

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
STATE HIGHER EDUCATIONAL ESTABLISHMENT  
UZHHOROD NATIONAL UNIVERSITY  
MEDICAL FACULTY**

**COURSE OF UROLOGY**

**S.O.Boiko, V.V.Rusin, S.Sh.S.Boiko**

**CONTENT MODULE 3  
TRAUMATIC INJURIES OF THE URINARY ORGANS AND  
MALE REPRODUCTIVE SYSTEM**

*(Guidelines for self-preparation of 4th year students  
Medical Faculty 2 of Urology)*

**Uzhhorod - 2021**

Boiko S.O. Content module 3. Traumatic injuries of the urinary and male reproductive systems / S.O. Boiko, V.V. Rusin, S.Sh.S. Boiko. - Uzhhorod:, 2021. - (Methodical instructions for self-preparation of 4th year students of the Medical Faculty 2 of Urology). - 27 p.

Reviewers: doctor of medical sciences, professor Boldizhar P.O.,  
head of the Department of Surgical Diseases  
Uzhhorod National University

doctor of medical sciences, professor Rummyantsev K.E.,  
professor of the Department of Surgical Diseases  
Uzhhorod National University

Methodical recommendations are approved:

at a meeting of the Department of Surgical Diseases  
"14" December 2020  
(protocol №4)

at a meeting of the Academic Council of the Medical Faculty  
"15" February 2021  
(protocol № )

© S.O.Boiko, V.V.Rusin, S.Sh.S.Boiko, 2021

**Module 3.** Traumatic injuries and neoplasms of the urinary organs and male reproductive system.  
Acute and chronic renal failure.

**Specific goals:**

1. Identify the main clinical manifestations of traumatic injuries of the kidneys, ureters, bladder and male genitals.
2. Identify the main symptoms of tumors of the kidneys, ureters, bladder and male genitals.
3. Explain modern classifications of injuries and neoplasms of the urinary and male reproductive systems.
4. Create schemes for diagnosis and treatment of traumatic injuries of the urinary and male reproductive systems and propose treatment plans depending on the clinical course of pathological progress.
5. Analyze and interpret clinical and laboratory results methods of examination of the kidneys, ureters, bladder, urethra and male genitals.
6. To create differential diagnostic criteria for the main clinical manifestations of diseases of the urinary and male reproductive systems.
7. Assess the prognosis for recovery and recovery in patients with neoplasms of the kidneys, ureters, bladder.
8. Provide first aid for damage to the kidneys, bladder, urethra and male genitals.
9. Interpret changes in the kidneys in common diseases (diabetes, hypertension, etc.).

**Methodical development of a practical lesson on the topic:**

**TRAUMATIC INJURIES OF THE URINARY ORGANS AND  
MALE REPRODUCTIVE SYSTEM**

ICD code - 10

S 37.0 - Kidney injury

S 37.1 - Injury of the ureter

S 37.2 - Bladder injury

S 37.3 - Damage to the urethra

S 37.8 - Injury of the testicle and its appendage

***Actuality of theme:***

Damage to the genitourinary system is quite common, sometimes accompanied by combined damage to the abdominal or thoracic organs. Timely recognition of this pathology will help the doctor to provide qualified medical care and help prevent errors in determining treatment tactics.

***The purpose of the lesson:***

To study and master the principles of diagnosis and treatment of damage to the kidney, ureter, bladder, urethra, penis, scrotum, testicles.

***Theoretically, students should know:***

1. Classification of kidney damage.
2. Clinic and symptoms of kidney damage.
3. Methods of diagnosis of kidney damage.
4. Indications for conservative and surgical treatment of kidney damage.
5. Clinic, diagnosis and treatment of ureteral injury.
6. Classification of bladder injuries.
7. Symptoms and methods of diagnosis of extra- and intraperitoneal rupture of the bladder.
8. Clinic, diagnosis and treatment of trauma (rupture) of the urethra.
9. Clinic, diagnosis and treatment of injuries of the male external genitalia.

10. Symptoms, diagnosis and treatment of combat trauma of the urinary and male genital systems.

***Practically students should be able to:***

1. Perform palpation and percussion of the kidneys, bladder, testicles, penis.
2. Carry out a differential diagnosis between closed and open kidney injury.
3. Carry out differential diagnosis between extra- and intraperitoneal rupture of the bladder.
4. Perform retrograde cystography and urethrography.
5. Interpret radiographs of patients with damage to the urinary system.

***Program issues in student preparation:***

1. Classification of closed kidney injuries.
2. Symptoms, diagnosis and treatment of closed kidney injuries.
3. Classification of open kidney damage, symptoms, diagnosis and treatment.
4. Damage to the ureters. Symptoms, diagnosis, treatment.
5. Iatrogenic damage to the kidneys and ureters: clinic, diagnosis, treatment.
6. Bladder damage, types, clinical manifestations.
7. Diagnosis and treatment of bladder injuries.
8. Zeldovich's test.
9. Methods of drainage of the pelvic cavity.
10. Damage to the urethra, symptoms, diagnosis, treatment.
11. Indications for the imposition of the primary urethral suture.
12. Types of plastic surgery for post-traumatic complications of urethral injuries.
13. Modern minimally invasive methods of treatment of urethral strictures.
14. Testicular damage, types, symptoms, diagnosis, treatment.
15. Testicular torsion: etiology, symptoms, diagnosis, treatment. Acute scrotum.
16. Symptoms, diagnosis and treatment of combat trauma of the urinary and male genital systems.

## TOPIC CONTENT

**Drainage according to Buyalsky-McWarter** - drainage of the pelvis through the occlusal hole.

**Epicystostomy** - creation of suprapubic bladder fistula.

**Solovyov's operation** - intussusception of the urethra into the bladder neck.

**Holtsov's operation** - excision of the defect of the urethra with the subsequent imposition of an end-to-end anastomosis.

**Urethrotomy** - dissection of the urethra. May be endoscopic, which is used for strictures of the urethra.

The organs of the genitourinary system, with the exception of the external male genitalia, are well protected from external influences and penetrating trauma. The protection of organs is realized through physiological mobility, internal organs and muscles and the skeleton that surrounds them.

### Kidney damage

Divided into: closed and open.

***Closed injuries.***

Etiology of closed lesions:

- direct hit,
- falling from a height on his feet,
- compression between two bodies,
- rib fracture,

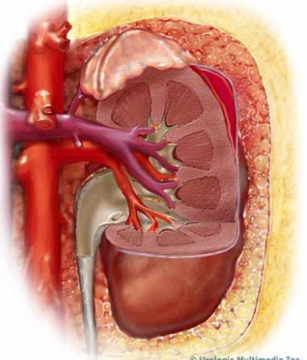
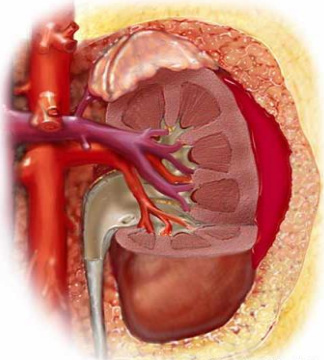
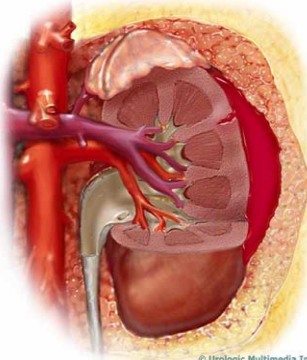
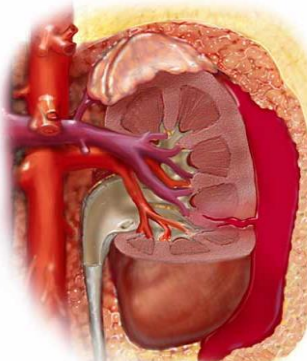
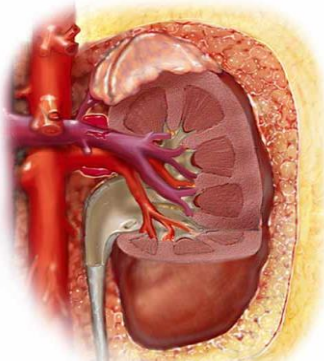
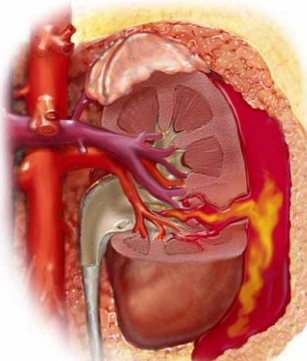
The most common causes of closed injuries are: road accident, fall, sports injury.

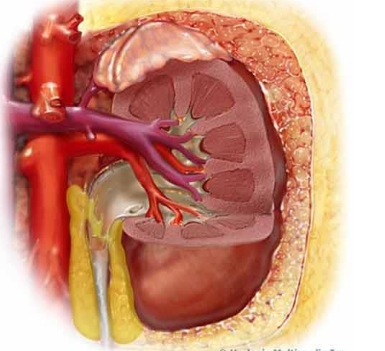
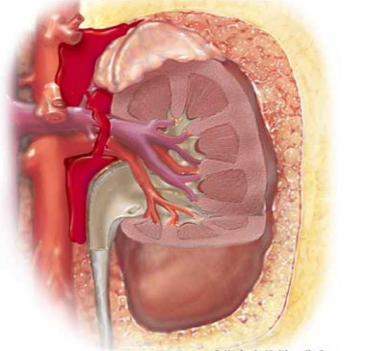
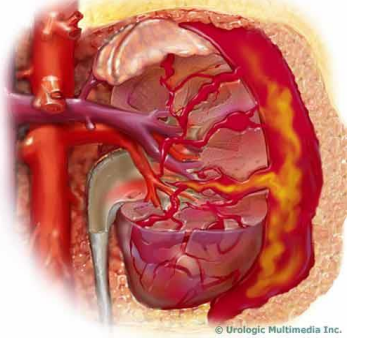
Etiology of open injuries:

- firearms,
- chipped,
- cut.

Iatrogenic lesions: perforation in retrograde pyelography; introduced a large amount of contrast in retrograde pyelography; lumbar novocaine blockade; percutaneous puncture biopsy of the kidney, accompanied by damage to a large vessel.

Classification of closed kidney injuries is carried out according to the Scale of gradation of kidney injuries according to AATS (American Association of Trauma Surgery):

		
<p><b>I stage damage</b> Subcapsular hematoma without existing ruptures. Uncommon subcapsular hematoma. Slaughter and small infarcts. Nonparenchymal ruptures</p>	<p><b>Stage II damage</b> Perirenal hematoma without existing ruptures</p>	<p><b>Stage II damage</b> Parenchyma rupture less than 1 cm long. Perinephric hematoma of varying degrees</p>
		
<p><b>Stage III damage</b> The rupture of the parenchyma is longer than 1 cm, but does not extend to the collecting system. Hematoma often occurs, but without urine extravasation</p>	<p><b>Stage IV damage</b> Damage to the basal vessels of the kidney, but without signs of devascularization of the kidney</p>	<p><b>Stage IV damage</b> Rupture that extends to the collecting system, there is extravasation of urine and there is a hematoma (urohematoma)</p>

		
<p><b>Stage V damage</b> The rupture in the pelvico-ureteral segment is a significant damage to the kidney with the formation of extensive urine</p>	<p><b>Stage V damage</b> Extensive damage to the basal vessels of the kidney with devascularization of the kidney</p>	<p><b>Stage V damage</b> Crushing of the kidney. Contains numerical deep gaps that extend to the collecting system and divide the kidney into numerical fragments</p>

### ***Clinic:***

Depending on the nature of the injury, patients may be admitted in a satisfactory, moderate or severe condition, sometimes in a very severe - shock.

Main symptoms:

1. Sharp pain in the lumbar region on the side of the injury.
2. Swelling in the lumbar sometimes subcostal area (hematoma, urohematoma).
3. Hematuria - not at all degrees of injury.

Combined or reflex symptoms:

1. Pale skin.
2. Nausea, vomiting.
3. Intestinal paresis, flatulence.
4. Muscle defense.
5. Shock.
6. Signs of internal bleeding (decrease in blood pressure, hemoglobin, erythrocytes, tachycardia).
7. Dysuria.
8. Renal colic - when the ureter is obstructed by a blood clot.
9. In men, in the presence of a hematoma in the retroperitoneal space - the penis outside the erection is raised and placed on the anterior abdominal wall in the direction of the side where the retroperitoneal hematoma occurred.
10. Joyce's symptom - (if a perirenal hematoma has formed) at percussion of a stomach dullness which does not shift at change of position of a body of the patient in a bed is defined.
11. A positive symptom of Pasternatsky.

### ***Diagnosis:***

- carefully collected history;
- objective signs of injury;
- Pasternatsky's positive symptom;
- Ultrasound of the kidneys and abdominal organs;
- plain urography (bone damage, the presence of urohematoma);
- excretory urography (weak and late filling of the cup-pelvic system with contrast, leakage of contrast outside the CBS, deformation of the CBS);
- retrograde pyelography (contrast leakage outside the heart rate, heart rate deformity);

- angiography (contrast leakage);
- The "gold" standard for the diagnosis of renal injury in hemodynamically stable patients is computed tomography with intravenous contrast, which identifies foci of renal structure and contrast extravasation outside the renal cavities;
- laparoscopy - translucency of the urohematoma, overhang of the parietal peritoneum in the area of the hematoma. At the lower pole of the hematoma, the peritoneum has a yellowish tinge, indicating the presence of urinary incontinence. In the early stages after kidney rupture, there is no effusion in the abdominal cavity;
- radionuclide renography - kidney function (damaged kidney will have impaired function);
- radionuclide scintigraphy - defects that correspond to the area of damage.

The task of the surgeon:

- 1) correctly assess the severity of the damage;
- 2) whether there are injuries of abdominal or thoracic cavities (in case of damaged abdominal organs - acute abdomen clinic);
- 3) determine the form of damage.

It is necessary to carefully examine the patient and urgent anti-shock measures. If the patient's condition allows, additional examinations can be performed. If unsuccessful, remove the patient from shock and operate immediately under the guise of a blood transfusion.

Differential diagnosis is performed with isolated trauma to the abdominal organs (liver, spleen, mesentery, intestines) - acute abdomen, no hematuria, fluid in the flanks. Additional examination methods confirm kidney damage.

### ***Treatment***

1. Immediate hospitalization.
2. Fighting shock (calm, warmth, blood transfusion)

Indications for conservative treatment:

- satisfactory condition of the patient;
- no profuse bleeding;
- no symptoms of internal bleeding;
- no signs of increasing urohematoma.

Conservative treatment: - bed rest;

- hemostatic therapy;
- transfusion of blood, plasma, blood substitutes;
- analgesics;
- antibiotics.

Indications for emergency surgery:

First of all, it is necessary to establish whether the patient has a second kidney and what is its function. The operation is aimed at stopping the bleeding and normalizing the outflow of urine.

- severe anemia, increasing signs of internal bleeding;
- combined damage (kidneys and organs of the abdominal or thoracic cavities);
- increase in perirenal hematoma (urohematoma);
- intense hematuria during the day with deterioration of the general condition;
- signs of acute inflammation in a damaged kidney or paranephric tissue.

In isolated closed kidney injuries - lumbar access (lumbotomy). At the combined trauma and the phenomena of peritonitis it is better to begin with a median laparotomy.

### ***Organ-sparing operations:***

1. Suturing of a wound of a kidney (catgut or vicril; knot, mattress seams on the crushed muscle, on fatty cellulose, or wrapping by a catgut strip).
2. Wedge resection of the kidney (if the upper or lower pole is damaged).
3. Nephrostomy or pyelostomy (is the final stage of organ-sparing operations).

For the purpose of hemostasis use hemostatic sponges, tachocomb plates.

***Indications for nephrectomy:***

1. Crushing of the kidney.
2. Detachment of the kidney from its vascular leg or rupture of the vascular leg when vascular reconstruction is impossible, or more than 1 hour has passed since the injury.
3. Multiple spatial kidney damage.

***Open damage.***

Etiology: Firearm.

Chipped.

Cut.

- Isolated.
- Combined (thoracic and abdominal cavities, spine).

By nature:

- Kidney contusion.
- Tangential injuries.
- Through wounds.
- Blind injuries.
- Crushing.
- Kidney gate injury.

***Clinic:***

Main symptoms: (wound in the lumbar region - the main)

1. Hematuria (damage to the pelvis).
2. Excretion of urine from the wound.
3. Peripheral hematoma (urohematoma).
4. Staining of secretions from the wound. Test with bromine (irrigation of the bandage with a solution of bromine due to the cleavage of urea is a rapid release of nitrogen in the form of gas bubbles).

Additional symptoms:

1. Pain.
2. Shock at 70%.
3. Muscle tension.
4. Phenomena of peritonitis.
5. Internal bleeding.

***Diagnosis***the same as when closed. In addition, you can perform fistulography.

***Treatment:***(surgical only). During the operation - stop bleeding, ensure the outflow of urine, prevent urinary incontinence, mandatory audit of adjacent organs.

1. Stationary.
2. Out of shock.
3. Deciding the nature of the operation.
4. At the combined injuries - a laparotomy and revision of organs of an abdominal cavity and retroperitoneal space. At isolated defeats - a lumbotomy.

Operations: nephrectomy;



kidney resection (for minor injuries and single kidney injury).

Mandatory primary treatment of the wound canal and extensive drainage of perirenal tissue. In the postoperative period, antibiotics, bed rest for 2-3 weeks, restoration of blood loss, correction of acid-base status and water-electrolyte metabolism.

### ***Complications of kidney injury***

- The early ones include: shock, internal bleeding, retroperitoneal hematoma, urohematoma, urinary incontinence.
- The later include: pyelonephritis, perinephric abscess, recurrent bleeding, urosepsis, paranephritis, urinary renal fistula, hydronephrosis, renal cysts, pyonephrosis, chronic renal failure, renal and intestinal fistula, hypertension, kidney stones.

### **Damage to the ureters**

Isolated ones are very rare. Sometimes - iatrogenic injuries during operations on the abdominal cavity, pelvis, retroperitoneal space, catheterization of the ureter.

Injuries: bandaging, dissection, separation from the bladder or kidney, removal of the segment, crushing.

The pelvic part of the ureter is most often damaged.

### ***Clinic:***

1. Signs of combined damage to the abdominal organs.
2. Signs of urinary infiltration of the retroperitoneal space (fever, signs of intoxication, lumbar pain, muscle tension, pastosity on rectal or vaginal examination).

### ***Diagnosis:***

- Excretory urography;
- Catheterization (obstruction);
- Retrograde ureteropyelography;
- Cystoscopy, ureteroscopy.

### ***Treatment:***

**1. Conservative** (with contusions of the ureter and tears of its wall). It consists of antibacterial drugs, analgesics and anti-inflammatory drugs, physiotherapy procedures.

**2. Surgical** - elimination of urinary incontinence and restoration of the integrity of the organ.

At lateral damages of an ureter - 2-3 knot seams (catgut, vicryl).

At a complete rupture - the primary suture (the ureter is obliquely dissected, the mucosa is not captured, U-shaped sutures are applied, which alternate with nodules). Varieties of anastomoses: "End to end", "end to side", "side to side".

In the presence of urinary infiltration, the operation is performed in two stages:

- 1) urinary drainage (nephrostomy, ureterostomy, retroperitoneal drainage);
- 2) in 6-10 weeks - plastic or reconstructive operation.

At defects of a pelvic part - an ureterocystoneostomy.

With significant defects - partial or complete replacement with a small bowel graft, transplantation of the ureter into the colon or skin.

When ligating the ureter during surgery (iatrogenic injury) - remove the ligature.

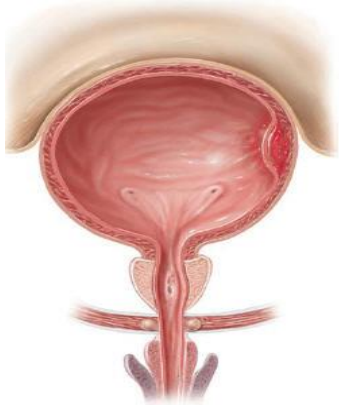
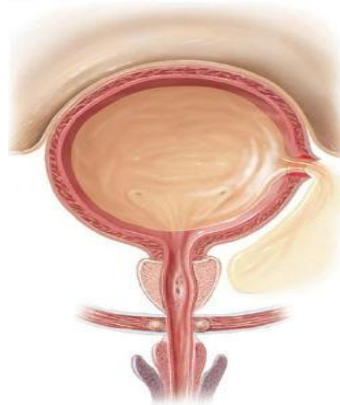
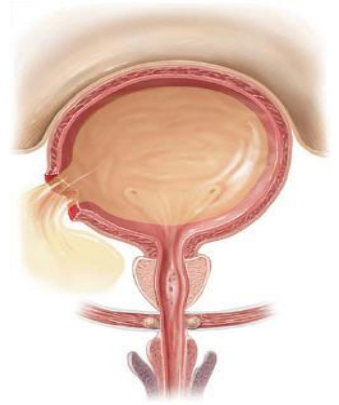
### **Bladder damage**

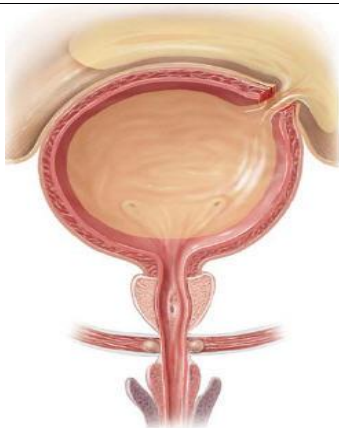
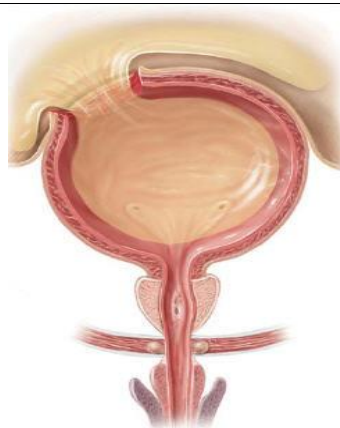
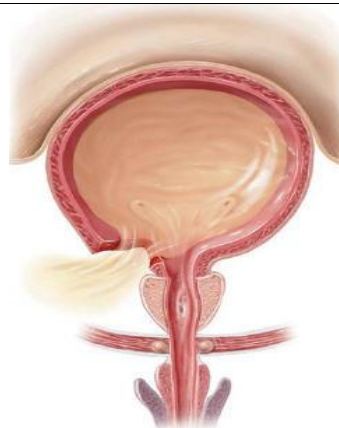
Etiology: kick, fall from a height, driving a car, pelvic fracture, iatrogenic (forced insertion of instruments, during gynecological operations, when removing inguinal hernia).

Classification: 1. Open. 2. Closed.

**Closed** there are extraperitoneal and intraperitoneal.

Classification of closed bladder injuries is performed according to the AATS Kidney Damage Grading Scale (American Trauma Surgery Association):

		
<b>I stage damage</b> Bruising, internal hematoma or partial rupture of the thickness of the bladder wall	<b>Stage II damage</b> Extraperitoneal rupture of the bladder wall is less than 2 cm	<b>Stage II damage</b> Extraperitoneal rupture of the bladder wall is greater than 2 cm

		
<b>Stage III damage</b> Intraperitoneal rupture of the bladder wall is less than 2 cm	<b>Stage IV damage</b> Intraperitoneal rupture of the bladder wall is greater than 2 cm	<b>Stage V injury</b> Intra- or extraperitoneal rupture of the bladder wall that penetrates the bladder neck or bladder triangle

***Clinic of extraperitoneal rupture:***

1. Acute urinary retention.
2. Bloody anuria - the release of drops of blood through the canal.
3. False urges and tenesmus (urogenital pressure).
4. Pain over the pubis, lower abdomen, exacerbated by the urge to urinate. Spreads into the perineum, rectum, penis.
5. Dullness over the pubis.
6. Formation of urinary edema for 2-3 days with the development of urosepsis.

***Clinic of intraperitoneal rupture:***

1. Acute urinary retention.
2. Pain over the pubis and then all over the abdomen.
3. Swelling in the pubic, inguinal area, in the perineum. Swelling of the scrotum and labia.
4. Muscle defense.
5. Peritoneal irritation.
6. Accumulation of fluid in the abdominal cavity.
7. Phenomena of peritonitis and urinary infiltration. Rapid development of peritonitis (10-12 hours after injury).

8. Sitting position of the patient, a symptom of "bath-up".
9. The urge to urinate without urinating, a few drops of bloody urine.

**Diagnosis:**

1. A typical clinic. Catheterization - the absence of urine through the catheter, or a weak stream (extraperitoneal); unexpected release of large amounts of fluid containing 10% or more protein that exceeds the capacity of the bladder (intraperitoneal). Enter 200-300 ml of isotonic sodium chloride solution through the catheter, release and measure the amount of fluid. Zeldovich's test.
2. Cystoscopy is a rupture or inability to fill the bladder.
3. Ascending cystography is the main method (leakage and spreading of contrast). Sometimes - delayed cystography (with intraperitoneal covered ruptures).
4. Excretory urography (contrast leakage and spreading).
5. Laparoscopy. At an intraperitoneal rupture - in an abdominal cavity find a large amount of straw-yellow liquid stained with blood. At a later date after the injury, the fluid becomes cloudy and contains blood impurities. This fluid is found in all parts of the abdomen. On the loops of the small intestine film of fibrin, the peritoneum is hyperemic. A rupture of the bladder is visible in the area of the pelvic floor. There may be blood clots. At an extraperitoneal rupture - (it is difficult to diagnose) there will be no effusion in an abdominal cavity. A hematoma with infiltration of the pelvic tissue into the urine is found in the area of the pelvic floor.
6. Rectal examination - overhang of the anterior wall of the rectum (with intraperitoneal ruptures).

**Treatment:**

1. In hospital (hospitalization of the patient).
2. Conservative treatment in the absence of rupture.
3. Surgery no later than the second day (urohematoma, rapid development of urosepsis).

At an intraperitoneal rupture:

1. Extensive laparotomy, revision of abdominal organs.
2. Suturing with 2-row catgut (vicryl) seam.
3. Epicystostomy as the final stage of the operation (if necessary).
4. Catheterization of the bladder as the final stage of the operation.
5. Abdominal drainage.
6. Drainage of the prostatic space (sratium Retzii) - through the wound.

At extraperitoneal (suprapubic cross access):

1. On the front wall - suturing (catgut, vicryl).
2. On the posterior wall - extraperitonealization of the bladder to find the rupture site.
3. Drainage of the pelvis by Buyalsky-McWarter - on the thigh (a tube from the incision of the skin on the thigh is inserted through a closed hole in the pelvic cavity).
4. Through the sciatic-rectal fossa (Samokhotsky operation in a modification of Kreiselburd).
5. By Holtsov - through the perineum.
6. Drainage of the prostatic space (sratium Retzii) - through the wound.

**Open bladder injuries:**

Etiology: falling on sharp prickly objects; gunshot wounds.

1. Blind
2. Through
3. Touching - an empty bubble.

1. Isolated rarely.
2. Combined more often.

Clinic:

- Shock;
- Anemia;
- Urinary retention;
- Painful urge to urinate;
- Bloody urine;
- Excretion of urine into the wound;
- Symptom of damage to adjacent organs.

Diagnosis:

1. Symptoms.
2. Wound canal direction.
3. Catheterization.
4. Cystoscopy.
5. Cystography.

Treatment: (operative - surgical treatment of wounds; laparotomy)

- Suturing of a bladder defect.
- Urination.
- Drainage of urinary incontinence.

## Urinary tract injuries

**Classification:**

1. Isolated and combined.
2. Closed and open.
3. By localization:
  - posterior part (in case of pelvic fracture) - above the urogenital diaphragm;
  - perineal part (direct blow);
  - anterior (hanging) (very rarely, usually open) - below the urogenital diaphragm.
4. Iatrogenic: rough manipulations with a catheter, dilator, cystoscope, urethroscope; sharp introduction of contrast at a retrograde urethrography.

**Closed** injuries are:

- Slaughter.
- Gap:

Impermeable ruptures of the urethra:

- 1) mucosal rupture;
- 2) rupture of the mucous membrane and the corpus cavernosum;
- 3) interstitial rupture (rupture of the corpus cavernosum with the integrity of the fibrous and mucous membranes);
- 4) rupture of the fibrous membrane;
- 5) rupture of the fibrous membrane and the corpus cavernosum.

Penetrating urethral ruptures:

- 1) rupture of all layers of the urethra around the circumference;
- 2) rupture of all layers of the urethra in a certain area.

- Break (separation).

- Crushing.

Clinic: Triad:

1. Bleeding from the urethra (urethrorrhagia).
2. Urinary retention is complete or partial.
3. The presence of hematoma and urinary incontinence (urohematoma) in the area of the scrotum, vagina, perineum, and sometimes the thigh.

Additional symptoms:

4. Frequent, painful urges to urinate.
5. Stretched bladder.
6. Gangrene of tissues.
7. Urosepsis (in advanced cases).
8. Shock (with damage to the prostatic and membranous part of the urethra).

Diagnosis:

1. History of clarification of the mechanism of injury.
2. Objective research.
3. Ascending urethrography (gold standard) - leakage of contrast.
4. Descending cystography.

The use of instrumental research methods (catheterization, cystoscopy) for diagnostic purposes is contraindicated, as it can cause additional injury and infection.

Treatment:

Conservative: (for fresh non-penetrating injuries) rest, cold compresses, antibiotics, immunomodulators, antioxidants, after 7-8 days of thermal and resorption procedures.

At impenetrable damages, at a urine delay, instead of high opening of a bladder it is possible to carry out a trocar epicycstostomy. If the patient's condition is stable, an attempt to pass a catheter through the urethra is justified. Catheter placement does not prevent the formation of urethral stricture, but helps to compare the apex of the prostate and the distal part of the urethra. This facilitates the subsequent recovery of the urethra.

Surgical: shock control, epicycstostomy, opening and drainage of effusions (periurethral hematoma), plastic surgery (open restoration of urethral patency) after normalization of the patient's condition, or endoscopic restoration of urethral patency, or endoscopic urethral stenting. Reconstructive operations are performed in 3-6 months.

**Open** - these are injuries with a violation of the integrity of the skin:

- Firearms
- Chipped
- Cut
- Torn
- Bitten
- Due to the disease

Symptoms:

- acute urinary retention or difficulty urinating
  - frequent urge to urinate
  - urethrorrhagia
  - pain in the lower abdomen and perineum
  - enlarged bladder
  - excretion of urine from the wound during urination
- Informative method of diagnosis is urethrography (ascending).

Treatment:

1. Fighting shock, anemia.

2. Epicystostomy (trocar or open).
3. Opening and drainage of hematomas and urinary incontinence.
4. Restoration of integrity and patency of the urethra.

**Indications for the primary suture of the urethra:**

- no more than 6 hours have passed since the injury;
- no fracture of the pelvic bones, or they are insignificant (without displacement of fragments);
- lack of massive urohematomas on the perineum.

**Stricture and obliteration of the urethra**

Classification: 1. Congenital

2. Acquired.

Etiology: 1. Inflammatory genesis - post-gonorrhea, post-tuberculosis.

2. Trauma.

Postgonorrhoeal strictures are multiple and damage the anterior part of the urethra.

Post-traumatic strictures are solitary, develop quickly.

Clinic:

1. Urinary incontinence: thin flow, difficulty urinating. Urination in drops (a few drops of urine are excreted).
2. Aspermia due to retrograde inflow of sperm into the bladder.
3. Acute or chronic urinary retention.
4. Frequent urination.
5. Ishuria paradoxa. Residual urine in the bladder.

Consequences of strictures - cystitis, pyelonephritis, hydronephrosis, chronic kidney disease.

Diagnosis:

- urethroscopy
- urethrography (combined).

Treatment:

- conservative (with narrowing of short length) - systematic dilating, physiotherapy, resorbing drugs: aloe, vitreous, hyaluronidase, trypsin.
- operative (at narrowings of big and small length):
  - a) internal urethrotomy (transurethral);
  - b) external urethrotomy - excision of the scar area and the introduction of a permanent catheter;
  - c) resection of the urethra by Holtsov-Morion (stricture of the spongy part) - perineal access, excision of the narrowed part of the urethra and anastomosis "End to end";
  - d) Solov's operation - intussusception of the urethra (stricture of the prostate; urethrocystoanastomosis - the urethra is drawn into the prostatic region and fixed to the bladder neck);
  - e) Fronstein's method - tonelization (currently not performed - ineffective);
  - g) Vishnevsky-Podrez (with a large length of strictures. Excision of the stricture and the formation of the urethra by suturing around the catheter of the surrounding tissues);
  - g) resection of the narrowed part of the urethra and transplantation of a tubular anastomosis from the mucous membrane of the cheek or a fragment of the subcutaneous vein of the thigh;
  - h) dilating.

**Penile injuries**

**Classification:**

1. Isolated and combined.
2. Closed and open (fire, chipped, torn and slaughtered).
3. A separate variety - burns and frostbite.

Closed: bruise, fracture (rupture of the cavernous body), dislocation, pinching.

Clinic:

- sharp pain
- urinary retention
- cessation of erection
- a sharp increase in the penis due to massive hemorrhage
- cyanotic color, crooked penis.

Dislocation - the movement of the root under the skin of the pubis, perineum, scrotum or thigh, as a result of rupture of the ligaments that secure the penis to the pubis.

Penile pinches occur when the penis is bandaged or various objects are put on the penis.

Treatment:

Conservative (at slaughter): rest, cold, antibiotics; from the 3-4th day warm baths, resorbable drugs, compresses; at fractures - a pressure bandage.

Operative (open): stop bleeding; FSH of wounds with suturing of the rupture of the protein shell and the corpus cavernosum; amputation of a penis.

### **Scrotum injuries**

At a scrotum injury the testicle, as a rule, slips from action of an injury and only a scrotum falls to an injury.

#### ***Classification:***

Closed and open.

Closed:

- hemorrhages with a sharp increase in the scrotum,
- the skin is blue-purple or black,
- superficial or deep hematoma.

Open:

- slaughtered,
- chipped,
- cut,
- firearms.

Can be isolated or combined.

Surgical treatment: removal of foreign bodies, dissection of the hematoma, suturing, drainage, antibiotics.

## **COMBAT GUNSHOT WOUND TO THE URINARY ORGANS AND MALE REPRODUCTIVE SYSTEM**

Modern combat surgical trauma includes gunshot wounds, mine blasts, non-gunshot wounds, non-gunshot wounds to secondary fragments and combined injuries with various types of weapons.

Gunshot wound is a complex set of functional and anatomical disorders that are not limited to the wound area, but are accompanied by a general reaction of the body (shock, acute local and general anemia, etc.). The gunshot wound is characterized by a complex structure, a wide area of damage to the tissues surrounding the wound canal. This is due to the ballistic characteristics and mechanical properties of the projectile - bullets, fragments. Gunshot wounds are one of the main reasons for the development of traumatic illness during hostilities.

Morphological features of gunshot wounds are: the wound channel is formed in a split second after contact of the wounding object with the tissue and is a cavity filled with tissue detritus, blood and often various foreign bodies. In the tissues surrounding the wound canal, necrotic changes develop, there are severe circulatory disorders, deep disorders of tissue trophism (the result of the shock wave).

The structure of the wound canal: the actual wound canal; contusion zone; zone of

molecular shock. Depending on the ballistic characteristics of the wound projectile, the zone of molecular shock can reach several tens of centimeters from the walls of the wound canal. The molecular shock zone is a potential site for secondary (late) foci of necrosis. The development of secondary necrosis is facilitated by dystrophic changes and disorders of microcirculation, which develop during the first day.

Complications of gunshot wounds in the vast majority are of infectious origin. As a result, anaerobic gangrene, tetanus, septic infection can develop, which are often combined with purulent processes and lead to a mixed purulent-septic infection. There are two forms of purulent processes in the wound: suppuration - as a component of secondary purification, which is not complicated, and purulent processes outside the wound canal, which usually occur during secondary purification.

The leading role in the diagnosis of combat wounds is played by instrumental studies: radiography, ultrasonography, computed tomography, laparoscopy.

A promising area of treatment of the wounded and injured with severe combined injuries and trauma is a multi-stage technology "damage control", which is to prevent the triad of death - hypothermia, acidosis, coagulopathy; and adverse course of the wound, reducing the volume and trauma of the primary surgery with a delay in the final recovery of damaged organs and structures after the stabilization of the functions that ensure the life of the wounded.

### **Combat kidney injury**

As a result of combat gunshot wounds, the kidneys suffer in 30-45% of cases. It should be noted that in wartime, the percentage of closed kidney injuries also increases, reaching 35% or more. In 60% of cases, kidney damage is combined.

For combat injuries of the kidneys are characterized by: massive blood loss, severe pain, large urinary infiltration of tissues, dysfunction of other internal organs, a high frequency of early and late complications.

Gunshot wounds of the kidney are divided into: paranephric tissue injury, tangential wound, penetrating wound, blind wound, complete destruction, vascular leg injury.

At gunshot wounds of a kidney the basic method of treatment is an operative measure, only 5-10% of victims are treated conservatively. The operation must be performed as early as possible.

At isolated wounds - a lumbotomy and revision of a kidney.

In severe combined injuries of the intra-abdominal organs - laparotomy and revision of the abdominal cavity and retroperitoneal space.

In severe combined thoracoabdominal injuries - thoracolumbolaparotomy and revision of the organs of the relevant areas.

#### ***Operative approach at revision of a kidney.***

After release from blood clots, the kidney is isolated from the surrounding tissues, determine the degree and nature of damage to the parenchyma, verify the integrity of the renal vascular leg and peritoneum. In case of ongoing severe bleeding, it is advisable to apply a vascular clamp to the renal leg, drain the renal bed of blood and then decide on the amount of intervention on the organ itself. Multiple deep tears, crushing of the parenchyma, damage to the vessels of the renal leg, when an attempt to stop the bleeding is unsuccessful, are indications for nephrectomy. Kidney removal is possible only in the presence and preservation of the functional full capacity of the second kidney.

Organ-sparing operations on the kidney are performed with damage to the fibrous capsule, superficial or moderate injuries of the parenchyma, small tears and marginal defects of the kidney tissue, which are not accompanied by significant bleeding. At heavy destruction of a parenchyma after organ-saving operation impose a pyelo- or nephrostomy.

### **Combat injury of the ureter**

#### ***Operational approach in the audit of the ureter.***

At injuries of an ureter suturing of an ureter, imposing of an anastomosis is carried out "End to end", if necessary, perform a nephrotomy. Nephrotomy is mandatory in combination with ureteral injury with abdominal injuries.

### **Combat injury of the bladder**

#### ***Surgical approach in intraperitoneal bladder injury.***



Laparotomy. Audit of abdominal organs. Suturing of the bladder with vicryl or catgut, imposition of epicystostomy, drainage of the bladder space. Suturing the wound to the subcutaneous tissue.

***Surgical approach in extraperitoneal bladder injury.***

Suprapubic access. Suturing of the bladder with vicryl or catgut, imposition of an epicystostomy, drainage of the peribladder space and pelvic cavity according to Buyalsky-McWarter and Kupriyanov. Suturing the wound to the subcutaneous tissue.

**Combat trauma of the urethra**

***Operative approach to urethral injury.***

Basic principles: conservative therapy in case of slaughter or incomplete rupture, imposition of trocar epicystostomy; delayed urethral suture according to the indications; drainage of the pelvic cavity according to Buyalsky-McWarter or Kupriyanov (with damage to the posterior urethra).

**Combat injury of the penis**

The wound is caused by the following wounding agents: high-speed bullets, fragments of anti-personnel mines. As a result, the injuries are of a combined nature and are associated with the spread of the injury to the lower extremities, abdomen and chest.

Gunshot wounds to the penis can be:

- tangential, limited to damage to the skin only or with a violation of the integrity of the protein shell of spongy bodies;
- through;
- blind;
- partial or complete amputation of the penis.

In addition, gunshot wounds can be isolated and combined - with injuries to the urethra, scrotum and its organs, thighs, bones and pelvic organs, and so on.

**Mistakes that are made when providing assistance to victims of combat injuries of the genitourinary system**

1. Incorrect sorting of patients.
2. Providing specialized surgical care at the qualified stage.
3. Excess of surgical care.
4. Carrying out operations without previous anti-shock therapy.
5. Carrying out non-radical surgical treatment without removal of non-viable tissues, foreign bodies.
6. Continuous bleeding.
7. Inadequate drainage.
8. Formation of the primary suture of the urethra in gunshot wounds.
9. Insufficient use of perforated urethral catheter drainage - in case of failure of the bladder sutures.
10. At the combined gunshot wounds with suspicion of defeat of bodies of urogenital system of performance of primary surgical treatment of the wound without laparotomy and wide revision of an abdominal cavity and a small pelvis.

**PRACTICAL WORK OF A STUDENT WITH A PATIENT**

When filing complaints, you need to find out:

1. The nature and location of pain (lumbar region, abdomen, pubis, perineum or external genitalia).
2. The presence of hematuria, urethrorrhagia.
3. The nature of urination (frequency, pain during urination, the feeling of complete release of the bladder, the amount of urine excreted during each urination and from the moment of injury).
4. Presence of complaints related to damage to other organs.

During the collection of anamnesis it is necessary to establish:

1. The time when the injury occurred, its nature (impact on the lumbar region, suprapubic region, perineum, abdomen, fall from a height, etc.).
2. Feelings of the patient immediately after the injury.
3. Who and when the help was provided.
4. Has previously suffered from kidney and urinary tract disease. If yes, how did the disease manifest itself.
5. Time from the onset of hematuria, urethrorrhagia and their nature.
6. When the first call to urinate appeared after the injury. Was this call accompanied by pain and was there pain during urination.

During the objective examination it is necessary to establish:

1. The general condition of the patient (shock, collapse, signs of alcohol intoxication, etc.).
2. Position of the patient (forced, psoas-symptom, frog's symptom, "vanki-vstanki" symptom, scoliosis).
3. Skin color, mucous membranes, the presence of skin lesions (bruises, hematomas, scratches, wounds, swelling).
4. The presence of deformities (explosion of the lumbar region, from the abdomen, over the pubis, in the perineum, penis).
5. The presence of crepitation.
6. Condition of the musculoskeletal system (spine, ribs, pelvis).
7. During palpation of the abdomen it is necessary to determine the signs of peritoneal irritation, the presence of free fluid in the abdominal cavity, swelling and palpation of the pathological formation in the hypochondrium. Palpation of the suprapubic area, urethra, testicles, perineum.
8. Auscultatory - the presence of limited mobility of the diaphragm on the side of the injury.
9. Macroscopic evaluation of urine (color and presence of clots).
10. Analysis of laboratory data, radiological and instrumental research methods.

### **MATERIALS FOR SELF-CONTROL**

*Complete the answer*

1. What are the symptoms of closed kidney damage:
  1. - Hematuria.
  2. -
  3. -
  
2. List the main signs of open kidney damage:
  1. - Leakage of urine into the wound.
  2. -
  3. -
  
3. List the types of closed kidney damage:
  1. - Kidney injury.
  2. -
  3. -
  4. -
  5. - Crushing of the kidney.
  
4. Name the indications for conservative treatment of closed kidney damage:
  1. - Satisfactory general condition.
  2. - No signs of urogenital growth.
  3. -
  4. -

5. Name the indications for immediate surgical treatment of kidney damage:
  1. - Increased signs of internal bleeding.
  2. - Enlargement of perirenal hematoma (urohematoma).
  3. -
  4. -
  
6. What organ-saving operations are performed in case of kidney damage:
  1. - Kidney resection.
  2. -
  3. -
  
7. Name the indications for nephrectomy for kidney damage:
  1. - Crushing of the kidney.
  2. -
  3. -
  
8. List the main symptoms of rupture of the bladder:
  1. - Acute urinary retention.
  2. -
  3. -
  
9. Signs of intraperitoneal rupture of the bladder according to the results of the Zeldovich test:
  1. - Isolation of more fluid through the catheter than was injected.
  2. -
  3. -
  
10. Specify the characteristic triad of symptoms of urethral damage:
  1. - Urethrorrhagia.
  2. -
  3. -

### *Test tasks*

1. The patient, 52 years old, fell from a height of 3 m on a flat surface of the right lumbar region. Complains of pain in the lumbar region on the right. In urine: microhematuria. Excretory urography: renal function is satisfactory. What is the most likely diagnosis?
  - A. Paranephric hematoma.
  - B. Subcapsular rupture of the kidney.
  - C. Multiple kidney ruptures.
  - D. Kidney injury.
  - E. Kidney separation.
  
2. The patient, 32 years old, was hit by a car. Complains of pain in the lower abdomen, over the pubis with irradiation to the perineum, rectum, frequent, heavy and painful urination in small portions, blood in the urine. At objective examination determines the tension over the pubis, percussion - blunting, which extends to the iliac region. What is the previous diagnosis?
  - A. Extraperitoneal rupture of the bladder.
  - B. Kidney rupture.
  - C. Rupture of the urethra.
  - D. Rupture of the ureter.
  - E. Kidney injury.

- 3.** The patient received an industrial injury - a trolley hit in the left lumbar region. There were complaints of pain in the area, nausea, bloating, frequent urge to urinate, macrohematuria. Blood pressure - 60/20 mm, pulse 130 beats / min., soft, filamentous. In the left half of the abdomen - elastic painful formation 20x18 cm, muscle tension over the pubis, in the left lumbar and iliac regions. What is the previous diagnosis?
- A.** Kidney injury.
  - B.** Closed penetrating rupture of the left kidney.
  - C.** Rupture of the ureter.
  - D.** Closed intraperitoneal rupture of the bladder.
  - E.** Subcapsular rupture of the left kidney.
- 4.** The victim with a gunshot wound to the lumbar region, with clinical signs of kidney injury, with prolonged internal bleeding, acute anemia, hematuria and symptoms of a large retroperitoneal hematoma, was taken to OMedB. What treatment should be taken immediately?
- A.** Cold on the stomach, the introduction of antibiotics.
  - B.** Complete abstinence from food and drink.
  - C.** Intraarterial blood injection.
  - D.** Intravenous administration of canned blood.
  - E.** Immediate operation.
- 5.** The patient, 43 years old, was taken to the clinic for pain in the left lumbar region, which appeared after falling from a height of 2 m. After the injury, during urination, he noticed the presence of macrohematuria. Condition of moderate severity. Blood pressure and heart rate are normal. No pathological changes were found on the part of the chest and abdominal organs. It takes place a small painful swelling in the left lumbar region. Specify a preliminary diagnosis?
- A.** Closed kidney damage.
  - B.** Urolithiasis.
  - C.** Tuberculosis of the kidneys.
  - D.** Kidney tumor.
  - E.** Acute pyelonephritis.
- 6.** The patient, 42 years old, was taken to the trauma department 2 hours ago. Radiologically - fracture of the pelvic bones. Taken out of shock. There is no independent urination. Urethrorrhagia. The enlarged bladder is palpated. Painful swelling in the perineum. Make a preliminary diagnosis.
- A.** Reflex urinary retention.
  - B.** Bladder injury.
  - C.** Trauma of the urethra.
  - D.** Acute renal failure.
  - E.** Acute prostatitis.
- 7.** The doctor on duty was summoned to the reception department for the victim who was beaten. The patient complains of low back pain, general weakness, nausea. Objectively: the abdomen is soft, there are no symptoms of peritoneal irritation, a positive symptom of Pasternatsky's case. General blood test without features, hematuria was detected in the urine. What pathology can be suspected in this patient?
- A.** Traumatic rupture of the cecum.
  - B.** Traumatic rupture of the liver.
  - C.** Rupture of the bladder.
  - D.** Slaughter of soft tissues of the lower back on the right.
  - E.** Extraperitoneal injury of the right kidney.
- 8.** The patient, 19 years old, was injured a day ago when falling from a height of 1.5 meters - "sat on

top" on a wooden beam. Urination is severely difficult, macrohematuria, urethrorrhagia. There is a hematoma on the perineum and scrotum. Urethrography revealed leakage of a contrast agent in the membranous part of the urethra. What should be the treatment tactics?

- A. Cold on the perineum, hemostatic therapy.
- B. Catheterization of the bladder to drain urine.
- C. Dilating of the urethra.
- D. Operation epicystostomy.
- E. Performing the primary suture of the urethra.

9. A urologist was called to the trauma department to a patient with acute urinary retention, who as a result of a road injury had multiple fractures of the anterior semicircle of the pelvis with damage to the urethra. An enlarged bladder is palpated over the pubis. What help is shown in this case?

- A. Catheterization of the bladder with a soft catheter.
- B. Epicystostomy.
- C. Catheterization of the bladder with a metal catheter.
- D. Capillary puncture of the bladder.
- E. Intra pelvic novocaine blockade.

10. Which of the following symptoms is most common in kidney damage?

- A. Lowering blood pressure.
- B. Swelling in the lumbar region.
- C. Hematuria.
- D. Renal colic.
- E. Hyperthermia.

11. Patient P., 21 years old, went to the admission department of the hospital with complaints of abdominal pain, mostly in the sacroiliac area, nausea, single vomiting. 2 hours before hospitalization he drank beer with friends. Then he stumbled and fell. In the admission department of the hospital he excreted 250 ml of intense pink urine with several small convolutions. Which diagnosis is most likely?

- A. Exacerbation of glomerulonephritis.
- B. Acute appendicitis.
- C. Perforated gastric ulcer.
- D. Acute cystitis.
- E. Intraperitoneal damage to the bladder.

12. The patient, 42 years old, is in the trauma department in a state of shock, where he was taken 2 hours ago after a serious injury. After withdrawal from shock (blood pressure 115/60 mm), an X-ray of the pelvic bones was made - a fracture of the pubic and sciatic bones of the "butterfly" type. Independent urination is absent, palpation of the bladder 5 cm above the pubis. The patient's condition is serious. What operation is shown to the patient?

- A. Epicystostomy.
- B. Trocar epicystostomy.
- C. Catheterization of the bladder with a three-way Foley catheter.
- D. Primary suture of the urethra.
- E. Primary suture of the urethra and epicystostomy.

13. A 20-year-old patient was hospitalized due to an injury to the right half of the scrotum with complaints of pain in its projection, increase in its size and the presence of a subcutaneous hematoma. What research will help to establish the clinical diagnosis?

- A. Palpation of the scrotum.
- B. Ultrasound of the scrotum.

- C. Diaphanoscopy.
- D. Radioisotope scan of the testicles.
- E. Dopplerography of testicular tissue.

14. Which of the following diagnostic methods is most informative for finding and detecting kidney injury?

- A. Palpation.
- B. Plain urography.
- C. Chromocystoscopy.
- D. Excretory urography.
- E. Retrograde ureteropyelography.

15. Within what time is it possible to perform a primary urethral suture (primary plastic) when the urethra ruptures?

- A. The first 2 hours.
- B. The first 24 hours.
- C. 2 days.
- D. 3-4 days.
- E. 1 week.

16. What is a subcapsular rupture of the kidney?

- A. Damage to the renal parenchyma with tearing of the fibrous capsule.
- B. Urohematoma.
- C. Kidney damage with preservation of the fibrous capsule.
- D. Damage to the vascular leg of the kidney.
- E. Multiple lesions of the parenchyma, pelvic system and capsule.

17. At which of the listed injuries renal colic is possible?

- A. Subcapsular kidney damage.
- B. Detachment of the renal leg.
- C. Multiple ruptures of the parenchyma and capsule.
- D. Kidney injury.
- E. Hematoma of perirenal tissue.

18. A 25-year-old patient was taken to hospital due to pain in the lumbar region on the right, macrohematuria. An hour ago, he was hit in the lumbar region with a hard object. Pulse 80 beats / min., Blood pressure 120/70 mm. Palpation, ultrasound and excretory urography revealed urohematoma. What should be the treatment tactics?

- A. Calm, appointment of hemostatics and antibiotics.
- B. Outpatient treatment.
- C. Bed mode.
- D. Nephrectomy.
- E. Lumbotomy, suturing of the rupture, nephrostomy.

19. What must be the victim of an injury, for the possibility of intraperitoneal rupture of the bladder?

- A. Pelvic fracture.
- B. Empty bladder.
- C. Injury of the lower half of the abdomen.
- D. Overflowing bladder.
- E. The thin wall of the detrusor muscles.

20. Patient Z., 37 years old, was diagnosed with subcapsular rupture of the kidney by ultrasound. What are the treatment tactics for this pathology?

- A. Patient care in an outpatient setting.
- B. Dynamic supervision in the hospital, adherence to bed rest for 8 days.
- C. Urgent operation.
- D. Hematoma puncture.
- E. Exclusion of physical activity for 3 months.

21. A 42-year-old patient was hospitalized 1.5 hours after a fall and damage to the perineum with the edge of a metal armature. Complains of urinary retention, urethrorrhagia. What study will be able to reliably determine the location, degree and nature of probable damage to the urethra?

- A. Retrograde urethrography.
- B. Radiograph of the pelvic bones.
- C. Urethroscopy.
- D. Urethral catheterization.
- E. General analysis of urine.

22. A 50-year-old patient was hospitalized due to penetrating damage to the urethra 2 days ago. What urgent surgery is absolutely indicated for the patient?

- A. Primary ureteroureteroanastomosis.
- B. Primary surgical treatment.
- C. Cystostomy.
- D. Meatotomy.
- E. Tunneling of the urethra.

23. A 70-year-old patient was hospitalized with complaints of significant swelling of the penis, inability to urinate, sharp pain in the root of the penis, which occurred after putting a metal ring on the penis, in order to prevent urinary incontinence. Which treatment is most effective?

- A. Prescribe analgesics.
- B. Meatotomy.
- C. Anti-edema therapy.
- D. Dilating of the urethra.
- E. Destruction of the clamping ring.

Answers to tests:

- |      |       |       |
|------|-------|-------|
| 1. D | 9. B  | 17. A |
| 2. A | 10. C | 18. E |
| 3. C | 11. E | 19. D |
| 4. E | 12. A | 20. B |
| 5. A | 13. C | 21. A |
| 6. C | 14. D | 22. C |
| 7. E | 15. B | 23. E |
| 8. D | 16. C |       |

### Situational tasks

#### *Task №1*

A 43-year-old patient was taken to the clinic for pain in the left lumbar region, which appeared after falling from a height of 2 m. After the injury, during urination, noticed the presence of macrohematuria.

Condition of moderate severity. Blood pressure and heart rate are normal. No pathological changes were found on the part of the chest and abdominal organs. There is a small painful swelling

in the left lumbar region.

Indicate the previous diagnosis and justify it.

#### ***Task №2***

A 25-year-old patient was taken to the clinic for pain in the right lumbar region area, macrohematuria with clots. An hour ago, the patient was hit by a hard object in the right lumbar region. The position is forced, severe scoliosis in the injured direction. Painful swelling is determined in the area of the right hypochondrium. Pulse 128 per 1 min., Blood pressure 85/50 mm. There are no signs of peritoneal irritation, no free fluid in the abdomen.

On excretory urograms the left kidney of the usual sizes, cup-shaped pelvic system is not changed, the passage of X-ray contrast agent on the ureter is not disturbed. On the right, the contrast agent in the projection of the kidney and urinary tract is not determined. Cystoscopy: blood is released from the orifice of the right ureter; from the orifice of the left ureter - urine.

Your diagnosis? What are the treatment tactics? Is there a need for any additional examination?

#### ***Task №3***

The patient is 35 years old, was admitted to the clinic for pain in the suprapubic area, ishuriya. Three hours ago, while intoxicated, he was hit in the suprapubic area. Despite strong urges to urinate, he cannot urinate after an injury. The position is forced - sitting. There is a symptom of "vanki-vstanki". At rectal inspection the overhang of a front wall of a rectum is defined. Percussion in the abdominal cavity is determined by free fluid.

Your previous diagnosis? Diagnostic and treatment tactics?

#### ***Task №4***

The patient was clinically and radiologically diagnosed with extraperitoneal rupture of the bladder.

What are the treatment tactics?

#### ***Task №5***

The patient is 40 years old, was admitted to the clinic for urethrorrhagia. An hour ago, on construction felt and received a blow to the perineum on the board.

Your previous diagnosis? What examination methods are indicated?

#### ***Task №6***

The patient is 42 years old, is in the trauma department, where he was admitted 2 hours ago, after a road injury, in a state of shock. After withdrawal from shock, a picture of the pelvic bones, which determines the fracture of the left pubic bone without displacement of the fragments. There is no independent urination, the enlarged bladder is palpated, blood has dried in the area of the outer opening of the urethra.

What diagnostic methods should be used and what treatment tactics?

#### ***Task №7***

A blow to the lower abdomen. There is no fracture of the pelvic bones. Pain, urine is excreted with impurities of blood. Some victims have no urination or very little portions of urine. In the detached parts of the abdominal cavity is determined by free fluid, a little later there were phenomena of peritoneal irritation.

What is the previous diagnosis? How to confirm it? What intervention is shown, given the possibility of combined intestinal damage?

#### ***Task №8***

The patient received damage to the urethra. They provided limited assistance imposition of



suprapubic urinary fistula.

What complication occurs after urethral injury? What are the known operations with this complication?

#### ***Task №9***

The patient is 17 years old. Delivered 4 hours after the injury - falling from altitude. Complains of pain in the left lumbar region and the left abdomen, the presence of blood in the urine. In the area of the left hypochondrium, a painful formation is burned, the lower edge of which is determined at the level of the navel. Pale skin. Blood pressure 90/65 mm.

Name the preliminary diagnosis, justify the plan of additional examination and treatment tactics.

#### ***Task №10***

Gunshot wound. Judging by the inlet and outlet fire holes are possible predict kidney damage, confirmed by hematuria, bleeding with urine from the wound opening.

What kind of surgical treatment is shown in this case? Its full volume, assuming that in most cases there is a combined damage to other organs.

### **Answers to situational problems**

#### ***Task №1***

Pain, macrohematuria, swelling in the left lumbar region give reason to suspect traumatic kidney injury. First of all, ultrasound of the kidneys is performed, which will reveal the integrity of the parenchyma, the clarity of the contour of the kidney, the presence of a fluid component near or around the kidney. To address the nature of the changes in the kidneys, it is necessary to perform excretory urography or CT with intravenous contrast, which will detect signs of damage to the left kidney (weak and late filling of the pelvic system, extrarenal leakage of contrast medium, or its complete absence on the side of the injury), and the condition of the contralateral kidney.

#### ***Task №2***

History and objective data are characteristic of damage to the right kidney. Significant signs of bleeding from the kidney cause a decrease in blood pressure and faster heart rate. The nature of the injury is unclear, and contrast-enhanced CT or renal angiography is indicated. In the absence of conditions for additional examinations, the patient undergoes immediate surgery - lumbotomy or laparotomy. The type of kidney surgery will depend on the extent of its damage.

#### ***Task №3***

All these symptoms are characteristic of intraperitoneal rupture of bladder.

At the patient's bedside, you can perform test Zeldovich, which will produce more fluid than injected. Retrograde cystography is shown, which will detect leakage of X-ray contrast agent outside the bladder, which is a sign of its rupture. The patient is subject to immediate surgical treatment - laparotomy, suturing of the rupture of the bladder, drainage of the bladder through the urethra (epicystostomy - if necessary in some cases), drainage of the abdominal cavity and Retz space (as the final stages of the operation).

#### ***Task №4***

Extraperitoneal rupture of the bladder is an indication for surgery - cystotomy, revision of the bladder, suturing of the rupture, drainage of the bladder through the urethra (epicystostomy - if necessary) and peri-bladder tissue by Buyalsky-McWarter or other methods.

#### ***Task №5***

Falling on the perineum with the subsequent appearance of urethrorrhagia allows you to think about traumatic rupture of the urethra. Pelvic radiography and retrograde urethrography should be performed.

#### ***Task №6***

A patient with a pelvic fracture without displacement of the fragments and obviously has a

complete rupture of the urethra. Urgent urethrography is shown. Upon confirmation of the diagnosis - the primary suture of the urethra, drainage of the bladder through the urethra (epicystostomy - if necessary), drainage of the urohematoma.

#### **Task №7**

Preliminary diagnosis: Intraperitoneal rupture of the bladder. To confirm the diagnosis it is necessary to perform a Zeldovich test, and retrograde cystography (the cystogram will show the leakage of contrast material into the abdominal cavity). In this case, an immediate operation is indicated - lower median laparotomy with revision of the abdominal organs, suturing of the rupture of the bladder, followed by drainage of the bladder through the urethra and drainage of the abdominal cavity and Retz space.

#### **Task №8**

A common complication after urethral injury is the development of stricture. There are the following types of surgical treatment:

a) internal optical urethrotomy; b) internal and external urethrotomy according to Vishnevsky (open surgery); c) resection of the urethra according to Holtsov; c) intussusception of the urethra according to Solov; d) toneralization of the urethra according to Fronstein.

#### **Task №9**

Preliminary diagnosis: Closed traumatic rupture of the kidney with symptoms of increasing internal bleeding. It is necessary to urgently perform ultrasound of the kidneys and parenchymal organs (in this case, the spleen is required) or CT scan of the abdominal cavity and retroperitoneal space. Conservative therapy aimed at combating bleeding and shock should be prescribed immediately. As the patient's general condition stabilizes, emergency surgery is required. In case of suspected combined damage to the abdominal cavity and kidney, laparotomy, revision of the abdominal cavity and left kidney is indicated. In the case of isolated kidney damage, left lumbotomy (or laparotomy) and revision of the retroperitoneal space are indicated. Further tactics will depend on the data obtained during the revision of the kidney.

#### **Task №10**

If there is a suspicion of combined damage to the abdominal cavity and retroperitoneal space, it is necessary to perform a laparotomy, followed by revision of the abdominal cavity and retroperitoneal space. Directly on the kidney, resection can be performed if the nature of the injury allows, or nephrectomy, and as a final stage - spatial drainage of the retroperitoneal space and the abdominal cavity.

### **Recommended Books**

#### **I. Main:**

1. **Urology**: textbook for students of higher medical educational institutions / [S. P. Pasichnikov, S. O. Vozianov, V. M. Lesovoy et al.]; ed. by S. P. Pasechnikov. – 2nd ed. – Vinnytsia: Nova Knyha, 2019. – 400 p.
2. **Urology** (Practical skills): study guide / Stus V.P., Lyulko A.V., Moiseyenko N.N., Fridberg A.M., Polion M.Y., Suvaryan A.L., Barannik K.S.; under edition of V.P. Stus. – Dnepropetrovsk: LLC «Akcent», 2014. – 141 p. <https://repo.dma.dp.ua/5712/>
3. **Urology**: A course of lectures / F. I. Kostyev, M. I. Ukhal, O. V. Borisov, V. D. Shvets, D. F. Tuchin, V. S. Grabazyuk, A. I. Malyarchuk; under edition of F. I. Kostyev. – Odessa, 2008. – 296 p.  
<https://repo.odmu.edu.ua/xmlui/bitstream/handle/123456789/1233/KostyevUrology.pdf?sequence=1&isAllowed=y>

## CONTENT

	P.
<b>Preface .....</b>	<b>3</b>
<b>Traumatic injuries of the urinary and male reproductive systems .....</b>	<b>4</b>
<b>Combat gunshot injury of the urinary and male genital system .....</b>	<b>15</b>
<b>Practical work of a student with a patient .....</b>	<b>17</b>
<b>Materials for self-control .....</b>	<b>18</b>