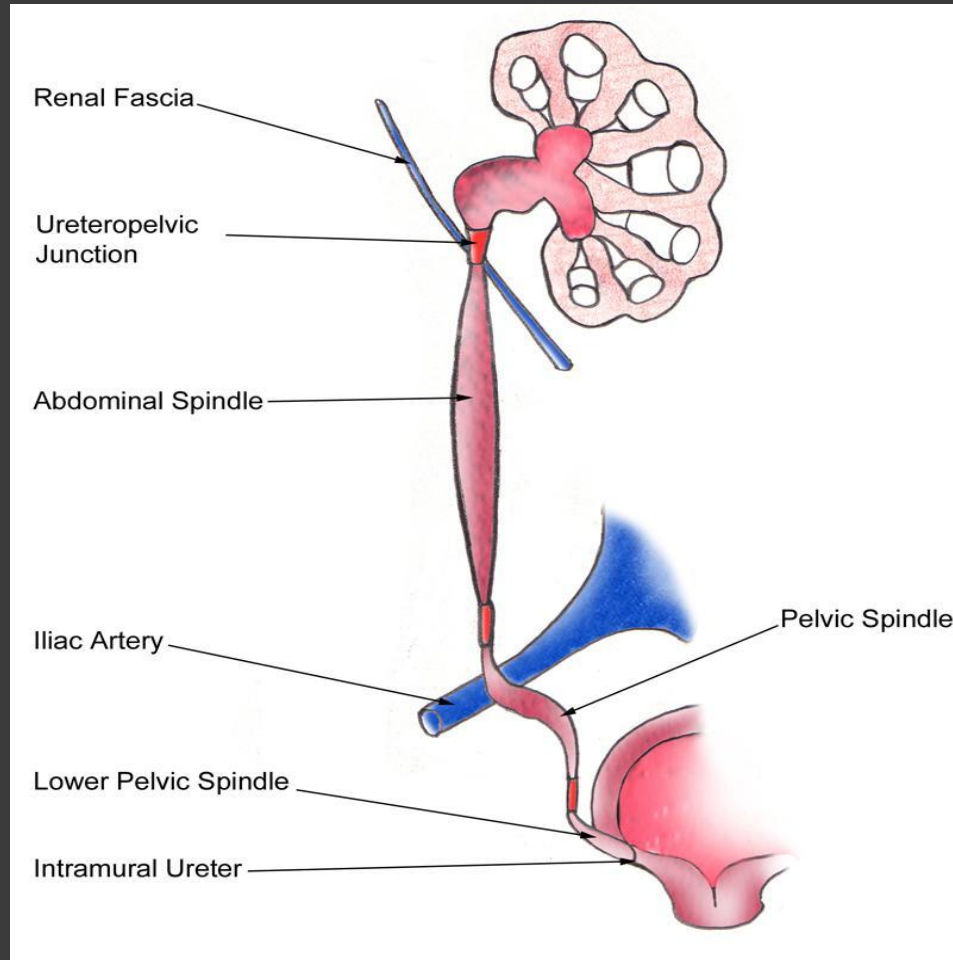
EXAMINATION TIP

Eliciting CVA tenderness

Locate vertebral level of the tenderness. Start the patient at upright. Bring your knee over or lower than the iliac crest position. Place the palm of your left hand over the left CVA. Then under the neck of your left hand with the other hand, or your right for the doctor, repeat the procedure to palpate over the right CVA. A patient with CVA tenderness will report a severe pain.



Anatomical Narrowing



Investigations & Imaging

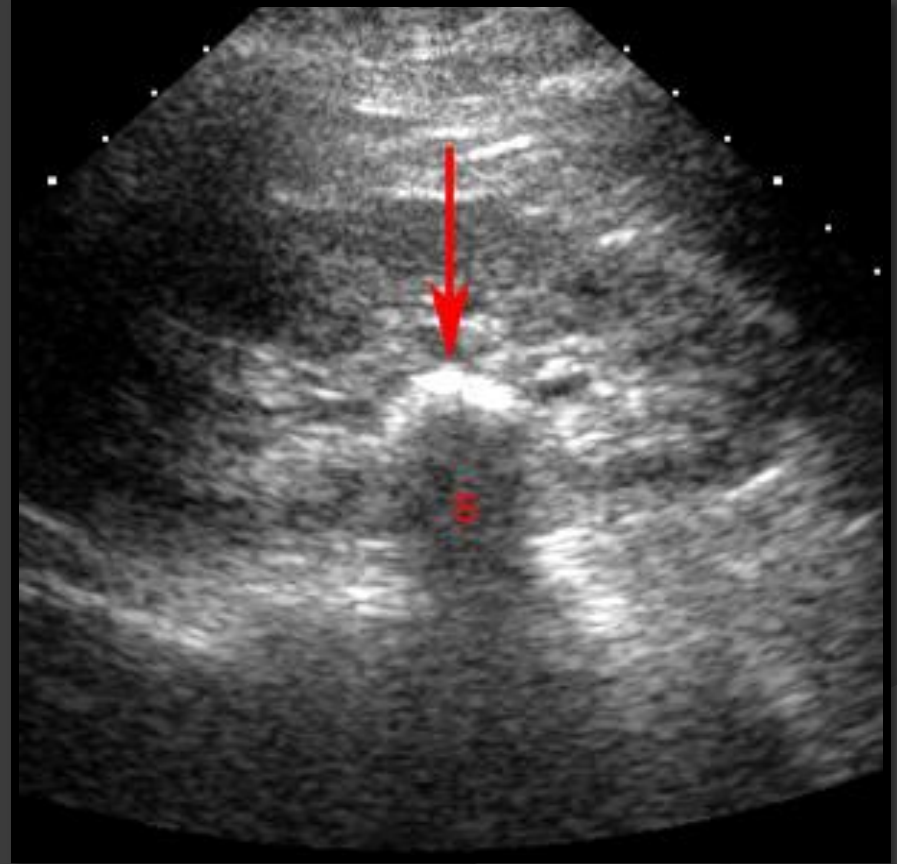
Guidelines from the European Association of Urology recommend the following laboratory tests in all patients with an acute stone episode :

- Urinary sediment/dipstick test for demonstration of blood cells, with a test for bacteriuria (nitrite), urinary pH, and urine culture in case of a positive reaction
- Blood Tests: Serum electrolytes, creatinine, calcium, uric acid, parathyroid hormone, and phosphorus, Complete blood cell count (CBC), C-reactive protein, Coagulation testing, if intervention is likely or planned: Activated partial thromboplastin time (aPTT) and prothrombin time (PT) with International Normalized ratio (INR)

- **U/S**
- **KUB**
- **IVP**
- **CT**
- **Nuclear Renal Scanning**

A nuclear renal scan can be used to objectively measure differential renal function,

U/S: Renal Pelvic Stones



VUJ Stone



Upper Ureteric Stone



X-ray characteristics

Radiopaque	Poor radiopaque	Radiolucent
Calcium oxalate dihydrate	Magnesium ammonium phosphate	Uric acid
Calcium oxalate monohydrate	Apatite	Ammonium urate
Calcium phosphates	Cystine	Xanthine
		2,8-dihydroxyadenine
		'Drug-stones'

KUB: Renal Stones



Figure: Plain X-ray showing a 23x23mm opacity at left T-11-12 level.





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TRT

-Conservative

-ESWL

-PNL

-RIRS + Ureteroscopy

-ECIRS

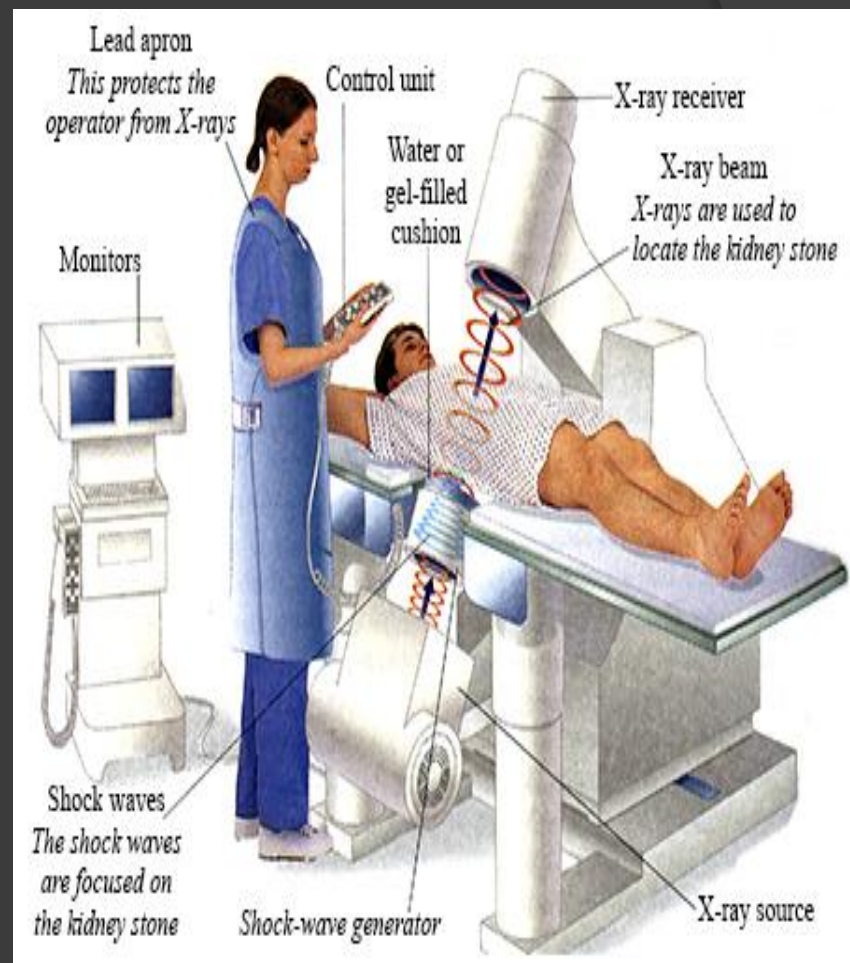
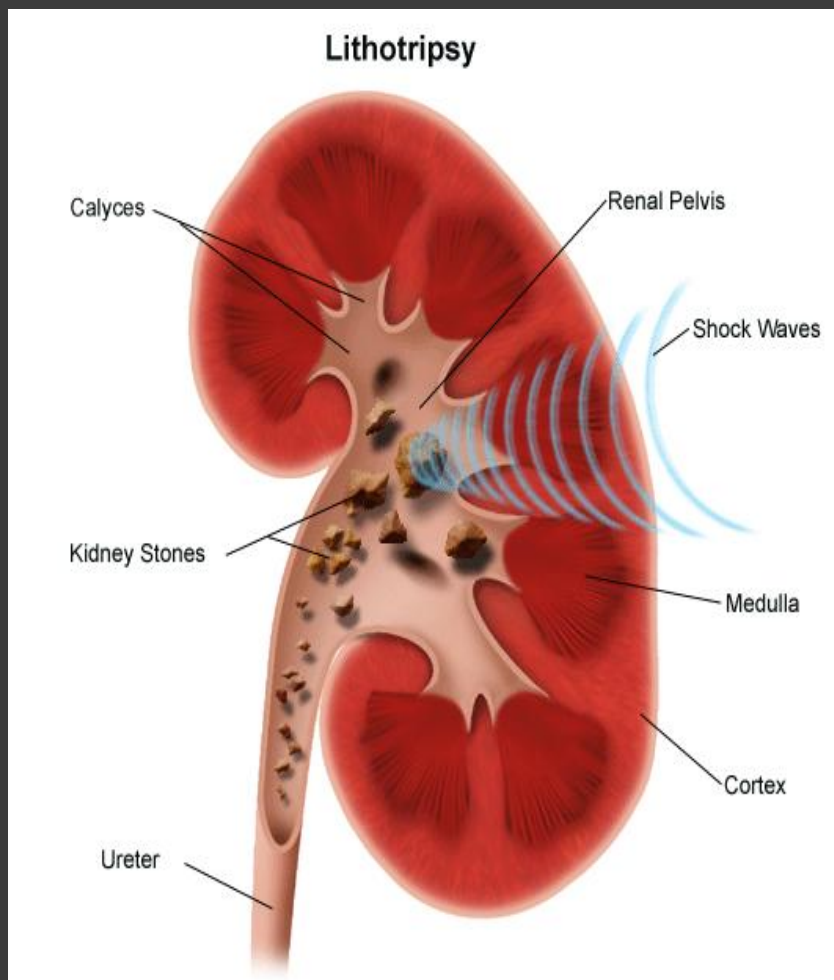
-Laparoscopic

-Open Surgery

ESWL(Extracorporeal Shock Wave Lithotripsy)

- ◎ It can be considered for those patients with renal stones, size(<25 mm) and those with failed conservative treatment.

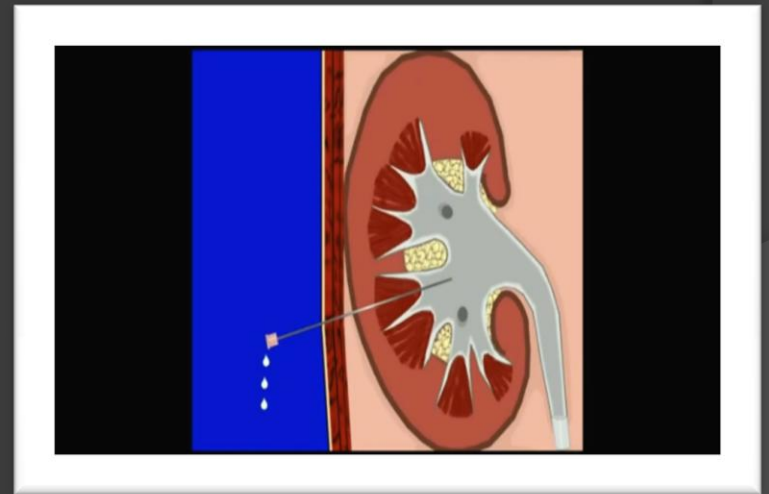
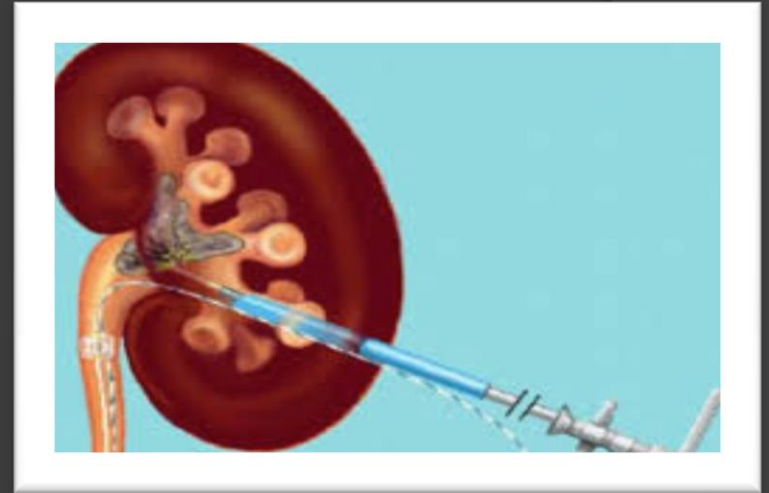
ESWL(Extracorporeal Shock Wave Lithotripsy)



P/C Nephrolithotomy

It is indicated for:

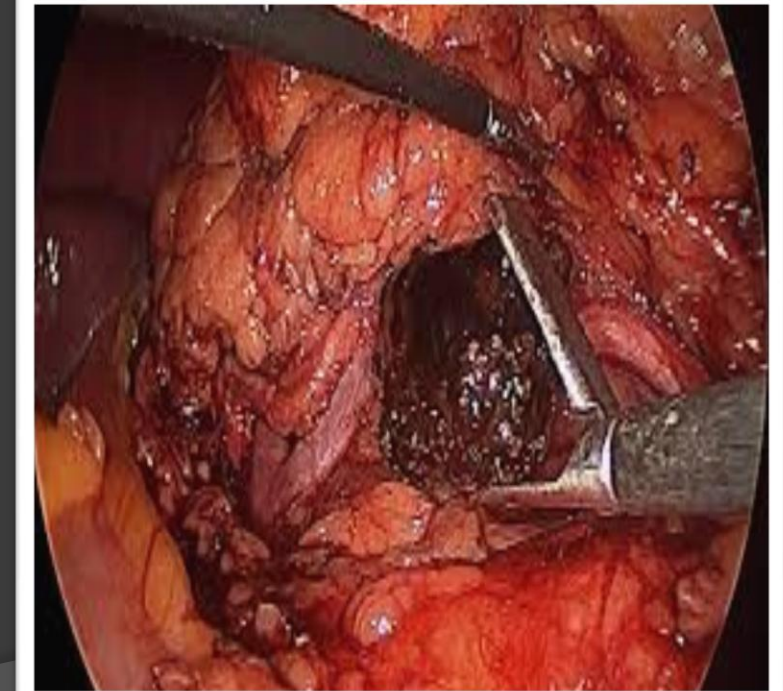
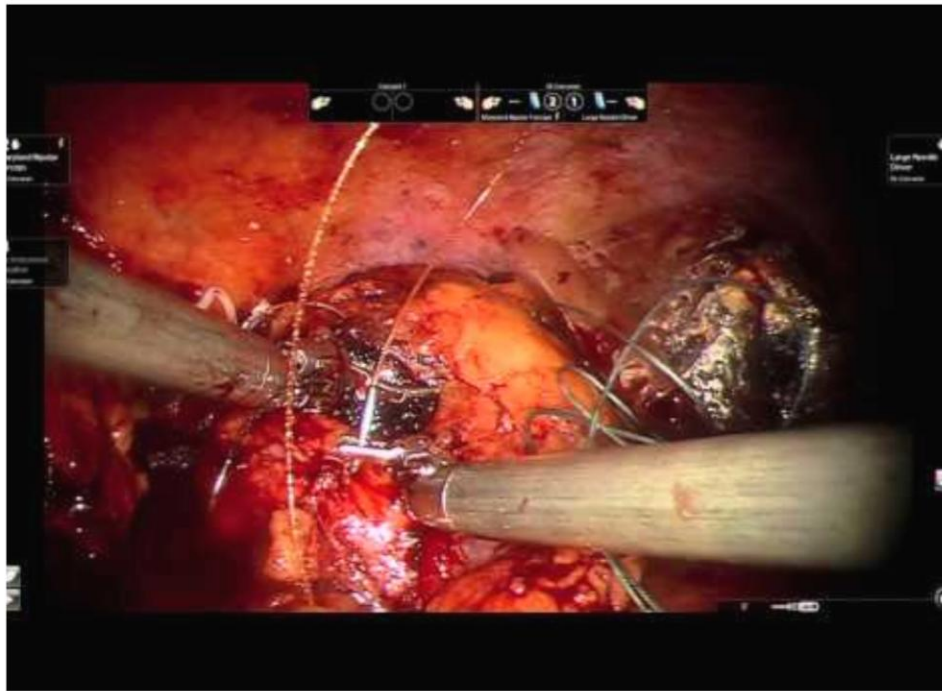
- Big renal stones (≥ 25 mm).
- Stone in calyceal diverticulum.
- Lower pole renal stones where the success of ESWL is low.
- when there is contra indication for ESWL.



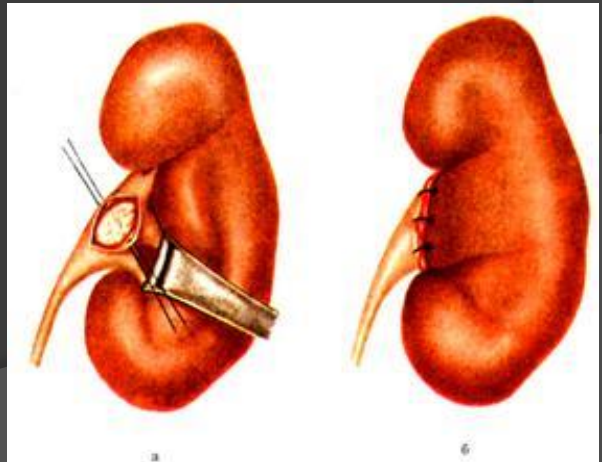
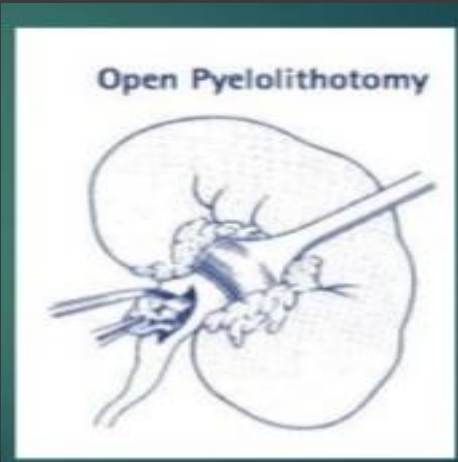
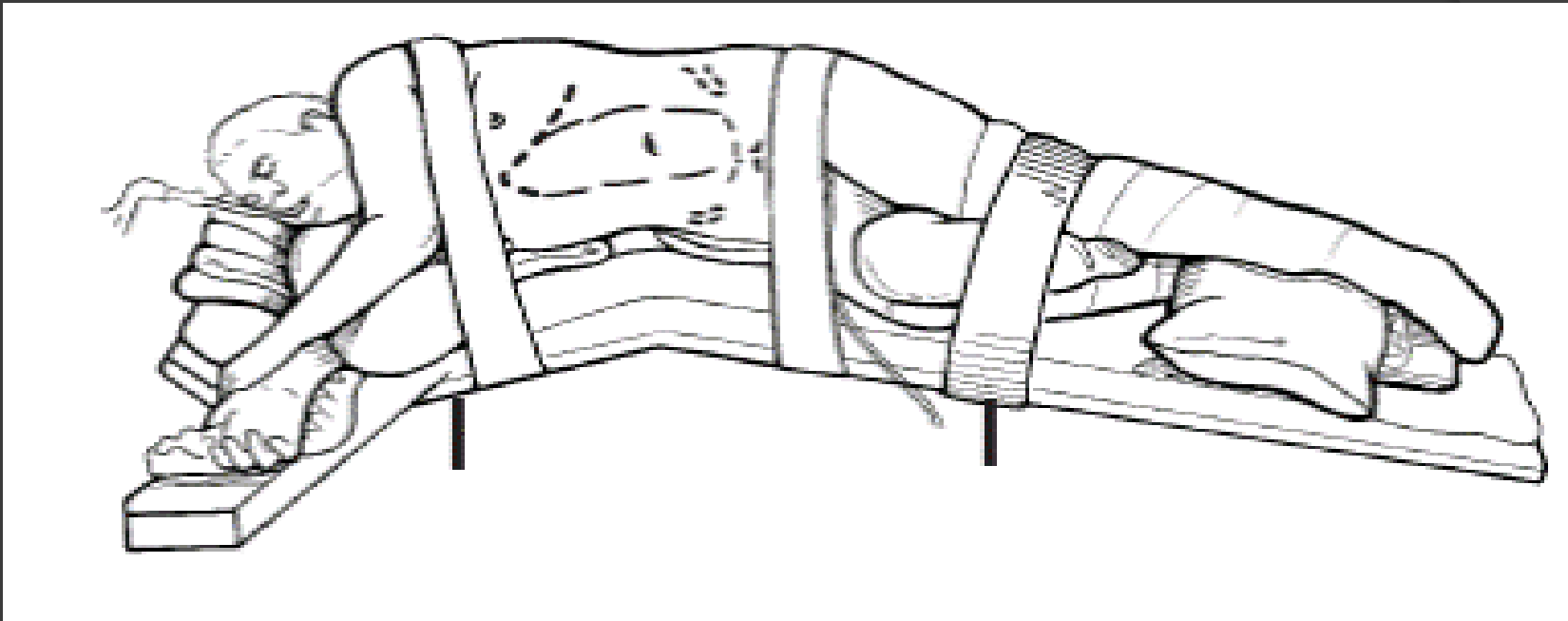
Retrograde Intra-Renal Surgery (RIRS) Flexible Ureteroscopy



Laparoscopic Pyelolithotomy



Open Pyelo & Nephrolithotomy





Thank you for your attention!

Do you have any questions ;-)

