

POLTAVA STATE MEDICAL UNIVERSITY
DEPARTMENT OF UROLOGY
(THE CHAIR – M.D., PROF. LEONID P.SARYCHEV)

INFLAMMATORY DISEASES
OF THE GENITOURINARY SYSTEM.
UROLITHIASIS

Lecture 1

2021

LECTURE PLAN

- Uncomplicated and complicated urinary tract infections
- Acute pyelonephritis, purulent forms, sepsis,
gestational pyelonephritis
- Chronic pyelonephritis
- Pyonephrosis
- Paranephritis
- Cystitis
- Infectious inflammatory diseases of the male genitalia
- Genitourinary tuberculosis
- Urolithiasis

URINARY TRACT INFECTIONS

***Urinary tract infections (UTIs)** occupy the second place after respiratory viral infections in the morbidity structure. In Ukraine, more than 170 thousand patients with cystitis are registered each year, more than 110 thousand – with pyelonephritis*

***Complicated forms of UTI** take their roots on the background of structural and functional disorders of the urinary tract.*

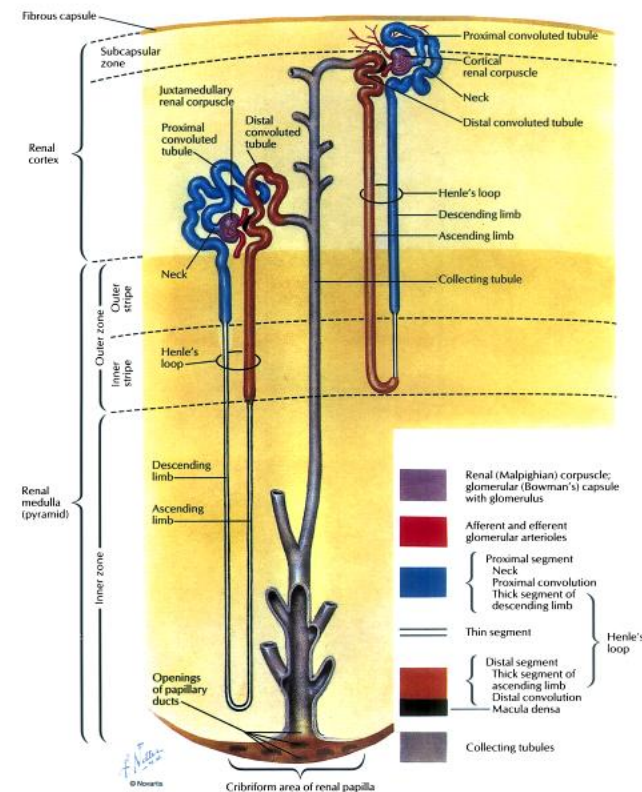
Risk factors for the development of complicated forms of UTI are elderly age, pregnancy, urinary tract abnormalities, diabetes mellitus, the presence of urinary drainage

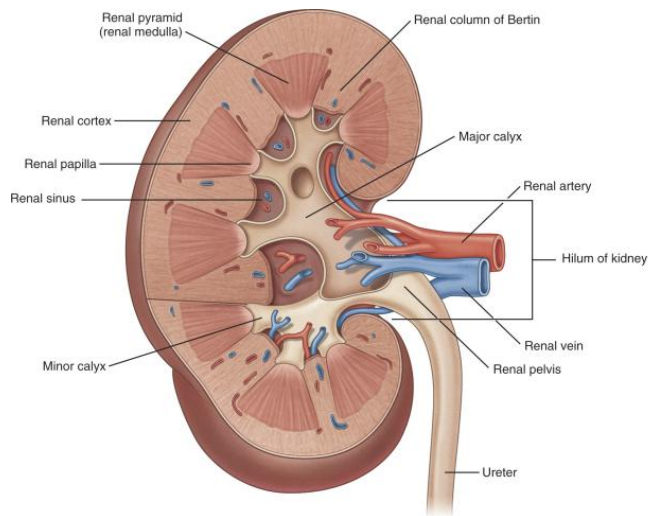
*In the structure of hospitalized to urological and nephrological hospitals, patients with pyelonephritis occupy **50-70%***

Pyelonephritis is a nonspecific infectious and inflammatory disease of the kidneys with parallel or sequential inflammation of the pelvis, calyces and parenchyma of the kidney (mainly tubular apparatus and interstitial tissue)

Takes second place after acute respiratory viral infections.
One of the main causes of chronic renal failure (71.5% according to the National Registry of Patients with Chronic Kidney Disease)

A.T.Rosenfield et al., 1979; M.C.Soulen et al., 1989;
L.Dalla Palma et al., 1999





Ways of kidney infecting

- **hematogenous**
(*non-complicated pyelonephritis*)
- **urogenous**
(*complicated pyelonephritis*)

E. coli, Str. pyogenes, Staph. aureus are predominantly isolated from the urine of patients with hematogenous pyelonephritis

Proteus, Ps. aeruginosa, Enterobacter, Klebsiella are predominantly isolated from the urine of patients with complicated (obstructive) pyelonephritis

90% of microbes are intestinal (E. coli, Proteus, Ps. aeruginosa, Enterobacter, Klebsiella)

Pyelonephritis classification:

primary *complicated*

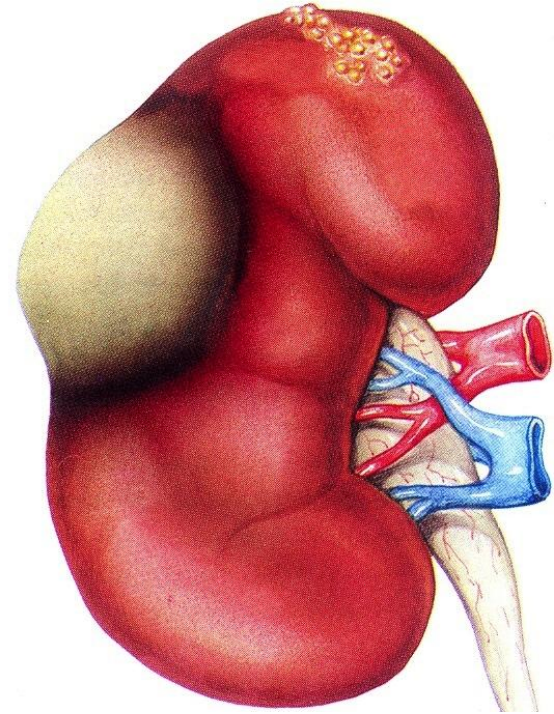
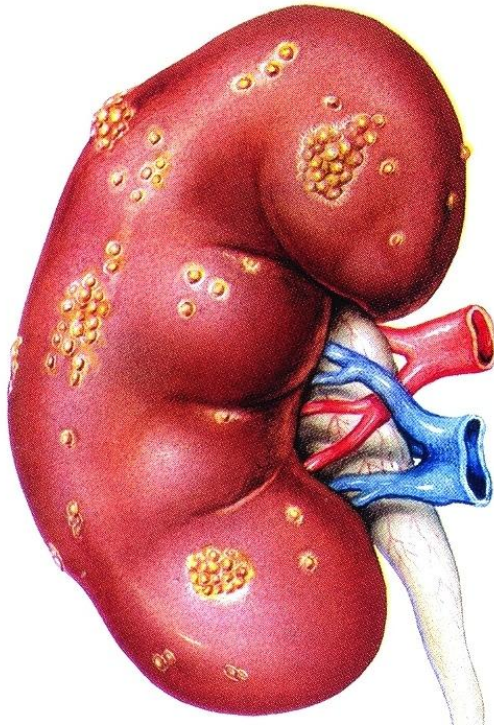
acute *chronic*

Stages of acute pyelonephritis:

serous *purulent*

Forms of acute pyelonephritis:

- **apostematous**
(*focal bacterial nephritis*)
- **renal carbuncle**
(*multifocal bacterial nephritis*)
- **renal abscess**



Apostematous nephritis, forming of carbuncles,
renal abscess

In children primary role in pyelonephritis plays:

- *infravesical obstruction;*
- *vesico-uretero-renal refluxes*

In elderly and senile adults high level of morbidity is due to :

- *immunodeficient states (age-related);*
- *urodynamic impairment;*
- *infravesical obstruction;*
- *impairment of intestinal passage*

Pyelonephritis complicates pregnancy in 2-17% of women, more often in the 2-3 trimester, and takes the leading place in the structure of extragenital pathology of pregnant women

Provoking factors for gestational pyelonephritis:

- *urodynamic impairment;*
- *distant places of infection;*
- *impairment of intestinal passage*

Patients with **diabetes mellitus** have pyelonephritis as a mutual factor:

"Infection of the kidneys" complicates the normalization of carbohydrate metabolism

In turn, successful treatment of pyelonephritis is impossible without normalization of carbohydrate metabolism

The classic **triad of symptoms** of acute pyelonephritis include:

- *pain in the lumbar region;*
- *fever;*
- *changes in urine (leucocyturia, bacteriuria)*

Causes of transition of serous pyelonephritis to purulent stage:

- *untimely resumption of urodynamics*
- *inadequate antibacterial therapy*

Clinical signs of transition of serous pyelonephritis to purulent stage :

- *worsening of patients condition;*
- *deterioration of pain in lumbar region;*
- *fever $>38,5^{\circ}\text{C}$*

The frequency of purulent forms of acute pyelonephritis is 30%

The rate of primary and secondary nephrectomies is up to 40%

Mortality reaches 20% and ranks first in the mortality structure of urological hospitals

The frequency of chronisation of acute purulent pyelonephritis reaches 75% (N. Papanicolaou, R.C.Pfister, 1996; L.Dalla Palma et al., 1999)

FORMS OF UROSEPSIS:

- **Sepsis** is characterized by presence of two or more symptoms (with proven infection)
- **Sepsis from hypotension** (characterized by decrease of systolic arterial pressure below 90 mm Hg. or more than 40 mm Hg. from initial)
- **Heavy sepsis** (with multi-organ failure)
- **Septic shock** (characterized by decrease of systolic arterial pressure below 90 mm Hg. or more than 40 mm Hg. from initial despite adequate resumption volume of liquid)

CLINICAL SIGNS OF SEPSIS (SIRS)

Body temperature $> 38.5^{\circ}\text{C}$ or $< 35.0^{\circ}\text{C}$

Heart rate > 90 beats per minute

Respiratory rate > 20 breaths per minute or arterial CO_2 tension < 32 mm Hg or need for mechanical ventilation

White blood cell count $> 12,000/\text{mm}^3$ or $< 4,000/\text{mm}^3$ or immature forms $> 10\%$

Diagnostic procedures aim in pyelonephritis is to establish:

- *presence of urodynamical problems*
- *cause of urodynamical problems*
- *stage of pyelonephritis*
- *type of purulent pyelonephritis*
- *type of causative microorganisms*

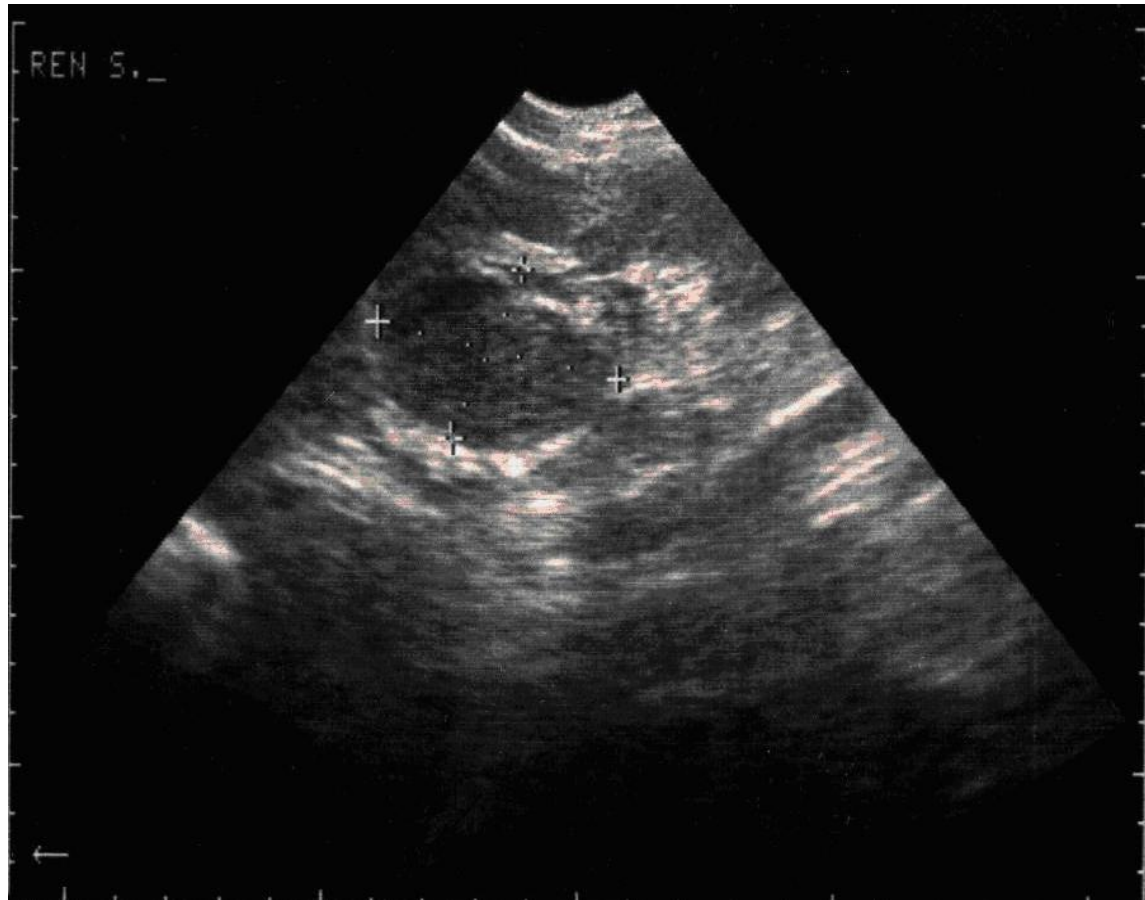
Examination of a patient with acute pyelonephritis begins with ultrasonography

For the purpose of determining the functional state of the kidneys and the cause of urodynamics impairment, a plain KUB and excretory urography is performed

For differential diagnosis those methods should be used:

- ▶ *Doppler ultrasound*
- ▶ *CT with enchansing*
- ▶ *MRI*

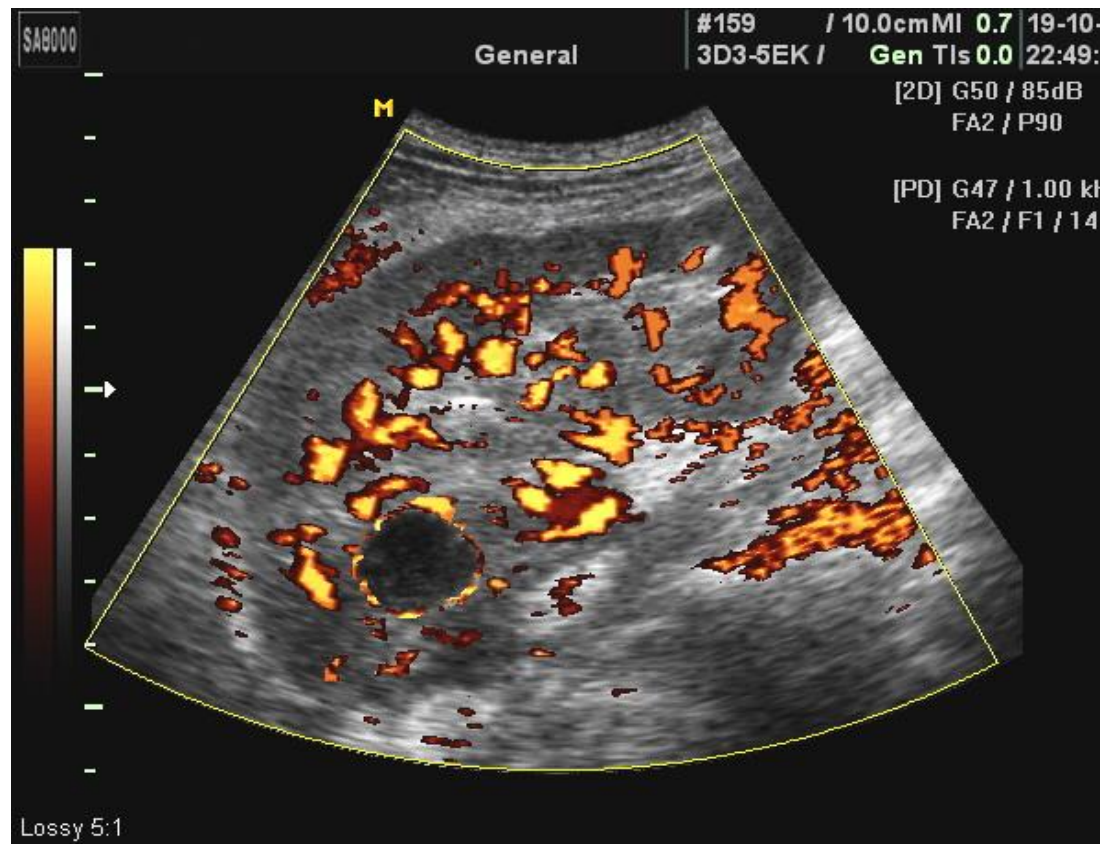
Kidney abscess (Ultrasonogram)



Carbuncle of the kidney (Ultrasonogram in ED mode)



Kidney abscess (Ultrasonogram *in DE mode*)



Kidney abscess (MRI)



Treatment of acute pyelonephritis

begins with the restoration of urodynamics:

- catheterization (internal stenting);
- percutaneous nephrostomy

Indications to some methods of treatment of acute pyelonephritis:

- **conservative treatment** is indicated when the purulent content is absent;
- **percutaneous drainage** is indicated when the purulent content is present;
- **surgical treatment** is indicated in when there is a spread of inflammation into the paranephrium and percutaneous drainage *is ineffective*

Intravenous antibacterial therapy includes:

- **Cephalosporins of III- IV generation**

(Ceftriaxone, Ceftazidime 1 g 2 times a day);

- **Amoxicillin** *(Amoxiclav 1.2 g 2-3 times a day);*

- **Aminoglycosides** *(Gentamicin 80 mg 2 times a day, Amikacin 500 mg 2-3 times a day);*

- **Fluoroquinolones** *(Ciprofloxacin 200 mg 2 times a day);*

- **Metronidazole** *(Metragil 500 mg 2 times a day)*

*After normalization of body temperature patient is transferred to oral antibiotics according to the principle of **stepwise therapy or uroantiseptics** (Nitroxoline 100 mg 4 times a day, Palin 400 mg twice a day, Norfloxacin 400 mg twice a day)*

For the purpose of preventing dysbiosis antibacterial therapy is usually accompanied with antifungal agents (Nystatin in a dose of 500 mg 3 times a day or Fluconazole 50 mg once a day)

Gestational pyelonephritis

Treatment begins with internal drainage of the kidney (catheter-stent)

Treatment of acute pyelonephritis in elderly persons *is carried out taking into account the nature of the disease, short courses of antibiotic therapy are preferred*

Diabetic patients *on the background of hyperglycemia usually have a rapidly developing purulent-destructive forms of acute pyelonephritis, so treatment strategy involves the normalization of carbohydrate metabolism, and should be more active*

PECULIARITIES OF MEDICAL TACTICS IN ACUTE PURULENT PYLONEPHRITIS:

- **Conservative treatment** *is indicated in apostematous nephrite at absence of urodynamics violations*
- **Minimally invasive (percutaneous) draining** - *kidney abscess*
- **Open surgical interventions** - *kidney carbuncle, kidney abscess, when there is a spread of inflammation into the paranephrium and percutaneous drainage is ineffective*

Inadequate treatment of acute pyelonephritis causes chronic infection of the inflammatory process

Chronic pyelonephritis is characterized by lesions of the tubular device, interstitial tissue, blood vessels, with the development of renal scarring and "wrinkling" of the kidney

Renal scarring is complicated by nephrogenic hypertension and chronic renal failure

PYONEPHROSIS

Pyonephrosis – *terminal stage of purulent destructive process with total replacing of parenchima with connective tissue*

In contrast to infected hydronephrosis, when function of the kidney is partially preserved, in pyonephrosis it is completely absent

Treatment is surgical - nephrectomy

PARANEPHRITIS

Paranephritis – *infectious inflammatory process in paranephral fat (acute and chronic)*

Primary paranephritis (20%) *develops in absence of renal diseases due to infecting of paranephral tissue from distant purulent foci (furuncles, abscesses, osteomyelitis and others)*

Secondary paranephritis (80%) *develops as complication of purulent processes in kidneys*

Treatment: *in the stage of exudative inflammation – conservative, in paranephral abscess stage – surgical draining*

CYSTITIS

acute

chronic

EPIDIDYMITIS, ORCHITIS, ORCHOEPIDIDYMITIS

acute

chronic

URETHRITIS

acute

chronic

PROSTATITIS

acute

chronic

PROSTATITIS

ACTUALITY



Every third man between the ages of 25 and 50 can suffer from chronic prostatitis!

Classification of prostatitis

Acute bacterial prostatitis

Chronic Bacterial prostatitis

Chronic Abacterial prostatitis

((syndrome Chronic Pelvic pain)

- inflammatory

- noninflammatory

Asymptomatic prostatitis with Inflammation

Treatment of prostatitis

- ***Renewal of microcirculation in prostate*** (ant inflammatory, bioregulating therapy – diclofenac, vitaprost rectal suppositoria)
- ***Prostate draining*** (massage, physiotherapy)
- ***Stabilization of immune violations*** (immunocorrective therapy)
- ***Antibacterial*** (urogenital infection liquidation)
- ***Symptomatic therapy*** (painkillers)

UROGENITAL TUBERCULOSIS

About 1 billion of people are infected by M.tuberculosis
Annually 10 million people become ill.

Absolute majority of cases – repeated activation of tuberculosis infection many years after primary infecting

Infecting of urinary system is usually hematogenous spread of pulmonary infection

Urogenital tuberculosis occupies the first place (25%) in extrapulmonary tuberculosis

Pathognomonic symptoms of urogenital tuberculosis

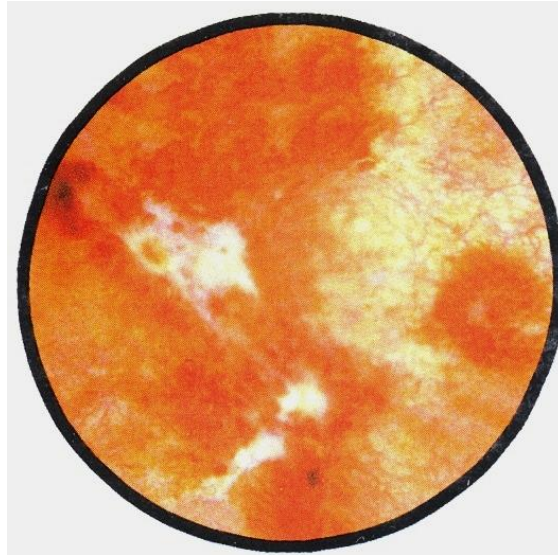
- *Tuberculosis of any localization in the anamnesis*
- *Tuberculosis of any localization in the family*
- *Asymptomatic microhematuria*
- *Asymptomatic (abacterial) leukocyturia*
- *Dysuria (microcyst)*
- *Absence of effect from nonspecific antibacterial therapy*
- *Positive Mantoux test (formation of papule within 62 hours with a diameter > 5mm)*
- *Positive bacterial analysis of urine*
- *Positive biological method (detection of Pirogov-Langhans cells in histological material)*

CLINICAL AND X-RAY CLASSIFICATION OF KIDNEY TUBERCULOSIS

- stage I - **Non-destructive tuberculosis** (*infiltrative*)
- stage II - **Primary destruction** (*papillitis or single caverns up to 1 cm*)
- stage III - **Limited destruction** (*caverns of large size that occupy one segment*)
- stage IV - **Polycavernous tuberculosis**

X-ray signs of kidney tuberculosis





Cystoscopic signs of tuberculosis of the bladder

Treatment of urinary tuberculosis

- ***Specific antibacterial therapy:***
 - *streptomycin, kanamycin, rifampicin, ciprofloxacin*
 - *isoniazid (tubazid)*
 - *ethambutol*
- ***Tissue therapy (aimed to prevent the scarring of the urinary tract):***
 - *wobenzyme*
 - *serrata*
 - *aloe*
- ***Operative treatment***

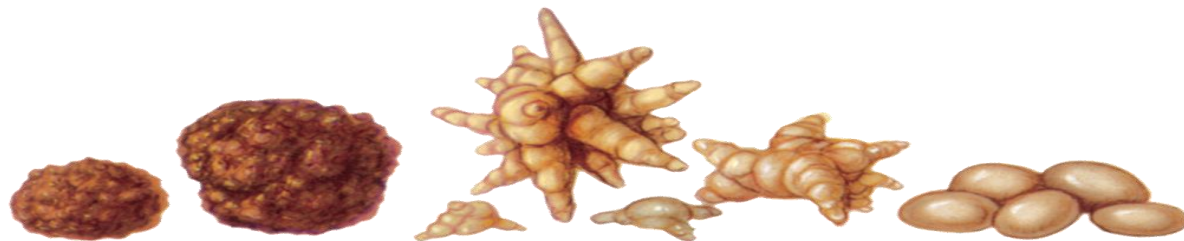
UROLITHIASIS

Urolithiasis is a combination of anatomical, biochemical and physiological changes in the body that cause stone formation.

Urolithiasis occupies the second place after UTI among all urological pathologies. Men get sick 2-3 times more often than women.

The average risk of calculus formation throughout life is 5-10%.

Patients with urolithiasis occupy 25-45% of urological hospitals population. In a number of regions (Syria, Iran, Pakistan, Saudi Arabia) the disease is endemic, indicating that the importance of environmental factors in its pathogenesis is significant



STONE COMPOSITION

Oxalates - (70-85%) consist of calcium salts of oxalic acid (dense, black-gray stones with a thorny surface)

Phosphate stones - (5-15%) consist of calcium salts of phosphoric acid (smooth, sometimes slightly rough, of a soft consistency, white or gray)

Urates - (2-18%) consist of salts of uric acid (yellow-brown color, smooth, firm consistency)

Cystine stones - (1-2%) are formed from the sulfur compound of the amino acid cystine (yellowish-white, soft consistency, with a smooth surface)



STONE FORMATION THEORIES

- 1856** - The theory of catarrh of the pelvis (the role of infection in the onset of urolithiasis)
- 1884** - Theory of the matrix (desquamation of the epithelium with subsequent impregnation with calcium salts in catarrh of the pelvis)
- 1890** - The crystalloid theory (pathological crystallization of urine)
- 1900-1910** - Colloid theory (with a decrease in the number of protective colloids - albumins, globulins and hyaluronic acid, pathological crystallization occurs)
- 1989** - Proteolysis-ion theory (with a decrease in proteolytic urine activity, a protein matrix forms and the pH of the urine changes, leading to sedimentation of urinary salts)

ETHIOLOGY

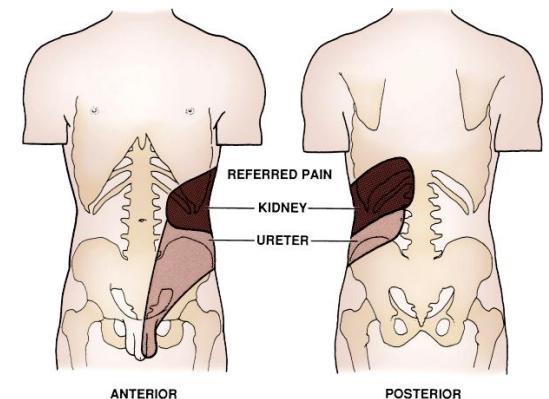
- **Hereditary predisposition (in 55% of patients, the relatives suffered from the urolithiasis)**
- **Anomalies of the urinary tract (that lead to the violation of urodynamics - horseshoe kidney, stricture of PUJ, doubling and kidney dystopia, ureterocele, infravesical obstruction)**
- **Endocrine disorders (hyperparathyroidism)**
- **Inflammatory diseases of the urinary tract**

SYMPTOMS

- Paroxysmal pain in the lumbar region (renal colic)
- Passage of stones in anamnesis
- Hematuria
- Leucocyturia
- Dizuria

RENAL COLIC

- ✓ *Due to acute violation of urodynamics*
- ✓ *It is acute, paroxysmal*
- ✓ *It is accompanied by irradiation of pain along the ureter:*
 - *into the lower quadrant of the abdomen*
 - *in men - in the scrotum*
 - *in women - in the labia major*

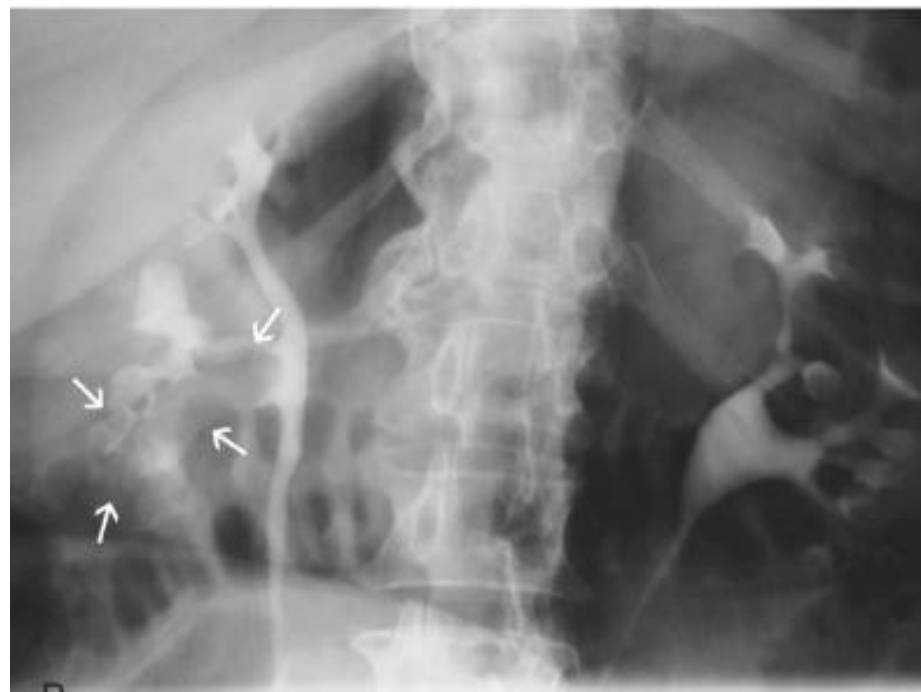


DIAGNOSIS

- ✓ Urinalysis
- ✓ Ultrasound
- ✓ Excretory urography
- ✓ CT scan
- ✓ MRI
- ✓ Cystoscopy, nephroscopy

DIAGNOSIS





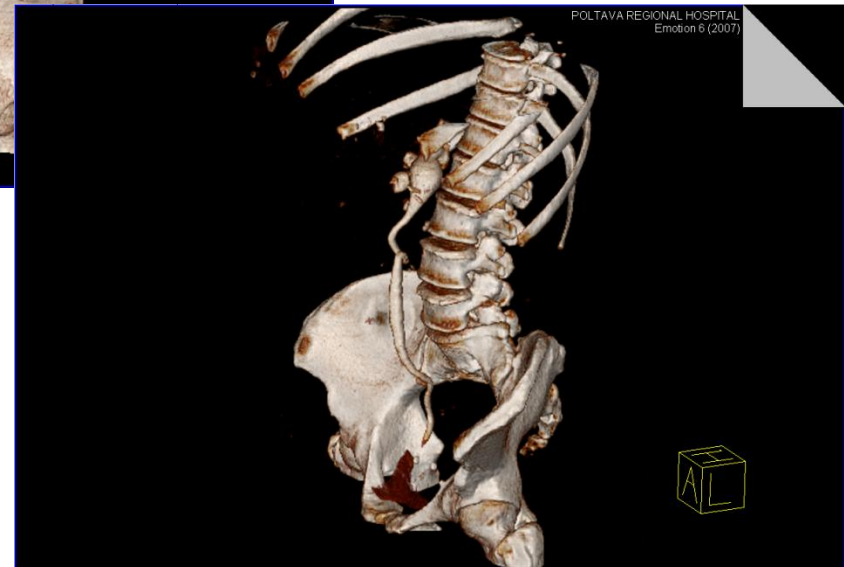
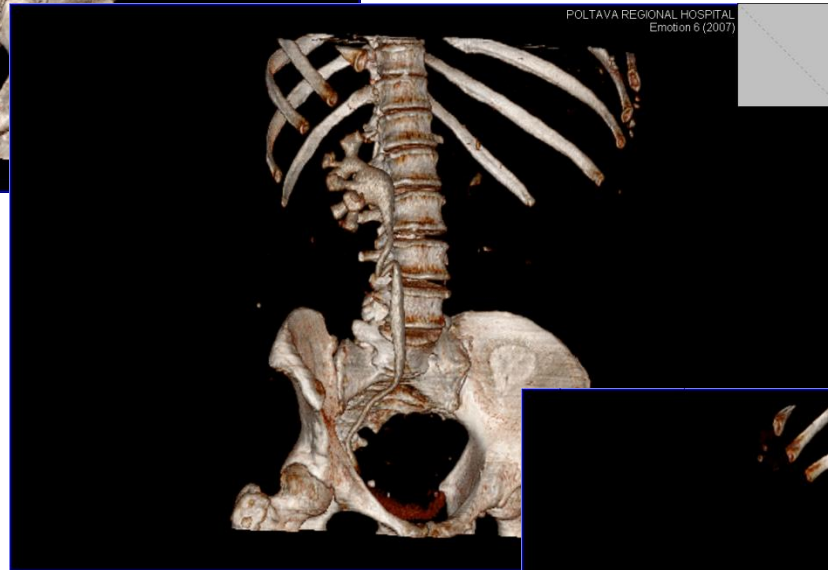
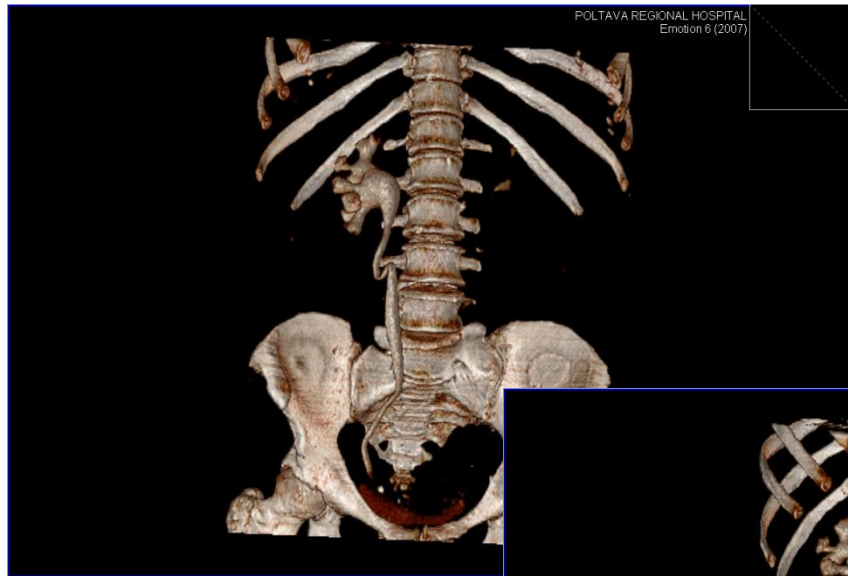


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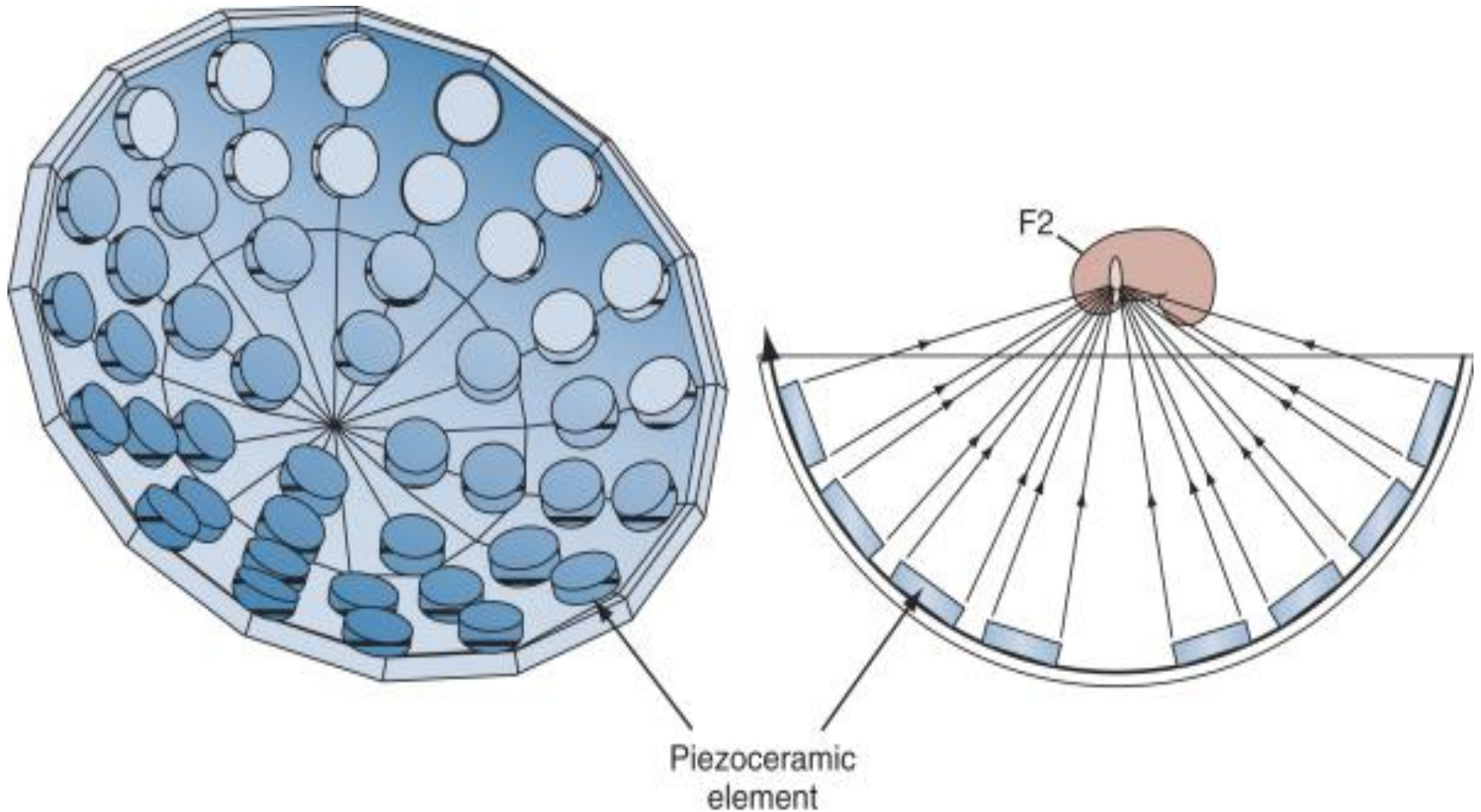
DIFFERENTIAL DIAGNOSIS

- Acute appendicitis
- Perforated ulcer of the stomach and duodenum
- Acute pancreatitis
- Ectopic pregnancy
- Radiculitis

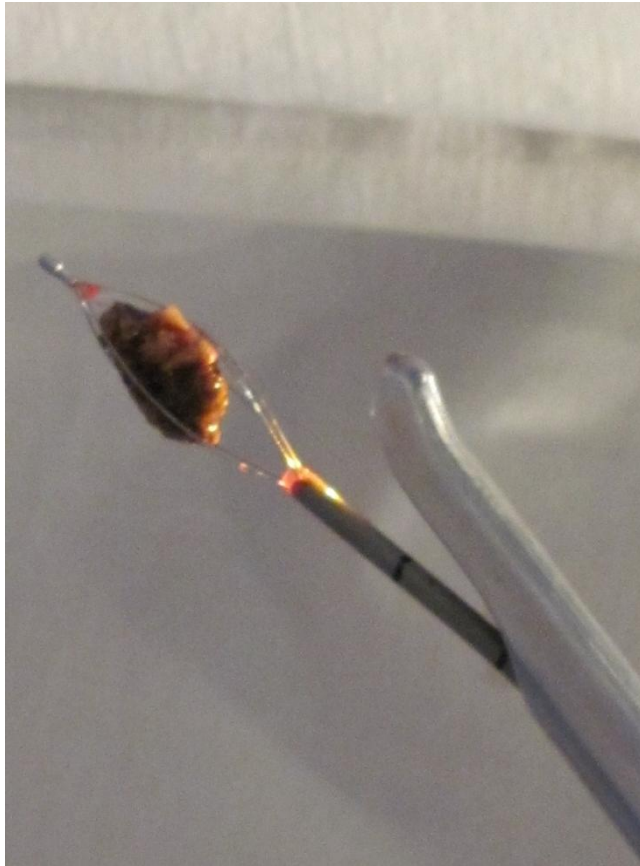
TREATMENT

- ✓ **Conservative** - concrements of ureters up to 5 mm (antispasmodics, herbal diuretics, with urate stones – alkalizing therapy)
- ✓ **Minimally invasive** (extracorporeal shock wave lithotripsy, contact lithotripsy from retrograde and antegrade approaches, ureterolithoextraction)
- ✓ **Surgical** (pyelolithotomy, ureterolithotomy)
- ✓ **Metaphylaxis**

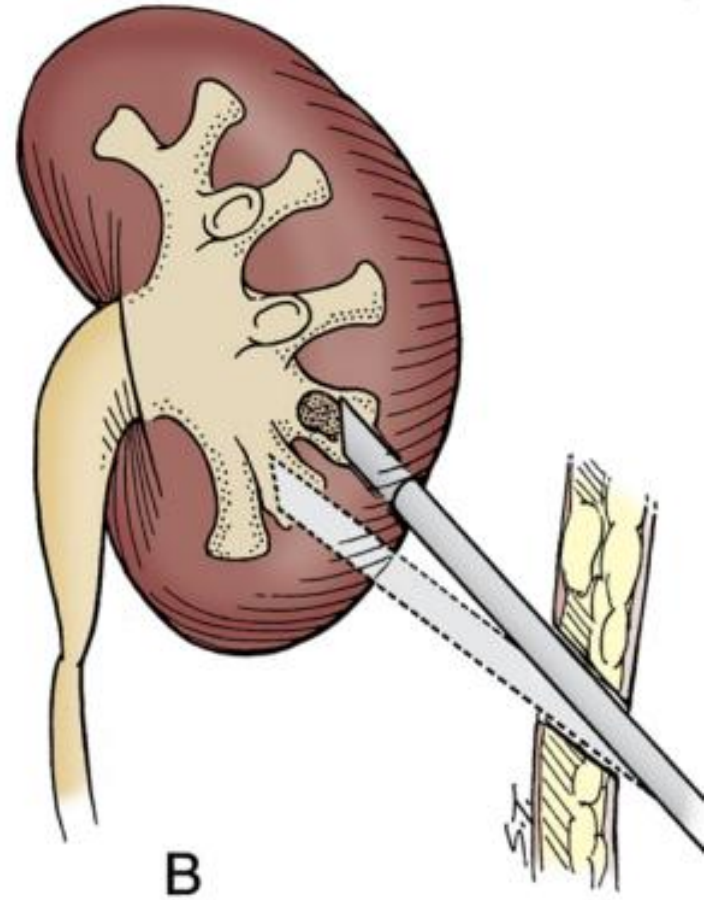
EXTRACORPOREAL SHOCK-WAVE LITHOTRIPSY



URETEROLITHOEXTRACTION



LASER LITHOTRIPSY



THANKS FOR YOUR ATTENTION!

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QUESTIONS OF ONCOLOGICAL UROLOGY

Lecture 2

2021

LECTURE PLAN

- Kidney tumors
- Wilms' tumor
- Tumors of the bladder
- Benign prostatic hyperplasia
- Prostate cancer
- Testicular tumors
- Penile cancer

TUMOURS OF KIDNEYS

I. Epithelial tumors of a parenchyma of kidneys

- Adenoma
- Oncocytoma
- Adenocarcinoma (clear cell cancer)

II. Epithelial tumors of a pelvis of a kidney

- Transitional cell papilloma
- Transitional cell carcinoma

III. Nephroblastic tumors

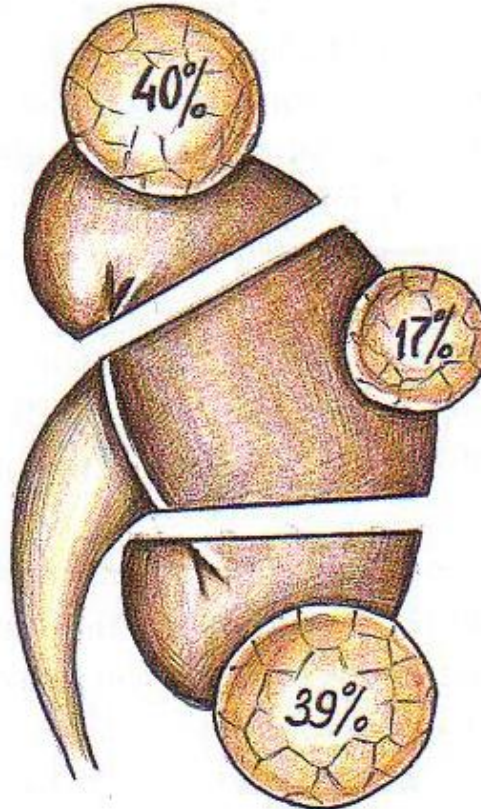
- Nephroblastoma (Wilms's tumor)

IV. Non-epithelial tumors

- Lipoma
- Hemangioma
- Angiomyolipoma

V. Other types of tumors

TUMOURS OF KIDNEYS (localization)



KIDNEY CANCER

The cancer of a kidney makes 3% of all neoplasms.

The adenocarcinoma (hypernephroma, clear cell cancer) takes 80-90% of all tumors of a kidney.

In men it's diagnosed twice more often than in women.

It is characteristic that at the time of clinical manifestation **of cancer of kidney** metastases are revealed more than at a half of patients.

The cancer of a kidney metastasizes mainly hematogenous way, first of all **in lungs, a liver, a brain**.

Tumors of a renal pelvis and ureter metastasize in lymphatic vessels of submucosal layer, **a bladder**, the distant metastases – in **lungs**.

CANCER OF THE KIDNEY (macro view)



KIDNEY CANCER. TNM CLASSIFICATION

- **T0**– symptoms of primary tumor are absent
- **T1**– a tumor $\leq 2,5$ cm within a kidney
- **T2**- a tumor $> 2,5$ cm within a kidney
- **T3**– a tumor extends to a vena cava, an adrenal gland, a renal capsule, without getting out of limits of a fascia of Gerota
- **T4**– a tumor extends out of limits of a fascia of Gerota

- **N0**- metastases in regional lymph nodes are not defined
- **N1**– single metastases in regional lymph nodes ≤ 2 cm
- **N2**– metastases in the distant lymph nodes ≤ 5 cm
- **N3**– metastases in lymph nodes > 5 cm

- **M0**– the distant metastases are not defined
- **M1a**– the single distant metastases
- **M1b**– the multiple distant metastases

KIDNEY CANCER

General (extrarenal) symptoms:

- Deterioration in the general state due to intoxication tumor decay products (anorexia, the general weakness, anemia).
- Decrease in weight (30%).
- Fervescence (11-50%). Resuming of fever after radical operational treatment demonstrates existence of a recurrent tumor or metastases.
- Increase of ESR.
- Increase of level of blood serumfibrinogen.
- Hyperglobulia (2,5%).
- Arterial hypertension (15-20%).

Local symptoms:

- **The hematuria**, is more often in the form of oblong clots (to 70%).
- **Pain** (60-70%).
- **The palpated tumor** (11-40%).

KIDNEY CANCER

DIAGNOSTIC ALGORITHM

ULTRASONOGRAPHY



SURVEY AND EXCRETORY UROGRAPHY



CT



MRI

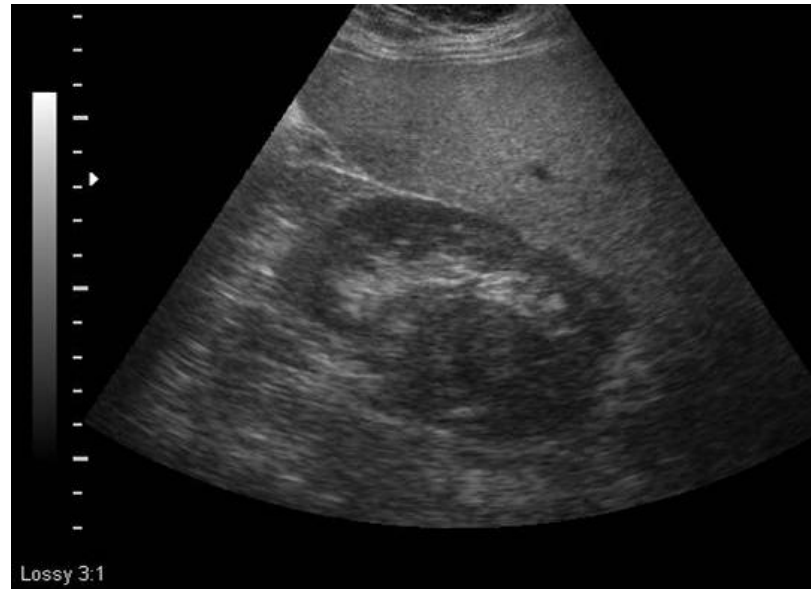


ANGIOGRAPHY



Roentgenogram of lungs, ultrasonography of a liver, brain CT, MRI
(for Mts exclusion)

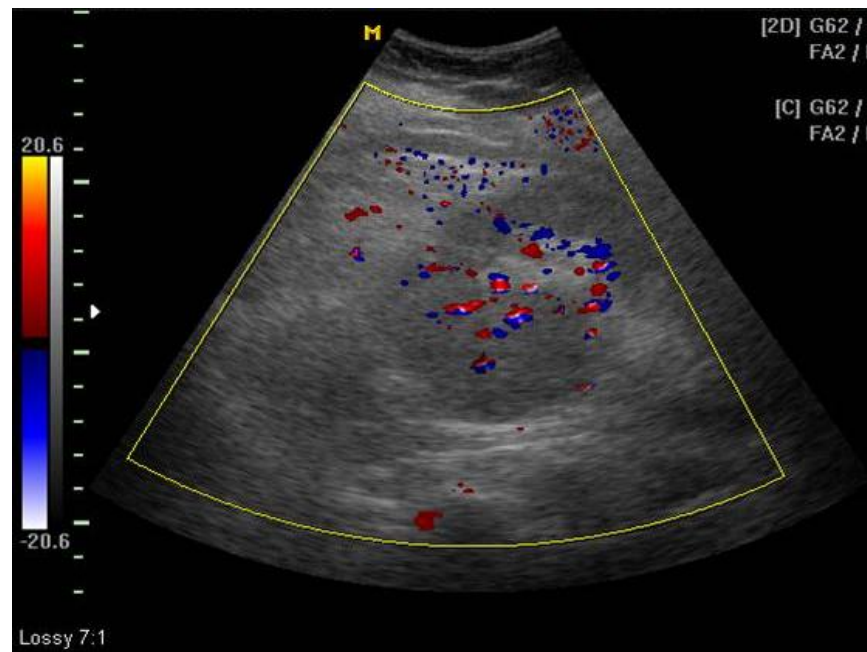
KIDNEY CANCER (ultrasonography in the mode of a gray scale)



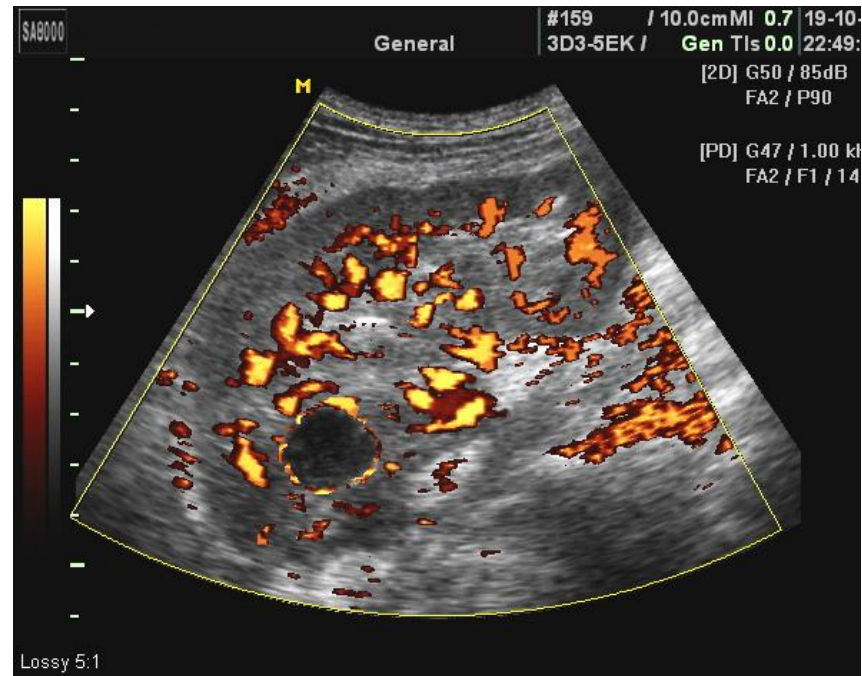
KIDNEY ABSCESS (ultrasonography, power doppler)



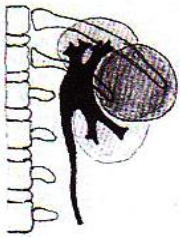
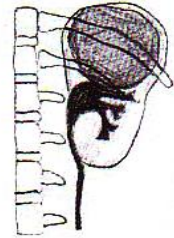
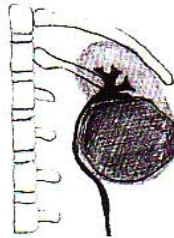
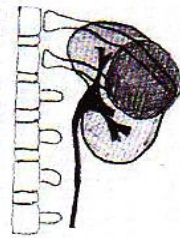
KIDNEY CANCER (ultrasonography, color Doppler mapping)



KIDNEY ABSCESS (ultrasonography, power doppler)



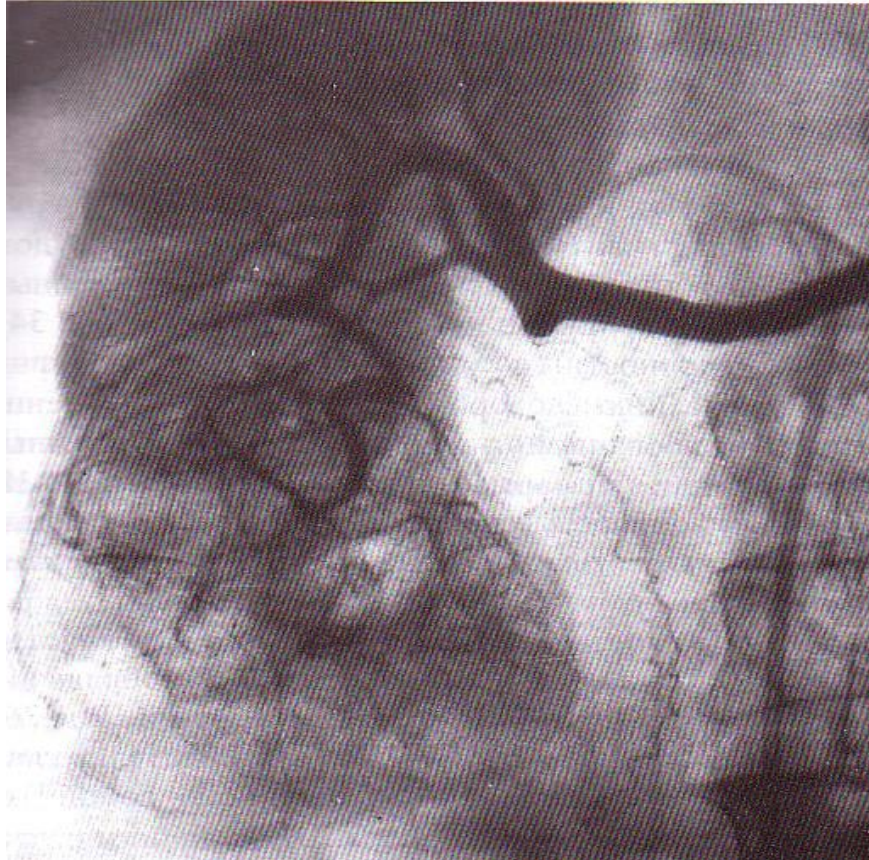
KIDNEY CANCER (excretory urography)



CANCER OF THE KIDNEY (MRI)

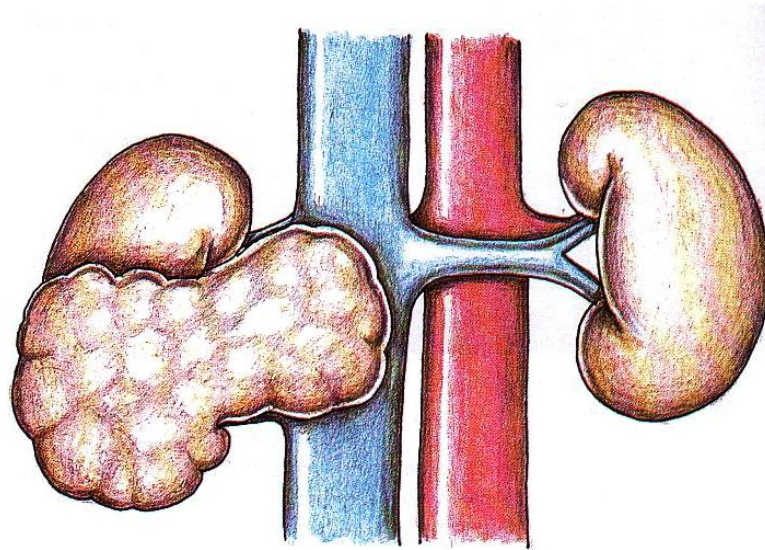


CANCER OF THE KIDNEY (angiography)



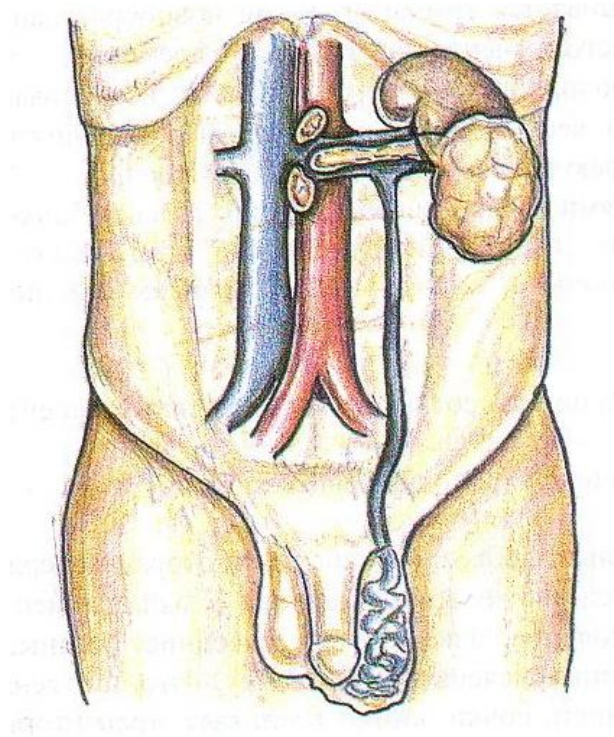
KIDNEY CANCER

(a venocavagrafia, tumor thrombus in the lower vena cava, 6-10%)



KIDNEY CANCER

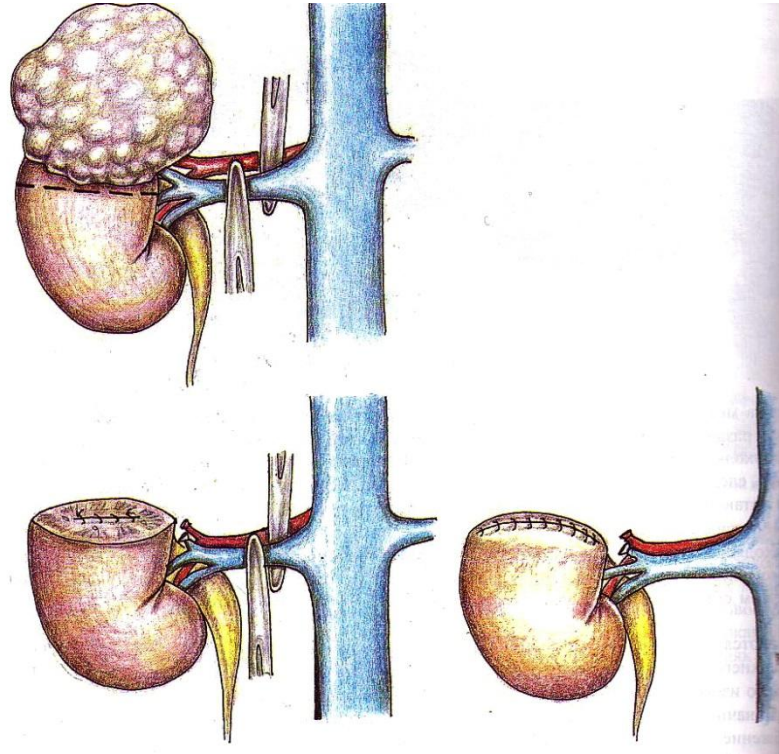
(varicocele due to tumor thrombus in the lower vena cava and renal vein)



KIDNEY CANCER. TREATMENT

- ***Radical nephrectomy.***
- ***Indications to organsparing tactics*** - tumors 4-7 cm in an upper or lower segment of a kidney (is more rare on middle segment).
- ***Substantiation of organsparing tactics*** is based on perhaps multifocal, bilateral damage of kidneys.
- ***Treatment of a papillary tumor of a renal pelvis*** includes a nephroureterectomy with a bladder resection (removal of a lymphatic collector).

KIDNEY CANCER. TREATMENT (organsparing operation)



NEPHROBLASTOMA (VILMS'S TUMOUR)

- *In a children's onkourology **Vilms's tumor** takes 92% of cases, is more often at the age of **2-5 years**. Metastasizes more often to lungs.*
- *It arises from embryonal rudiments of pronephros or a metanephros. In **20%** of cases it is combined with anomalies of development.*
- *In most cases the first symptom paying an attention of parents and the doctor is "**the mass of an abdominal cavity**".*
- *In **75%** of cases **increase of the BP** at the child takes place.*
- *Treatment– **a radical transabdominal nephrectomy**.*
- *The children operated in age till **6 months** survive practically in **100%** of cases. The children operated till **one year** survive more than in **80%** of cases.*

BLADDER TUMOURS

Percent **of tumors of a bladder** takes **4%** of all neoplasms, with a tendency to its increase. Men are diagnosed with bladder tumours 3-4 times more often, at the age of **50-70**.

Papillary cancer – the most frequent form (**85%**) of a bladder cancer.

Etiology:

- work with aniline dyes;
 - tobacco smoking;
 - chronic inflammatory processes in a bladder;
 - bilgartsiosis;
 - the increased concentration of urine.
-
- **The most frequent symptoms of bladder cancer** – *an intermittent hematuria and a dysuria.*

BLADDER PAPILLOMA

***Benign papilloma** – a stage of development **of cancer of bladder**.*

*Diagnosis **of papilloma of a bladder** includes TUR of a wall of a bladder with a tumor biopsy.*

*All patients are subject **to dispensary observation** with a control cystoscopy within **the first year** every 3 months; **the second year** – every 6 months, **within the next 3 years** – once a year.*

BLADDER CANCER. TNM CLASSIFICATION

- **Ta**– a papillary noninvasive tumor
 - **Tis**- cancer of "in situ" (within a mucous membrane)
 - **T1**– the superficial cancer infesting a mucous membrane and a submucosal layer
 - **T2**– invasive and muscular cancer
 - **T2a**– an invasion of inside layers of a detrusor
 - **T2b**– an invasion of enveloping layers of a detrusor
 - **T3**- an invasion out of detrusor limits
 - **T3a**– a microscopic invasion
 - **T3b**– a macroscopic invasion
 - **T4**– an invasion in the near organs
 - **T4a**– a prostate, a rectum, a uterus
 - **T4b**– a pelvic wall, a front abdominal wall
-
- **N1**- a single lymph node ≤ 2 cm
 - **N2**- lymph nodes ≤ 5 cm
 - **N3**- lymph nodes > 5 cm

BLADDER TUMOURS

DIAGNOSTIC ALGORITHM

ULTRASONOGRAPHY



CYSTOSCOPY WITH THE TUMOUR BIOPSY



PHOTODYNAMIC (FLUORESCENT) CYSTOSCOPY
(special optics, 3% solution of 5-aminolevulinic acid)

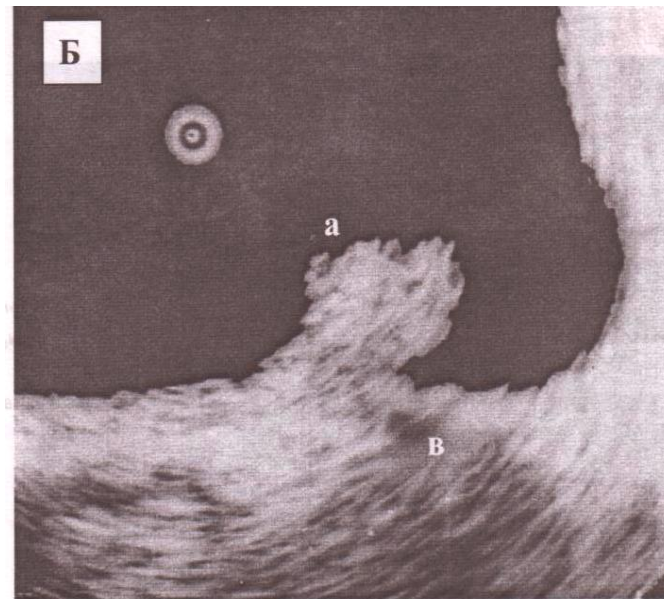
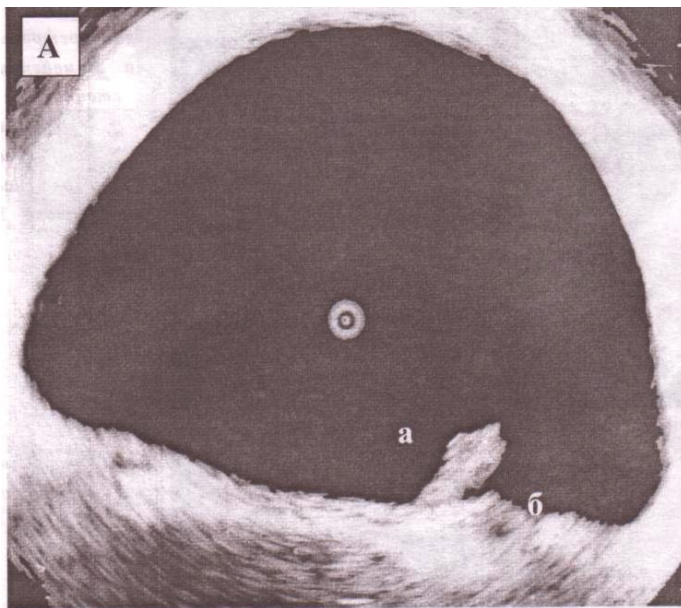


KUB AND EXCRETORY UROGRAPHY

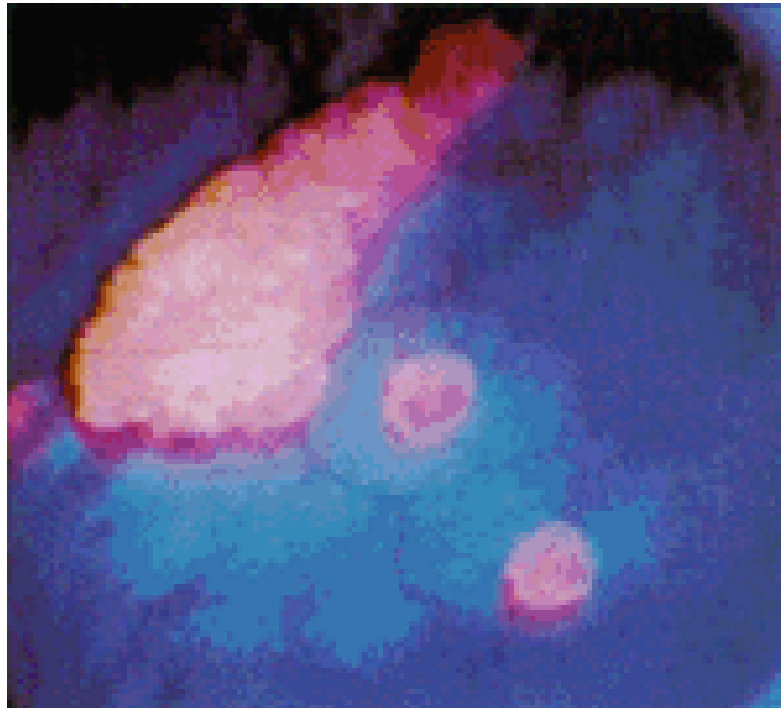


Roentgenogram of lungs, ultrasonography of a liver, CT, MRI
(for Mts exclusion)

BLADDER TUMOUR. TRUS



CANCER "in situ". PHOTODYNAMIC CYSTOSCOPY

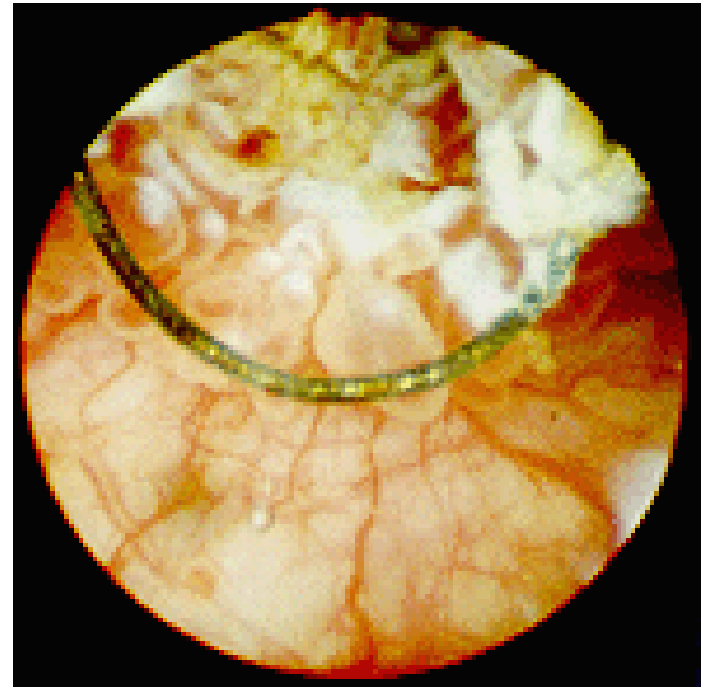
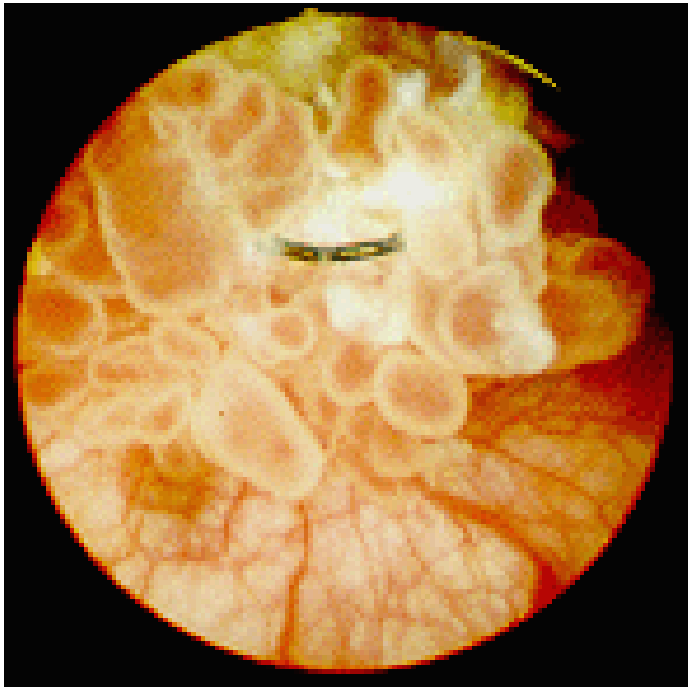


BLADDER TUMOUR (cystoscopy)



BLADDER TUMOUR

(TUR of a bladder wall with a tumor biopsy)



CANCER OF THE BLADDER TREATMENT STRATEGIES

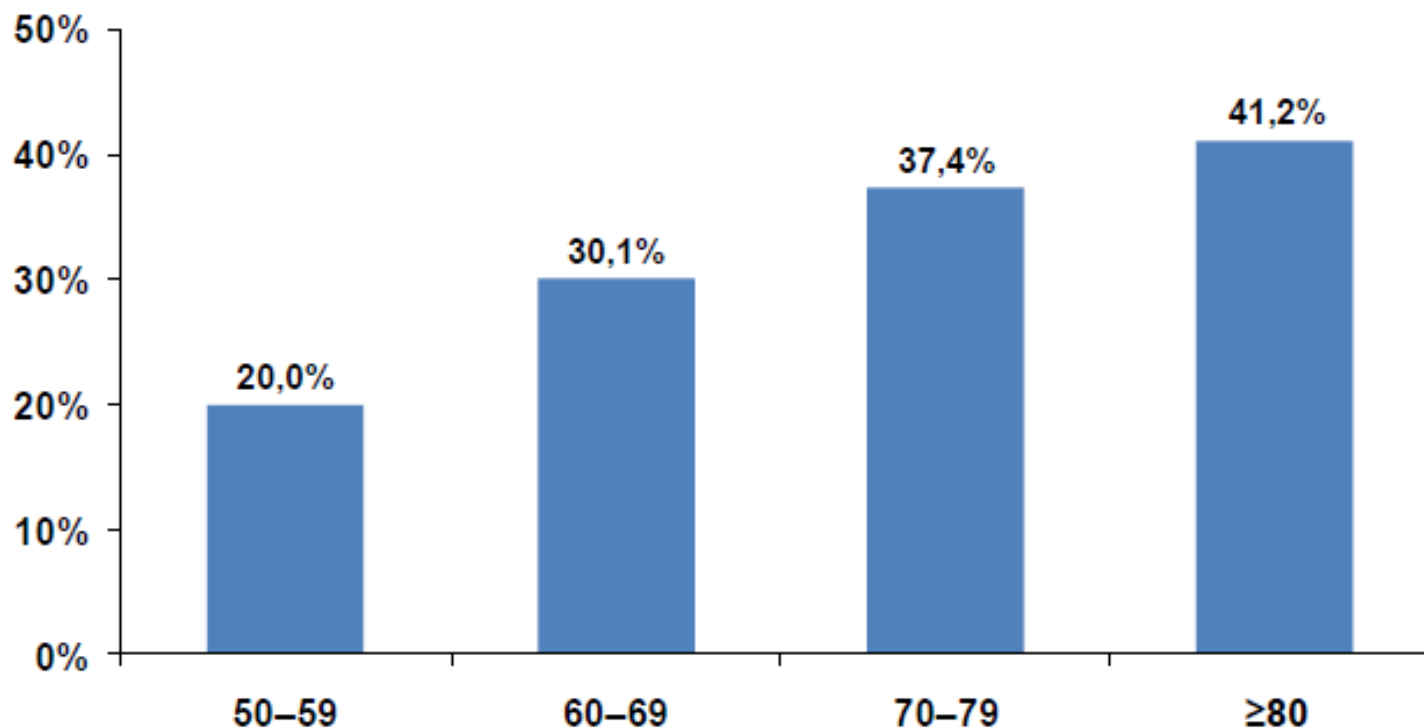
Stage	Treatment
Tis/Ta/T1	• TUR + Single dose of intravesical chemotherapy • BCG therapy is recommended in tumours with a high risk or recurrence and/or progression e.g. high-grade (G3) tumours and in carcinoma in situ (CIS)
T2-T3	• Radical cystectomy gold standard. • Radiotherapy can be considered for those patients not suitable for surgery or for those patients who want to preserve their bladder
T4	• Palliative – chemo/radiotherapy for symptom relief

HYPERPLASIA OF THE PROSTATE (BPH)

- **The most frequent disease of men** after 50 years
In Great Britain more than 1,5 million addresses to the doctor annually are registered
- **Operation for BPH** - on the tenth place on frequency among surgical interventions within NHS
- **The acute urine retention** takes 5% of the most frequent reasons of the emergency request for medical care in NHS hospitals

NHS, National health system

Age frequency of addresses to the doctor of patients with BPH



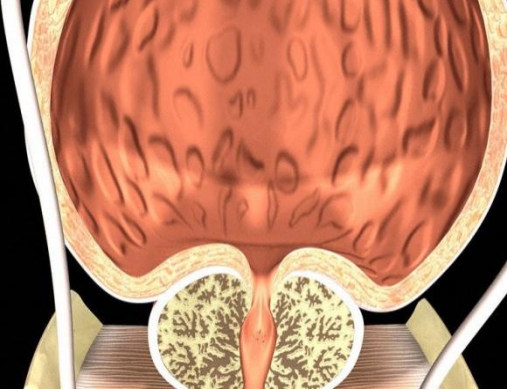
LUTS frequency at BPH

Clinical LUTS

- Clinically LUTS suggestive of BPH is present
 - ~10% in 40s
 - ~25% in 50s
 - ~40% in 60s
 - ~40% in 70s
 - *Overall 25% in 40-79*

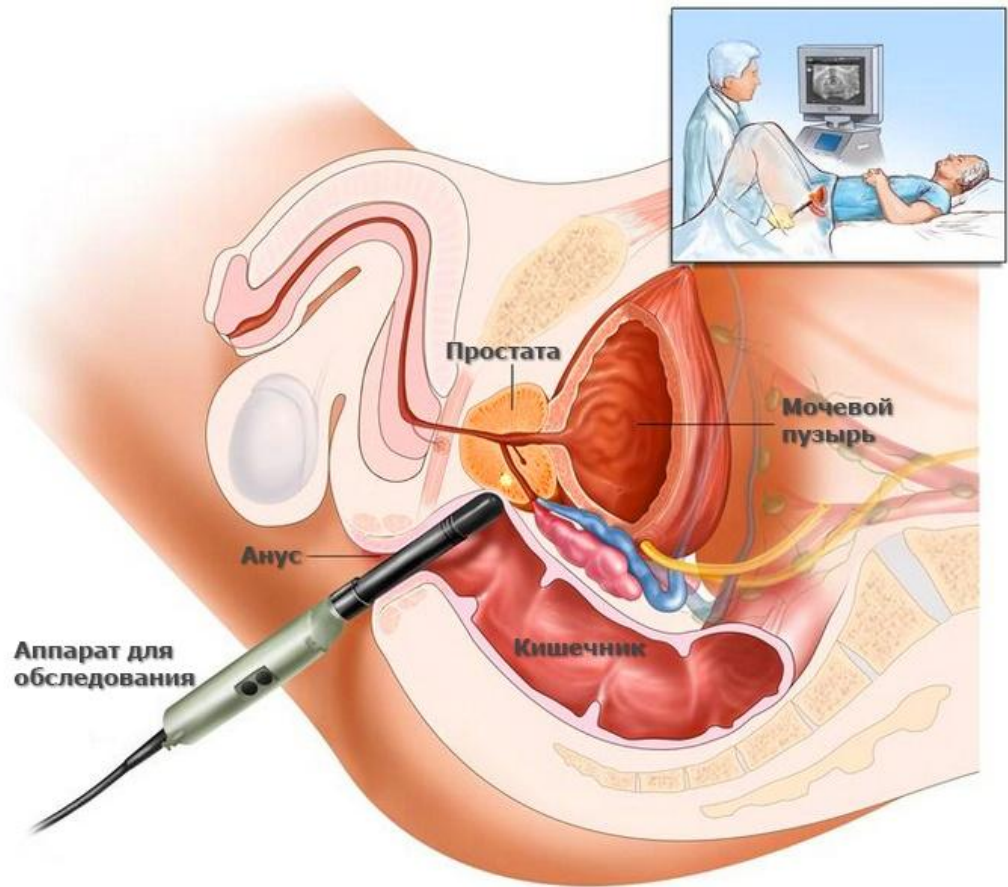
– Garraway Lancet 1991 (Stirling study)

Garraway WM, Collins GN, Lee RJ. High prevalence of benign prostatic hypertrophy in the community. Lancet. 1991 Aug 24;338(8765):469–471.



Classification of BPH

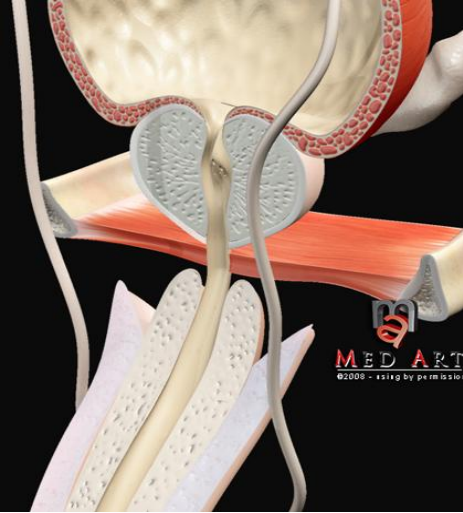
- **Stage I – a scale of IPSS is 0-7 points** prostate gland volume up to 30 cm³, Q_{max}<15 ml/sec., no residual urine)
- **Stage II - scale of IPSS is 8-19 points** volume of a prostate 30-80 cm³, Q_{max}<10ml/sec., volume of a residual urine <200 cm³)
- **Stage III - scale of IPSS of 20-35 points** prostate gland volume >80 cm³, Q_{max}<5 ml/sec., volume of a residual urine>200 cm³, decompensated bladder, ureterohydronephrosis, intermittent uric infection)



Diagnosis of BPH. Digital rectal examination. TRUS

RISK FACTORS OF PROGRESSING OF BPH

- Age (>60 years)
- Expressiveness of LUTS (>8 points on IPSS scale)
- Urine flow rate ($Q_{\max} < 15$ ml/sec.)
- **Prostate volume (>30 cm³)**
- **PSA level (>1,5 ng/ml)**

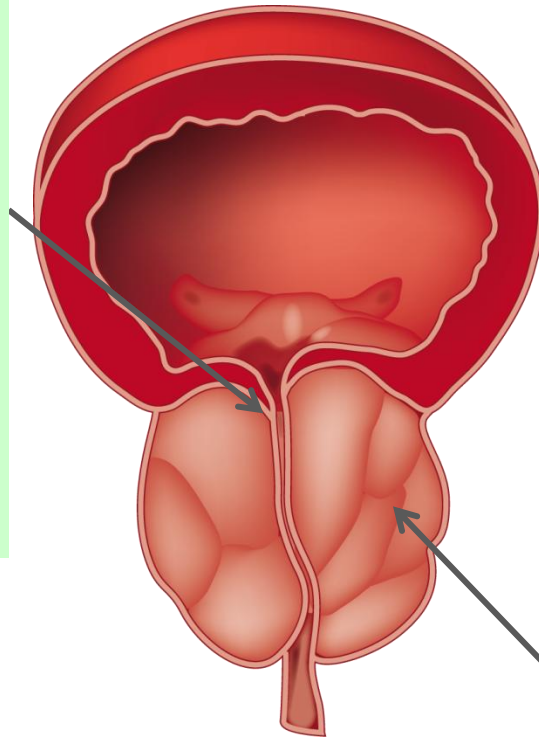


BPH. Medical tactics

- **Stage I** - *IPSS of 0-7 points: dynamic supervision*
- **Stage II** - *IPSS of 8-19points: conservative treatment*
- **Stage III** - *IPSS of 20-35points: operative treatment*

BPH. Conservative therapy: inhibitors 5 α -of reductase and α -adrenoblockers

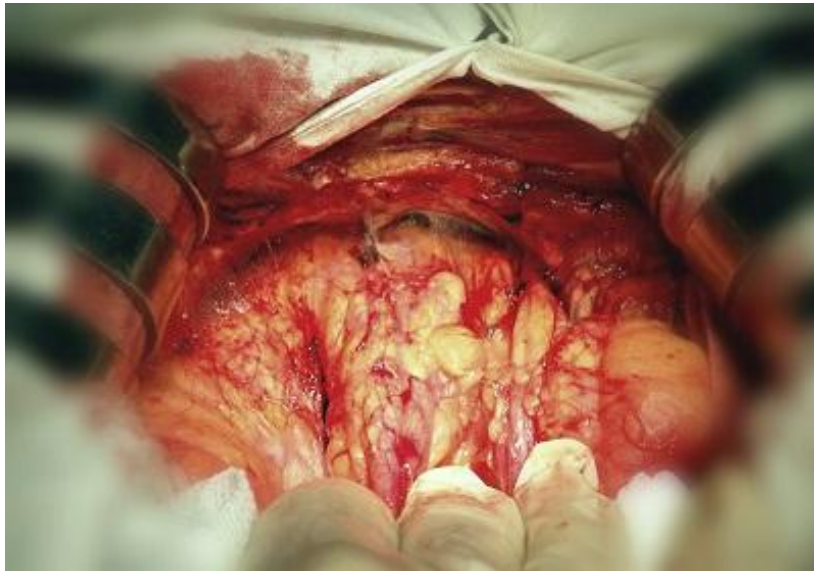
α -adrenoblockers-
(tamsulozin, doksazosin)
*relax receptors of smooth
muscles of a neck of a
bladder and a prostate*

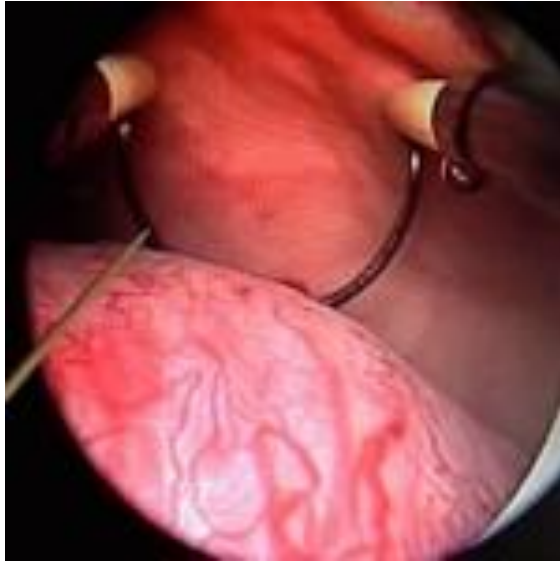


5 α -reductaseinhibitors
(finasterid, dutasterid)
*reduce the prostate size
due to inhibition of growth
cells*

BPH. Operative treatment

Retropubic adenomectomy



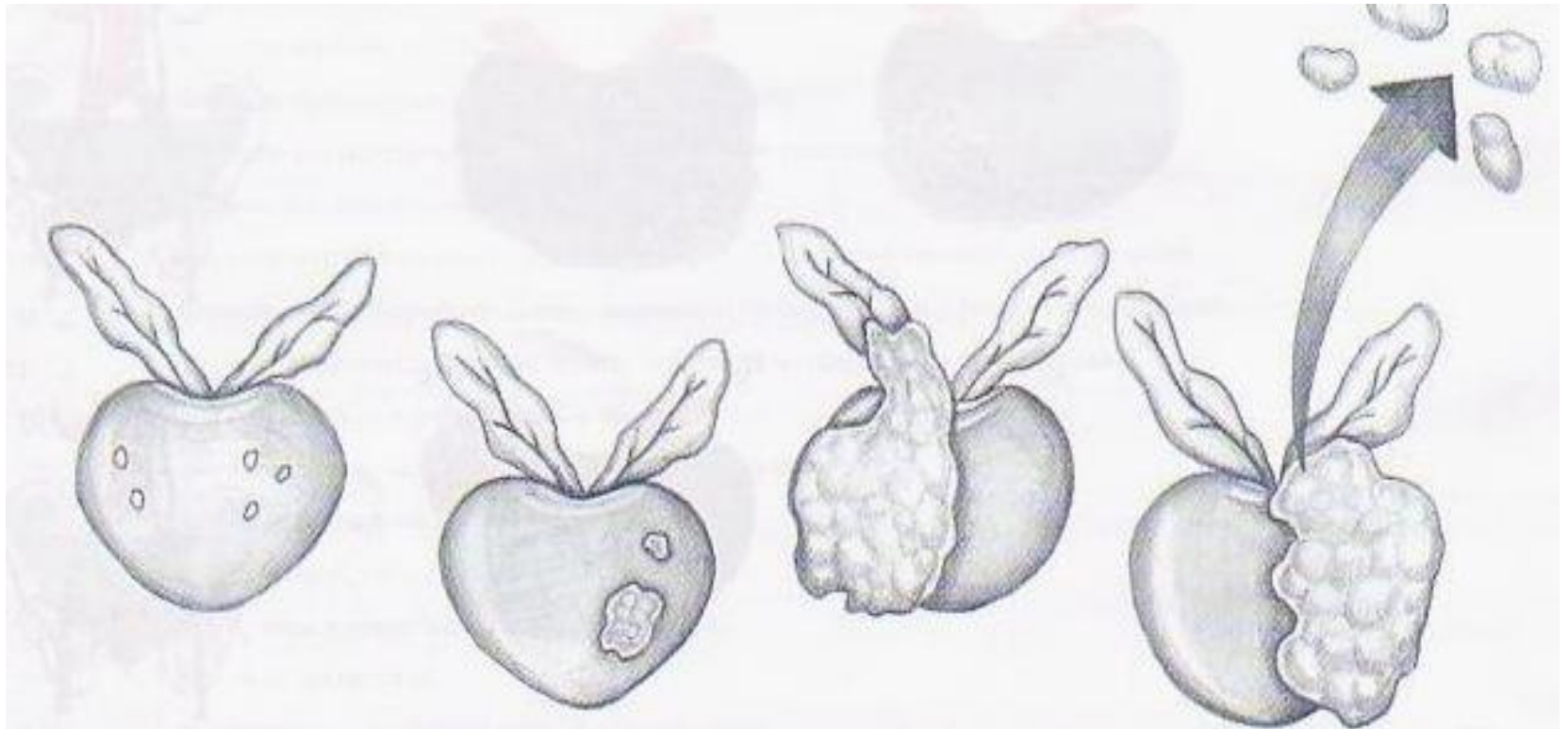


BPH. Operative treatment

Transurethral resection and vaporization of a tumor



PROSTATE CANCER



local

local spread

local-invasive

disseminated

PROSTATE CANCER

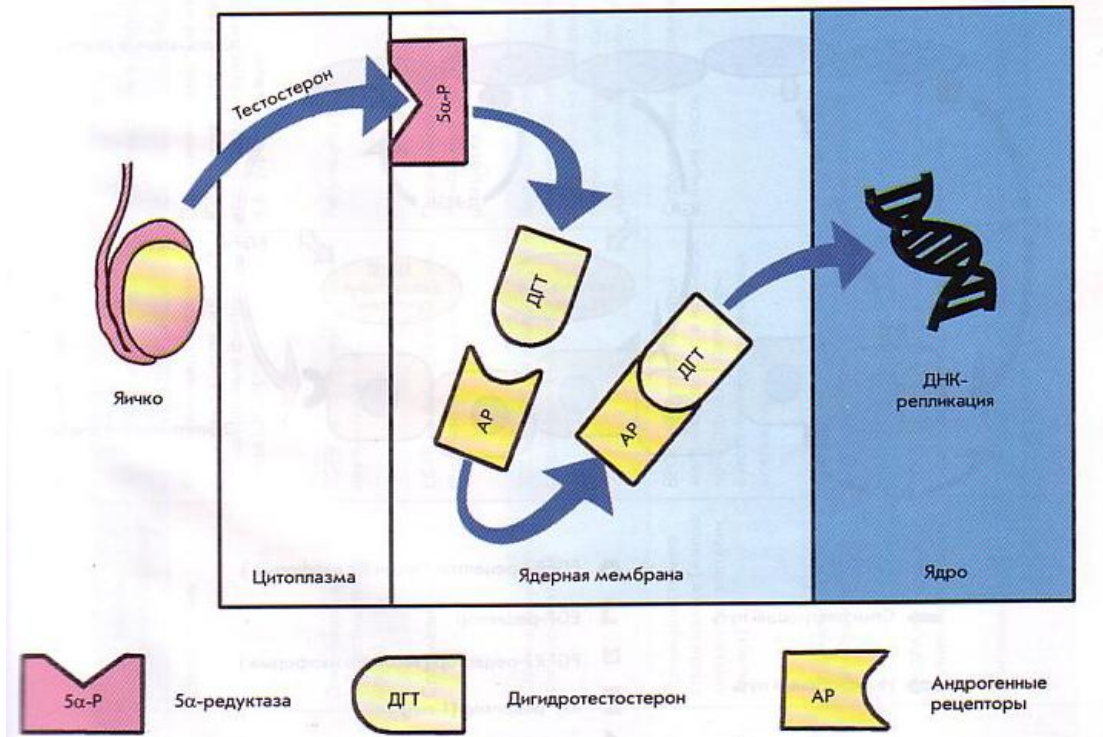
The most frequent oncological pathology in men after 60.

*The microscopic centers of atypia of an epithelium (or cancer cells) **without clinical manifestations** can be found in a at 30-40% of men. At the same time the probability to die from a cancer does not exceed 3%.*

Metastasizes in **pelvic bones and a backbone, lungs, a liver.**

Locally limited forms of cancer are revealed in 30% of cases.

PROSTATE CANCER



Mechanism of androgenic stimulation of cellular growth

PROSTATE CANCER. TNM CLASSIFICATION

- **Tx**– primary tumor cannot be revealed
- **T0**– primary tumor is not revealed
- **T1**– clinically not revealed tumor
- **T1a**– accidentally revealed tumor ($\leq 5\%$ of the resected tissue)
- **T1b**– accidentally revealed tumor ($\geq 5\%$ of the resected tissue)
- **T1c**– revealed at a puncture biopsy (due to increase of the PSA)
- **T2**– a tumor within a prostate
- **T2a**– a tumor occupies less than a half of one lobe of a prostate
- **T2b**– the tumor affects more than a half of one lobe of a prostate
- **T2c**– a tumor occupies both lobes of a prostate
- **T3**– an invasion out of prostate capsule
- **T3a**– a unilateral invasion out of prostate capsule limits
- **T3b**– a bilateral invasion out of prostate capsule limits
- **T3c**– a tumor spreads to seminal vesicles
- **T4**– an invasion in the near organs
- **T4a**– an invasion in a rectum, a bladder neck
- **T4b**– an invasion into urogenital diaphragm, pelvic walls

PROSTATE CANCER. TNM CLASSIFICATION

- **N1**– a single regional lymph node ≤ 2 cm
- **N2**– a single regional lymph node ≤ 5 cm
- **N3**– regional lymph nodes > 5 cm

- **Mkh**– the distant metastases cannot be defined
- **M0**– the distant metastases are not revealed
- **M1**– the distant metastases
- **M1a**– in non-regional lymph nodes
- **M1b**– in a bones
- **M1c**– other localization

PROSTATE CANCER

histologic gradation on extent of differentiation

D.F.Gleason, 1966

At small increase in a microscope morphologist can distinguish various types of a glandular configuration of a tumor.

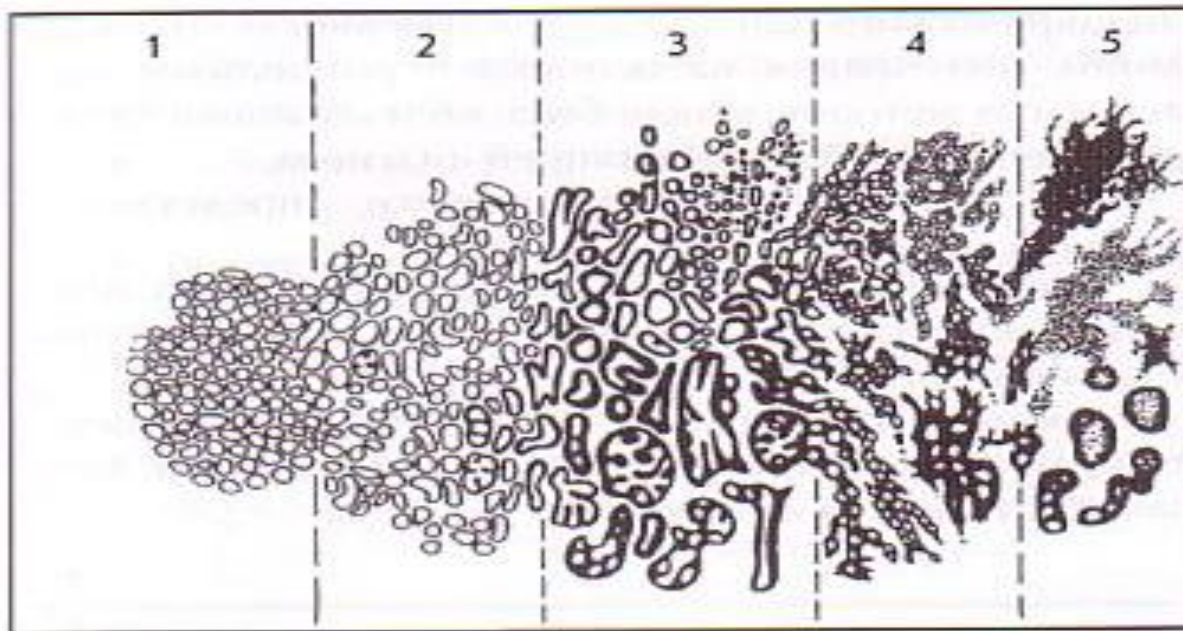
1 degree of a gradation are characterized by availability of almost normal glands.

In process of increase in an indicator of Gleason glandular structures become heterogeneous, their sizes and a configuration - wrong, tumor borders - indistinct.

At the 5th degree of a gradation glands are practically absent, the tumor has a solid structure.

PROSTATE CANCER

histologic gradation on extent of differentiation,
D.F.Gleason, 1966



PROSTATE CANCER

histologic gradation on extent of differentiation
in points, *Gleason's index*

- *G1 – the tumor which is well differentiated
Gleason's index 2-4*
- *G2 – the tumor which is moderately differentiated
Gleason's index 5-6*
- *G3 – a tumor from moderated to badly differentiated,
Gleason's index 7*
- *G4 – the tumor which is low differentiated, aggressive,
Gleason's index 8-10*

*The sum of balls on Gleason's scale is summed up from dominating and the following on frequency like differentiation and makes *Gleason's index* from 2 to 10*

PROSTATE CANCER

predictive value of prostatespecific antigen (PSA) of blood serum

**Probability of a malignant tumor, %,
W.J.Catalona et al., 1998**

- | | | |
|--------------|---|------|
| • 0-2 ng/ml | - | 1% |
| • 2-4 ng/ml | - | 15% |
| • 4-10 ng/ml | - | 25% |
| • >10 ng/ml | - | >50% |

PROSTATE CANCER. TREATMENT

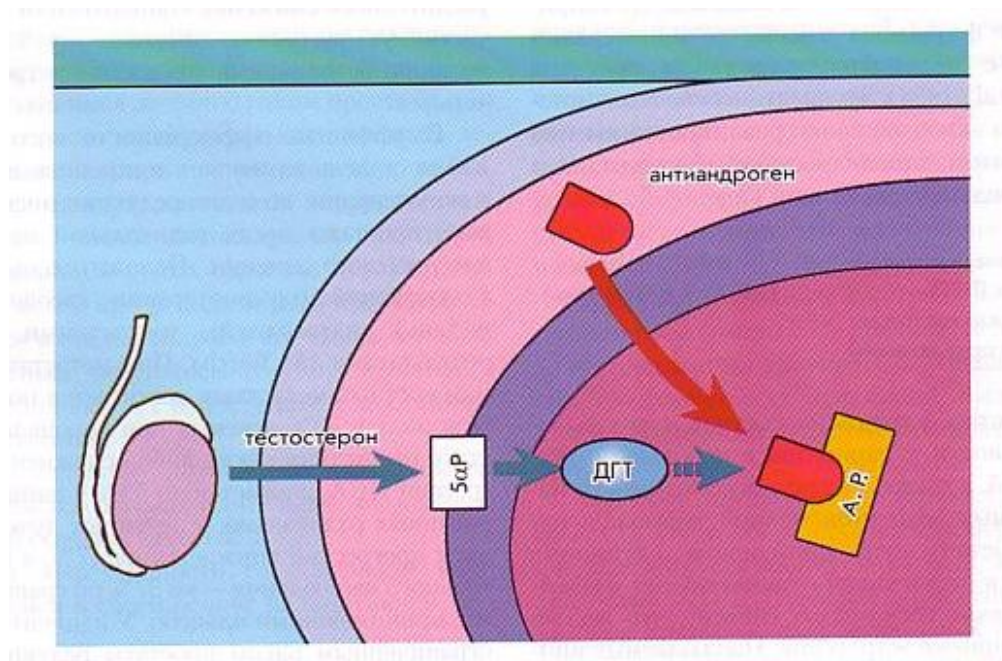
- **Locally limited - a radical prostatectomy**
- **Locally widespread –total androgenic block (medicamentous – zoladex - or surgical castration or a combination with hormonal anti-androgenic therapy - androcur, bicalutamid, casodex), brachytherapy**
- **Disseminated - total androgenic block (medicamentous – zoladex - or surgical castration or a combination with hormonal anti-androgenic therapy - androcur, bicalutamid, casodex), shemo-and radiation therapy, symptomatic therapy**

PROSTATE CANCER

*At patients with locally limited (locally widespread) forms of a prostate cancer (**Gleason's index does not exceed 6**) without **clinical manifestations** after 70-75 – (life expectancy 10 years) most of scientists favors **active supervision with control of the PSA level each 6 months***

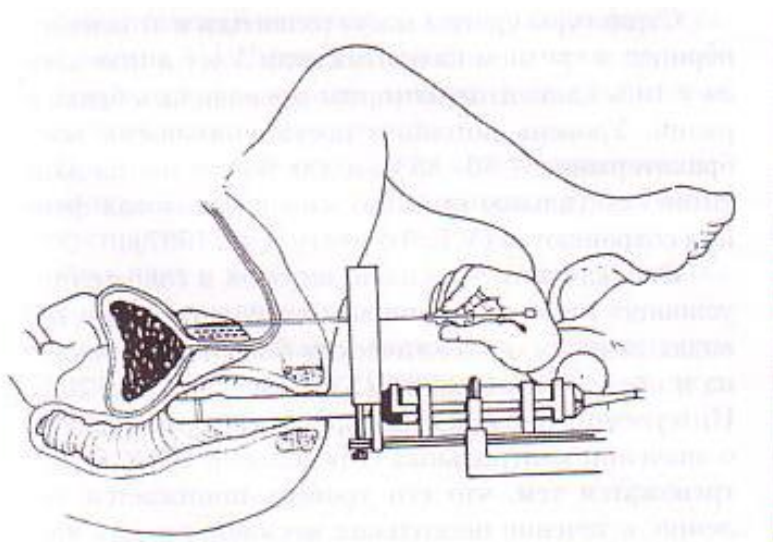
Owing to a negative impact of castration and antiandrogen therapy on central nervous and cardiovascular systems, etc. the risk of a "sudden" death not from nononcological pathology at such patients is much higher than oncological (hypercoagulation, thromboses, increase of the BP)

PROSTATE CANCER



The mechanism of action of anti-androgens – switching off a promoting effect of dihydrotestosterone due to blocking of androgenic receptors

PROSTATE CANCER



THANK YOU FOR ATTENTION!

POLTAVA STATE MEDICAL UNIVERSITY
DEPARTMENT OF UROLOGY
(THE CHAIR – M.D., PROF. LEONID P.SARYCHEV)

INJURIES OF UROGENITAL SYSTEM ORGANS

Lecture 3

2021

LECTURE PLAN

- Kidney injuries
- Injuries of the ureters
- Bladder injuries
- Injuries of urethra
- Injuries of scrotum
- "Acute scrotum"
- Injuries of the penis
- Plastic induration of the penis

INJURIES OF KIDNEYS

- **Injuries of kidneys** are the most frequent damages of an abdominal cavity and retroperitoneal space
Ratio **of men and women - 3:1**
- Up to 70-80% of damages are combined with an injury of other organs and systems (belong to **a polytrauma**)
- It arises due to a direct injury, more often – a bump to the area of a waist, falling on a firm subject

A. Blunt traumatic injuries of kidneys (70-90%)

B. Open traumatic injuries of kidneys

INJURIES OF KIDNEYS

EUWL injurie is a precial type: *when using high energies expressiveness of damages is directly proportional to a quantity of shockwave impulses*

*When using optimum parameters the injury at **EUWL** is equal to a kidney contusion without damage of a capsule*

Damages at endoscopic interventions *(kidney catheterization, a percutaneous nephrostomy, laser contact nephrolitotripsy)*

INJURIES OF KIDNEYS

Scale of damages by AAST:*

- **Grade I:** *contusion or non-enlarging subcapsular perirenal haematoma, and no laceration*
- **Grade II:** *superficial laceration <1 cm depth and does not involve the collecting system (no evidence of urine extravasation), non-expanding perirenal haematoma confined to retroperitoneum*
- **Grade III:** *laceration >1 cm without extension into the renal pelvis or collecting system (no evidence of urine extravasation)*

*AAST-American association of a surgical trauma

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*AAST-American association of a surgical trauma

INJURIES OF KIDNEYS

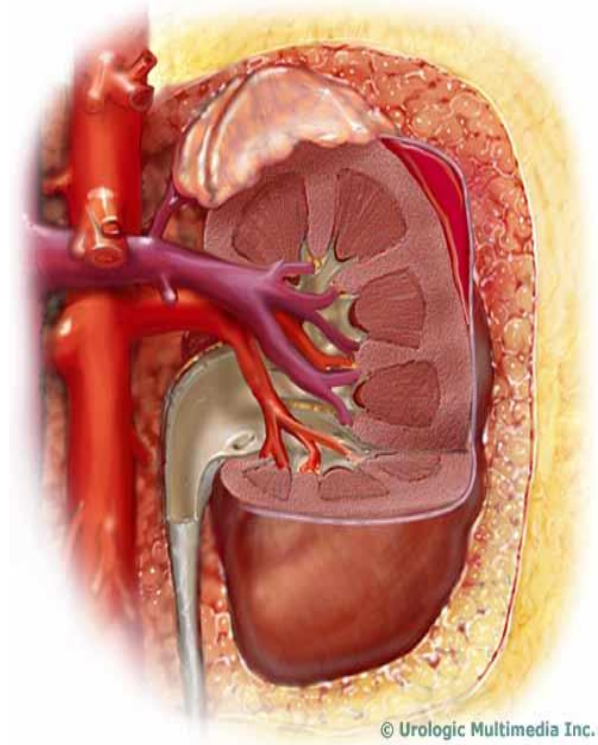
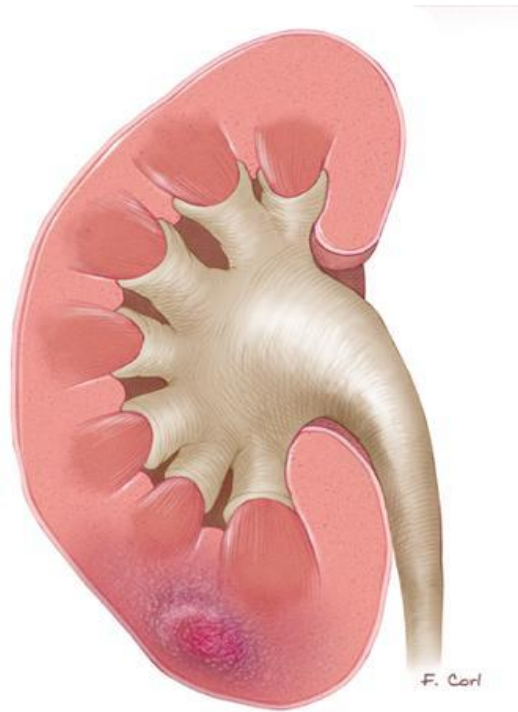
Scale of damages by AAST*:

- ***Grade IV***
- *laceration extends to renal pelvis or urinary extravasation*
- *vascular: injury to main renal artery or vein with contained haemorrhage*
- *segmental infarctions without associated lacerations*
- *expanding subcapsular haematomas compressing the kidney*
- ***Grade V***
- *shattered kidney*
- *avulsion of renal hilum: devascularisation of a kidney due to hilar injury*
- *ureteropelvic avulsions*
- *complete laceration or thrombus of the main renal artery or vein*

*AAST-American association of a surgical trauma

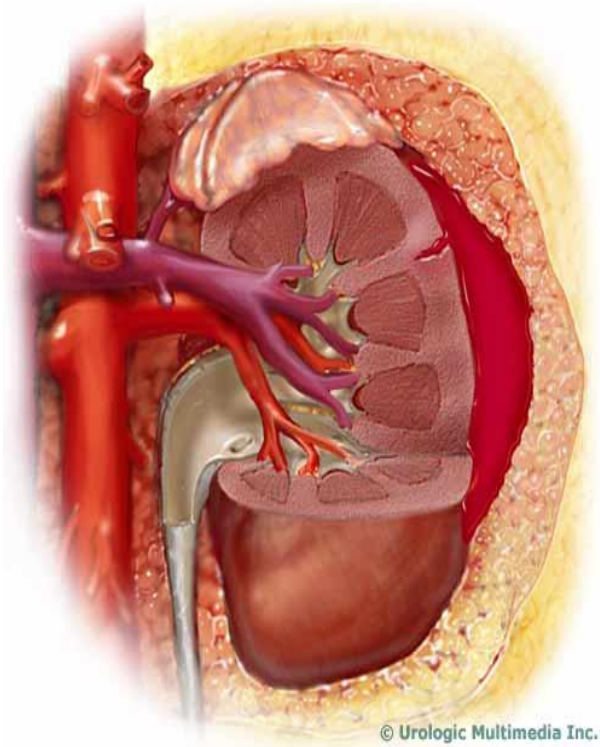
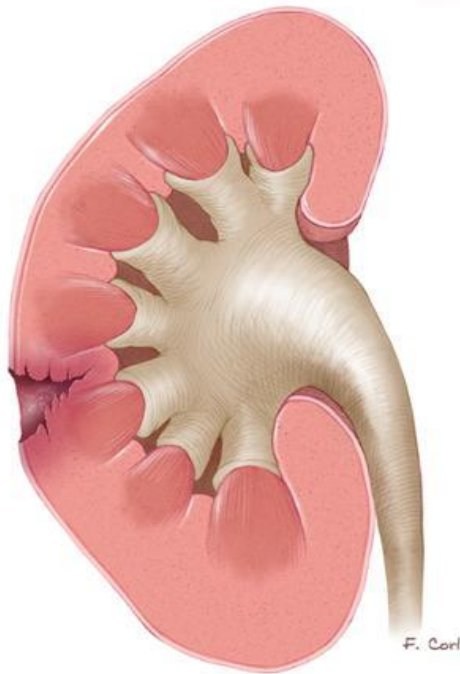
INJURIES OF KIDNEYS

Kidney contusion; subcapsular hematoma



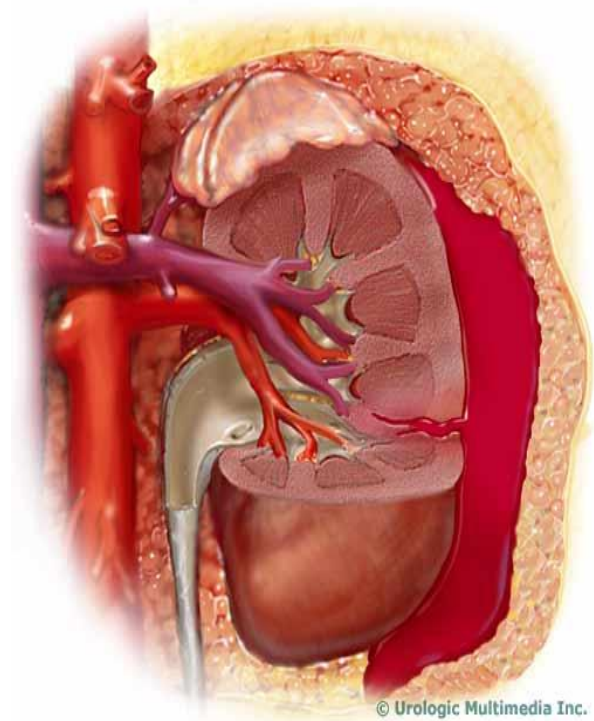
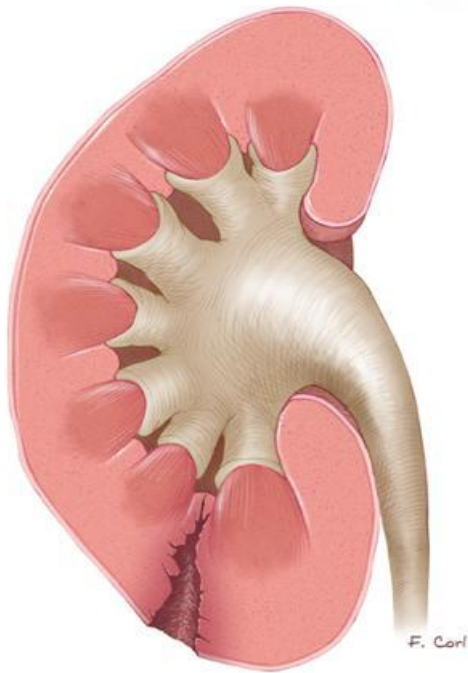
INJURIES OF KIDNEYS

Cortical laceration up to 1 cm; non-increasing perirenal hematoma



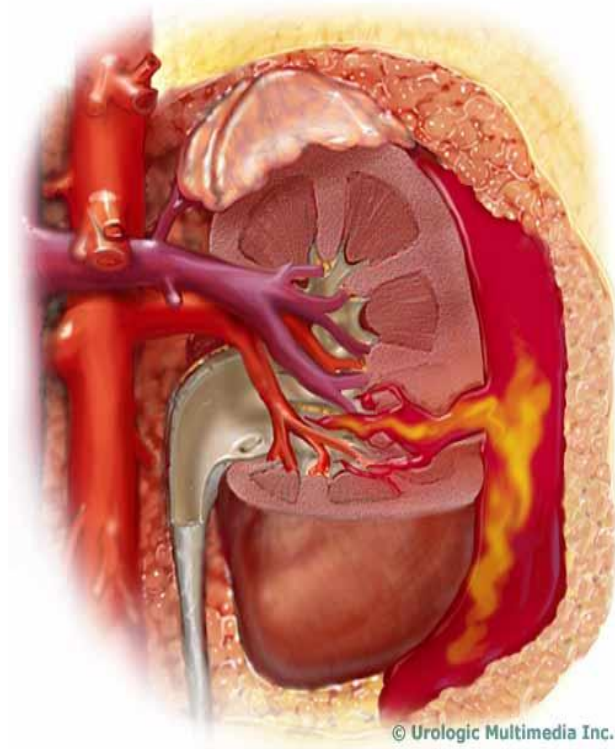
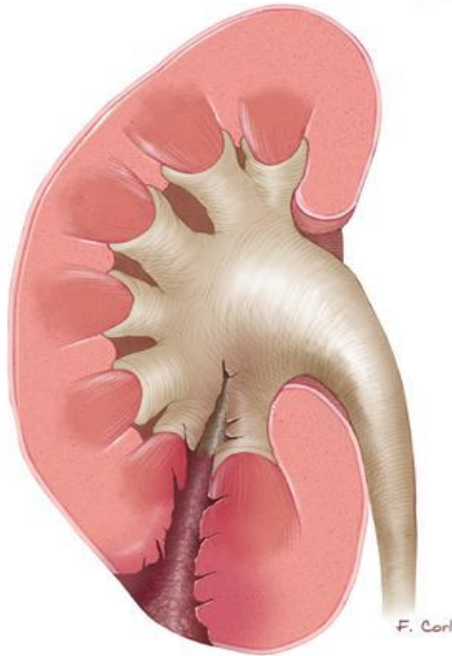
INJURIES OF KIDNEYS

Cortical laceration >1 cm without urine extravasation



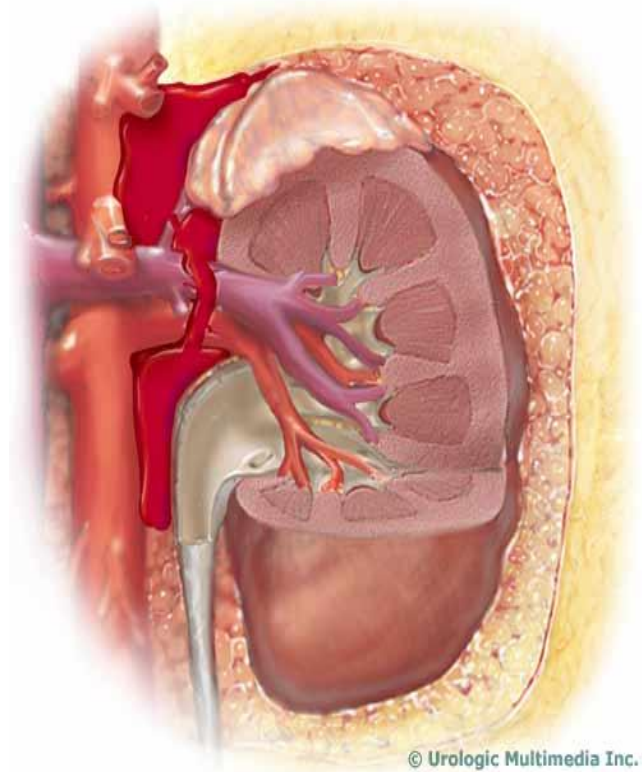
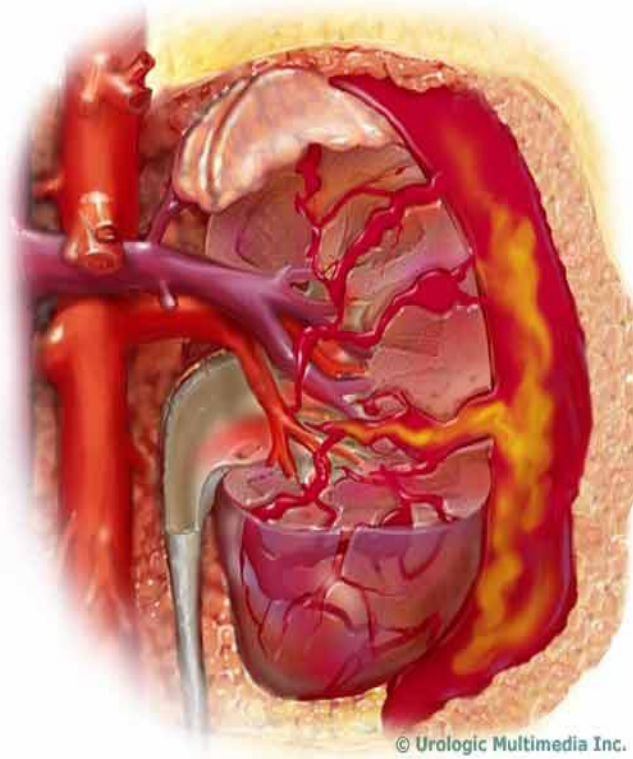
INJURIES OF KIDNEYS

Cortical laceration with damage of pyelocaliceal system and segmentar vessels with formation of an urohematoma



INJURIES OF KIDNEYS

Shattered kidney of a kidney,
damage or avulsion of vessels of a renal hilum



INJURIES OF KIDNEYS

Clinical picture of injuries of kidneys:

- ***pain** in lumbar area*
- ***a swelling** (it is caused by a hematoma, an urohematoma)*
- ***hematuria***

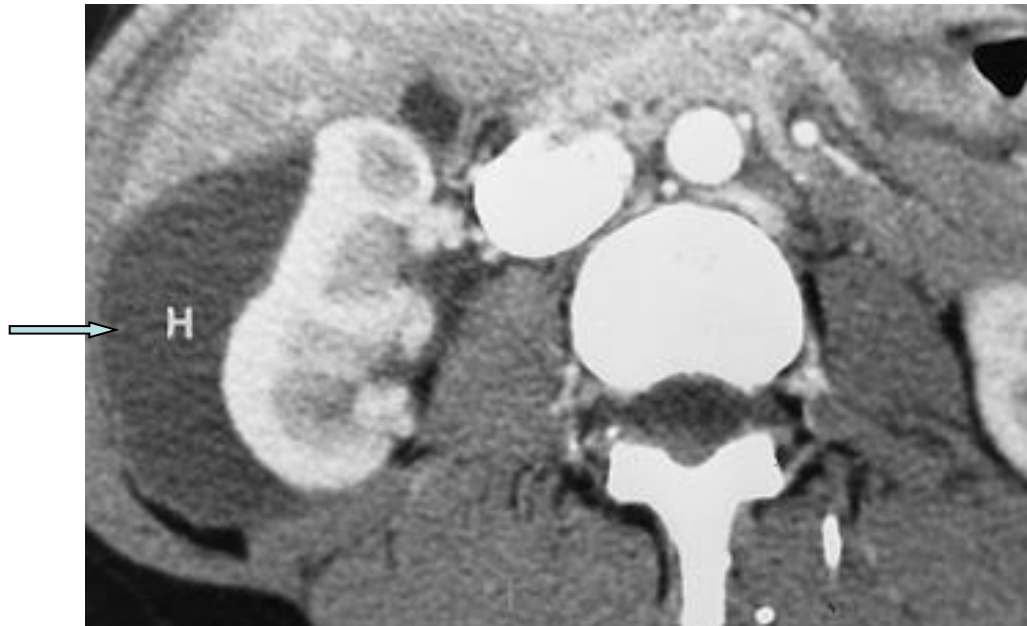
Diagnosis:

- ✓ *Blood test, urinalysis*
- ✓ *ULTRASONOGRAPHY*
- ✓ *KUB and excretory urography*
- ✓ *Computed tomography*

RUPTURE OF THE KIDNEY

COMPUTER TOMOGRAM

Subcapsular hematoma



RUPTURE OF THE KIDNEY

COMPUTED TOMOGRAM

Extravasation of urine



RUPTURE OF THE KIDNEY
EXCRETORY UROGRAM
Retroperitoneal urohematoma



INJURIES OF KIDNEYS

MEDICAL TACTICS

Conservative treatment:

- *bed regimen*
- *cold*
- *antibacterial therapy*

Indications to operative treatment:

- *the internal bleedings which are followed by increase of anemia and decrease of the blood pressure*
- *the increasing or pulsing hematoma*
- *an urine extravasation in a large volume*

DAMAGES OF URETERS

A. The blunt damages of ureters

Can be met when performing medical and diagnostic manipulations (catheterization of ureters, an ureteroscopy, a laser contact lithotripsy)

B. Open damages of ureters

Meet at gynecological operations on organs of a small pelvis and retroperitoneal space (according to references, at expanded operations - from 5 to 30%)

DAMAGES OF URETERS

MEDICAL TACTICS

In not heavy (partial) damages of an ureter treatment is conservative:

- *stenting for 3 weeks*
- *bladder catheterization for 3-5 days for prevention of a reflux*

In heavy damages of ureter treatment would be operative:

- *recovery of integrity of an ureter on a stent catheter*
- *draining of retroperitoneal space*
- *if necessary - a nephrostomy*
- *bladder catheterization for 3-5 days for prevention of a reflux*

INJURIES OF THE BLADDER

Injuries of a bladder belong to a severe injury of abdomen and pelvic organs and need emergent medical service

In 86-90% of cases road accidents, falling from height, a sport injury are the reason of the blunt injuries of a bladder

With injuries of a bladder changes of pelvic bones are found in 75-90% of patients

The probability of injuries of a bladder increases in the presence of severe injuries of organs of a pelvis and an abdominal cavity

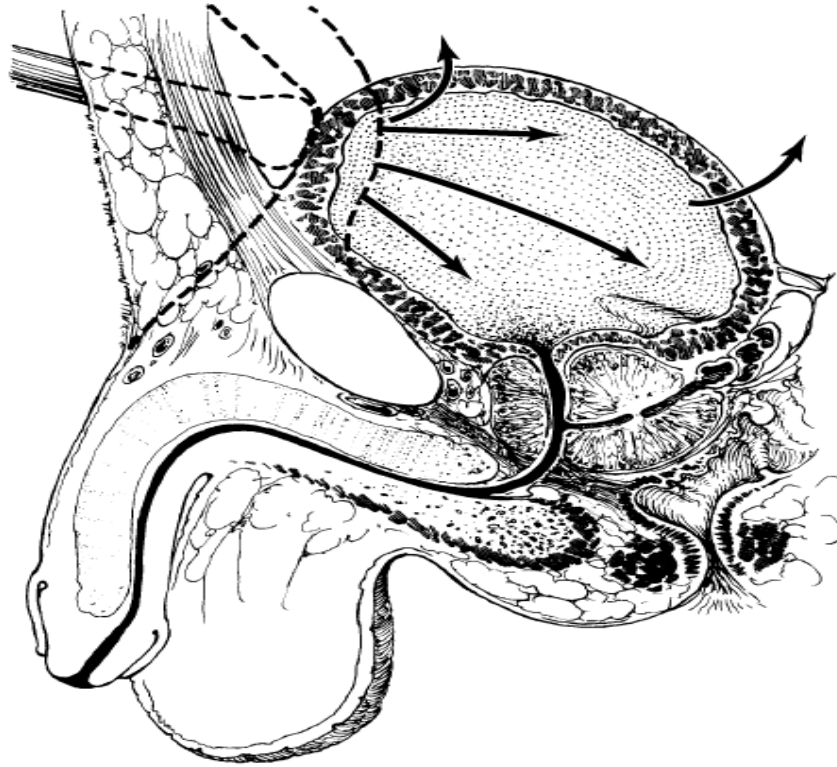
INJURIES OF THE BLADDER

A. The blunt trauma of a bladder (67-88%)

- **Intraperitoneal rupture of the bladder**
(due to stratifying of a back wall of a detrusor at sharp increase of intravesical pressure on the overfilled bladder – "a hydrodynamic blow")
- **Extraperitoneal rupture of the bladder**
(as a rule, in combination with fractures of pelvic bones)
- **Bladder separation**
(at fractures of pelvic bones with disintegrity of a pelvic ring)

B. Open injuries of a bladder (12-33%)

B. Urinary fistulas



Mechanism of intraperitoneal rupture of the bladder

INJURIES OF THE BLADDER

Scale of weight of damages of AAST:*

- Degree I *Contusion, hematoma, partial damage of a wall of a bladder*
- Degree II *Extraperitoneal (<2 cm) rupture of a wall of a bladder*
- Degree III *Extra-(>2 cm) or intraperitoneal (<2 cm) rupture of a wall of a bladder*
- Degree IV *Intraperitoneal (>2 cm) rupture of a wall of a bladder*
- Degree V *Intra-or extraperitoneal rupture of a wall of a bladder with laceration extending into bladder neck or ureteral orifice (trigone)*

*AAST-American association of a surgical trauma

INJURIES OF THE BLADDER

The clinical picture of injuries of a bladder is characterized by a combination of symptoms of injury of the bladder, other organs, pelvic bones and symptoms of early and late complications of an injury:

- pain in the bottom of abdomen*
- hematuria*
- inability to urinate (acute urine retention)*

Complication of an extraperitoneal rupture of the bladder – ***pelvic phlegmon***

Complication of an intraperitoneal rupture of the bladder - ***slow uric peritonitis***

INJURIES OF THE BLADDER

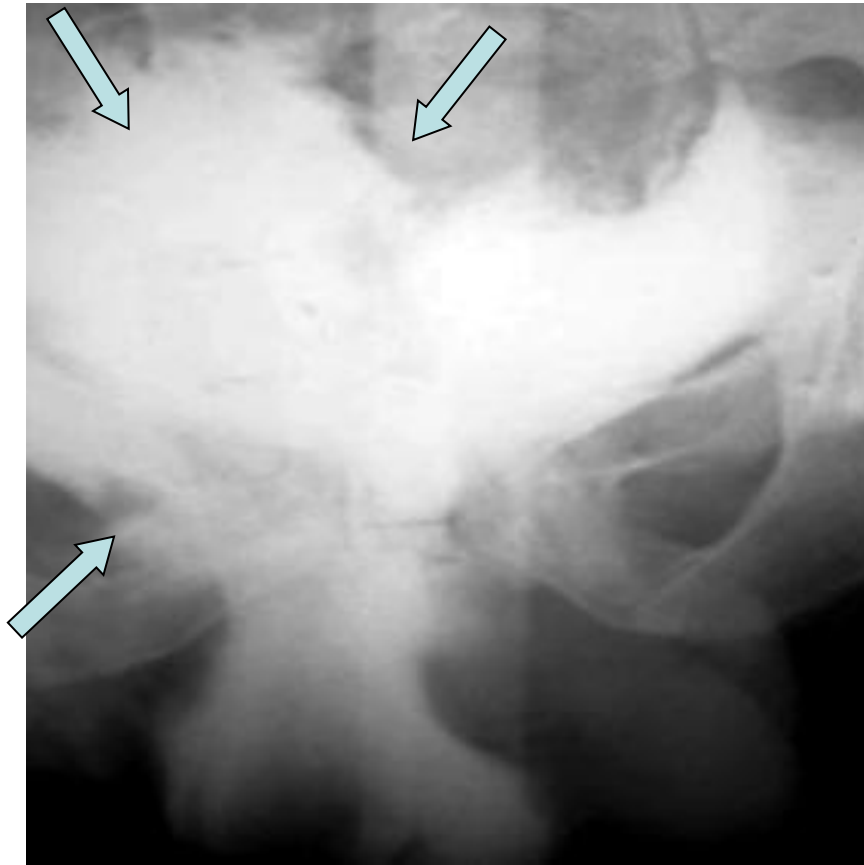
Diagnosis:

- ✓ *Blood test, urinalysis*
- ✓ *ULTRASONOGRAPHY*
- ✓ *KUB and excretory urography*
- ✓ *The ascending cystography*
- ✓ *Computed tomography*
- ✓ *Cystoscopy*

EXTRA PERITONEAL RUPTURE OF THE BLADDER

Ascending cystography

Extravasation of urine



INTRAPERITONEAL RUPTURE OF THE BLADDER

COMPUTED TOMOGRAM

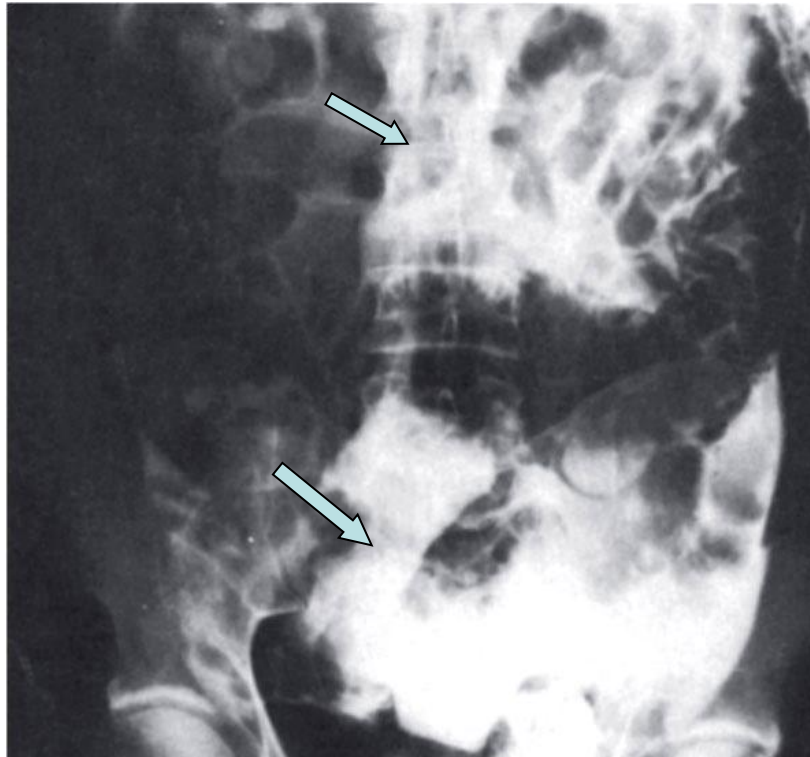
Contrast medium between intestinal loops



INTRAPERITONEAL RUPTURE OF THE BLADDER

CYSTOGRAM

Contrast medium between intestinal loops



INJURIES OF THE BLADDER

MEDICAL TACTICS

At a contusion and an incomplete rupture of the bladder – conservative treatment:

- *a constant catheter in a bladder for 7-10 days*
- *bed rest*
- *cold*
- *antibacterial therapy*

Indications to operative treatment:

- *Extra-(>2 cm) or intraperitoneal rupture of a wall of a bladder*

At an intraperitoneal rupture of the bladder – a laparotomy with obligatory drainage of a bladder and an abdominal cavity

INJURIES OF THE URETHRA

In an absolute majority cases injury of an urethra is the closed injury at fractures of pelvic bones and falling on a crotch

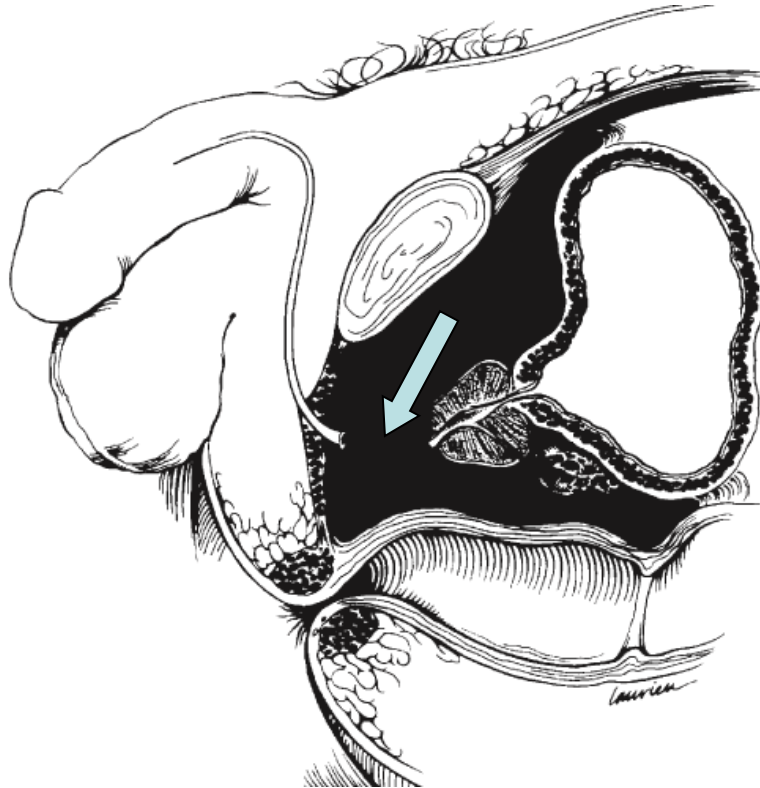
About 70% of injuries of an urethra arise at road accidents, 25% - after falling from height, 5% - as a result of the iatrogenic reasons (at catheterization, bougieunage of urethra)

Clinical picture:

- urethrorrhagia*
- hematuria*
- dysuria*
- an impossibility to void*

RUPTURE OF THE BACK URETHRA (BLADDER SEPARATION)

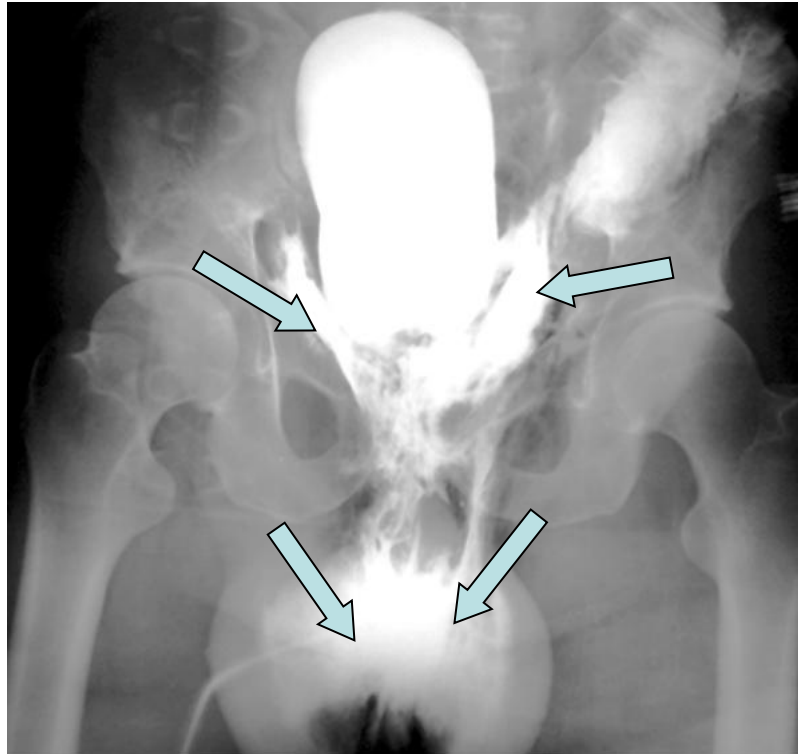
Urohematoma of a small pelvis



RUPTURE OF THE BACK URETHRA

ASCENDING URETROGRAM

Urohematoma of a small pelvis and scrotum



POSTTRAUMATIC STRICTURE OF THE URETHRA

THE DESCENDING AND ASCENDING URETROCYSTOGRAM

Stricture (obliteration) of perineal urethra



INJURIES OF THE URETHRA

MEDICAL TACTICS

At an incomplete laceration of posterior urethra *cystostoma or a constant urethral catheter for 7-10 days is indicated*

At a complete laceration of posterior urethra *the urgent or delayed urethroplasty is shown*

At a bladder separation

(a fracture of pelvic bones with disturbance of integrity of a pelvic ring, an extensive urohematoma of a small pelvis) cystostoma and drainage of an urohematoma with the subsequent urethroplasty is indicated (not earlier than 4 months after an injury)

"ACUTE SCROTUM". INJURIES OF THE PENIS

- **Acute epididymitis**
- **Torsion of vessels of a testis**
- **Torsion of hidatids of a testis**
- **Traumatic damages of albuginea of a testis without loss of a parenchyma**
- **Traumatic damages of albuginea of a testis with loss of a parenchyma and ischem of a spermatogenic epithelium**
- **Partial or full crush, testis separation**
- **Scalped wounds of a scrotum and penis**
- **Penis fracture**
- **Priapism**

"ACUTE SCROTUM"

About a half of copulative and reproductive disturbances at men develop at a children's age

One of the reasons of such disturbances is **a syndrome of "an acute scrotum"**

Diseases of organs of a scrotum take about 20% of urgent pathology of a children's age

In a structure of diseases as the reasons of urgent operative treatments in children, **acute pathology of organs of a scrotum** takes the second place after acute appendicitis

More often the problem arises among full health after the physical tension, sport games or an injury, is more rare due to infectious inflammatory diseases and allergic reactions

"ACUTE SCROTUM"

Frequency **of torsion of a testis** takes 1:500 patients in children's surgical hospitals

The peak of frequency **of torsion of a testis** is observed at teenagers – on average at the age of 16 years

If the acute pain in a scrotum arises at children till 1 year, it is almost always **testis torsion**

After 20 years the acute epididymitis is a most often pain reason in a scrotum

More seldom under **a syndrome of "an acute scrotum"** nnfringement of a hernia, a tumor, infectious diseases of a testis can mask

"ACUTE SCROTUM"

In the gestational period of 28 weeks the testis begins to descend via the inguinal channel and in 32 weeks reaches a scrotum through so called processus vaginalis which is normally obliterated on a distance from an abdominal cavity to a testis

From it there is only a small closed bag remains - tunica vaginalis which shrouds a testis in a scrotum, being fixed to a seminal cord on a back surface

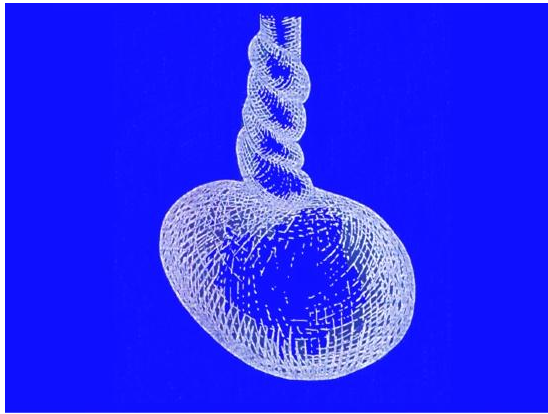
The mechanism of torsion of a testis can be connected with anatomic features of a children's age when tunica vaginalis shrouds a seminal cord above, than at adults, creating conditions for bigger mobility of an unfixed part

"ACUTE SCROTUM"

One more reason of extravaginal torsion of a testis higher than the level of scrotum which can be seen in newborns, – there can be its not omission

As twisting of a vascular bundle leads to a blood stasis, **arterial** and, eventually, venous **thrombosis** develops

*Expressiveness of an obstruction and, as a result, destructive changes in a testis, depends on torsion degree: in most cases **torsion of a testis happens on 360°***



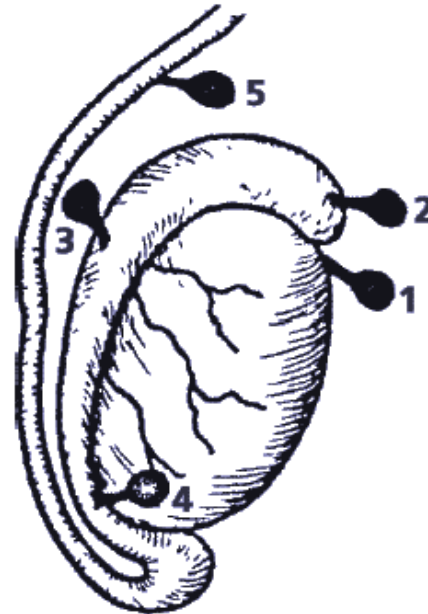
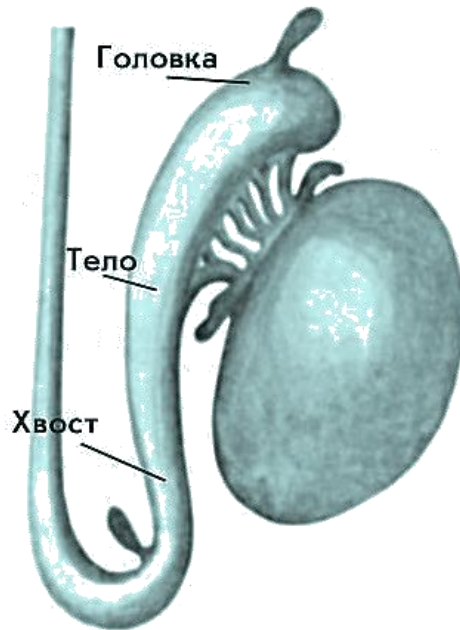
"ACUTE SCROTUM"

Difficulties of **diagnosis of torsion of a testis** are caused by the fact that the similar clinical picture is observed at, **gidatid torsion, an orchitis, an epididymitis and an injury of a scrotum organs**

At physical inspection at patients identical symptoms are observed: half of a scrotum is edematous, sharply painful at a palpation

Besides, at torsion more expressed increase and induration of a testis takes place

"ACUTE(SHARP) SCROTUM"



- 1 — гидатида яичка;
- 2 — гидатида придатка;
- 3 — верхняя гидатида отклоняющегося проточка;
- 4 — нижняя гидатида отклоняющегося проточка;
- 5 — гидатида парадидимиса

"ACUTE SCROTUM"

The key moment of diagnosis is the choice between three diagnoses which meet most often:

- **testis torsion** of which about 20% of cases of an acute pain in a scrotum
- **torsion of a gidatid** of a testis and its epididimys of which about 35-40% of urgent cases take place
- **an acute epididymitis** which takes 35% of patients

*Most informative diagnostic method is **Doppler ultrasound**, which diagnostic sensitivity is 90% and specificity – 100%*

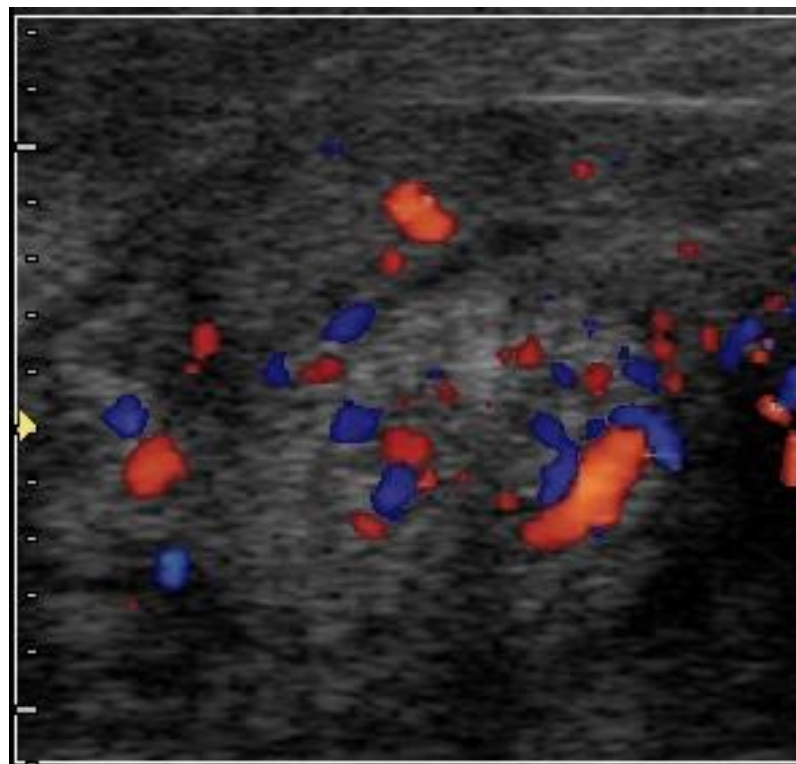
"ACUTE SCROTUM"

Before operation

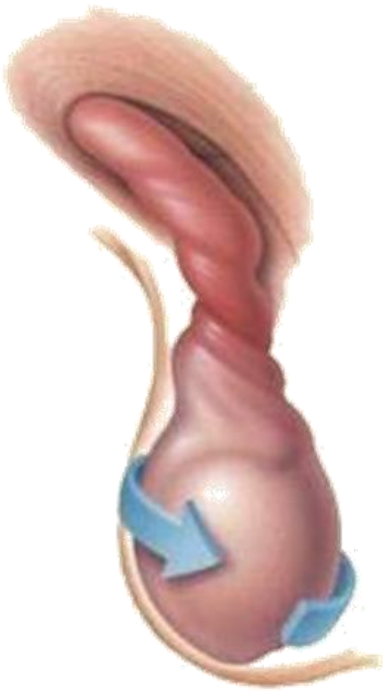


"ACUTE SCROTUM"

After operation



"ACUTE SCROTUM" MEDICAL TACTICS

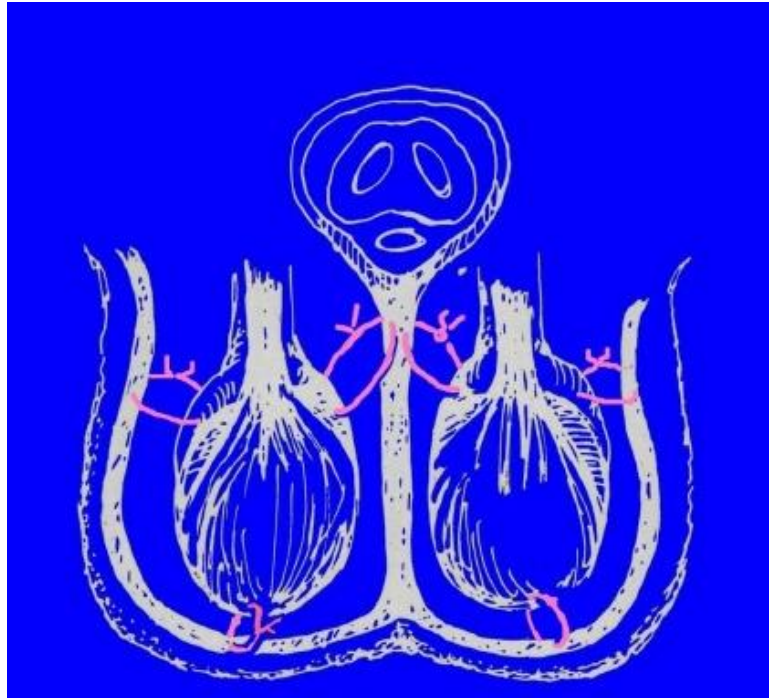


Surgical treatment – the only effective method of elimination **of torsion of a testis**

As the preventive method at adults preceding surgical intervention can be considered **attempt "to untwist" a testis**

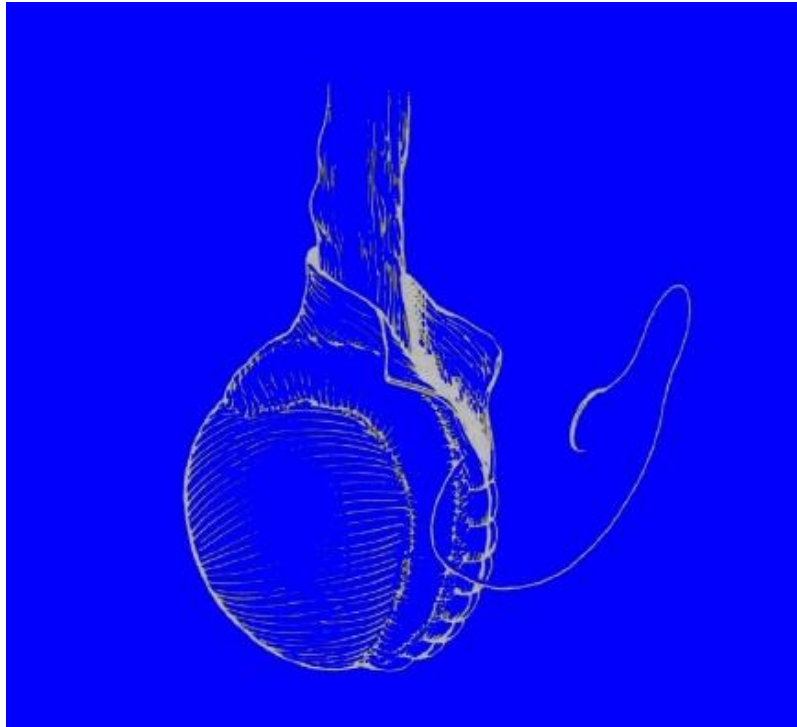
As testis torsion, as a rule, occurs in the medial direction, you should **retwist it in the lateral direction as opening the book**

"ACUTE SCROTUM"



Orchidopexy

"ACUTE SCROTUM"



Excesses of own tunica vaginalis of a testis are excised, turned out and fixed

"ACUTE SCROTUM"

According to clinical supervision if elimination of torsion happens **till 6 o'clock**, "survival" of a testis is about 80%

In 12 hours an opportunity to rescue a testis decreases to 20%

After 24 hours irreversible trophic changes of testis tissue are, as a rule, observed and surgery is removal of a testis

*Even after the emergent surgical intervention due to long (several hours) ischemia the full atrophy of a testis or partial trophic changes exerting negative impacts on cells **of Leydig** and **Sertori with** violatone **of reproductive function** develops in 50% of cases (due to decrease in production of testosterone and imairment of a spermatogenesis)*

DAMAGE OF THE TESTIS

Scale of damages by AAST:

- Degree I *Contusion or hematoma*
- Degree II *Subclinical rupture of a tunica albuginea*
- Degree III *Rupture of a tunica albuginea with loss of a parenchyma <50%*
- Degree IV *Rupture of a tunica albuginea with loss of a parenchyma > 50%*
- Degree V *Full destruction or separation of a testis*

DAMAGES OF THE TESTIS

MEDICAL TACTICS



Sewing up tunica albuginea of a testis

PENIS "FRACTURE"

MEDICAL TACTICS



PRIAPISM

MEDICAL TACTICS



Drainage of cavernous bodies by Al-Harab

THANK YOU FOR THE ATTENTION!