HEMORRHOIDS

**Definition.** The hemorrhoids (or piles) means pathological enlargement of hemorrhoidal nodes, their periodic bleeding, protrusion from the anal canal and frequent inflammation (fig. 1,2).

![Fig.1,2. External and internal hemorrhoids with thrombosis and protrusion.](image)

**Epidemiology.** It’s one of the most common diseases. Its prevalence makes 130-145 patients over 1000 adult populations; and its position in structure of large bowel diseases ranges from 34 up to 41 %. The ratio of disease between men and women makes 1.4:1. This tendency is most expressed in able-bodied age from 40 till 60 years. In men heavy physical work, overstraining and harmful habits promote development of hemorrhoids.

**Ethiology.** The basis of hemorrhoids is cavernous bodies which are placed during normal embryogenesis in the distal part of the rectum just before anorectal (dentate) line and in anal canal under the perineal skin. Cavernous bodies are seldomly settled circular. Basically they are accumulated by 3-4 separate groups, localization of which corresponds to localization of the main hemorrhoidal nodes : on 3,7 and 11 hours of clock-dial scale. The reason of increasement of hemorrhoidal nodes is impaired blood circulation in cavernous formations. These changes more often occur due to influence of such adverse factors, as sedentary and inactive life style, incorrect feeding, constipation, straining at difficult defecation, pregnancy, alcohol abuse. Under influence of these factors hemorrhoidal nodes increase in size, displace distally. Simultaneously dystrophic processes progress in the anal retentive system and hemorrhoids start to bulge out from the anal canal.
**Pathogenesis.** The main reasons in formation of hemorrhoids are hemodynamic and dystrophic factors. Dysfunction of the vessels providing blood inflow and outflow to cavernous bodies is in the basis of occurrence of hemorrhoids. Functional disturbances of intramural spiral arteries and cavernous veins results in expansion of the lumen of arteries and arteriovenous shunts. Amplification of arterial blood inflow results in overflow of cavernous formations. Reduction of blood outflow to venous system promotes repeated increase of hemorrhoids. Development of dystrophic processes in common longitudinal muscle of rectal submucosa and Park’s ligament (which holds the cavernous bodies in the anal canal) leads to gradual but irreversible protrusion of hemorrhoids from the anal canal.

**Morphology.** Externally hemorrhoid looks like compact formation, but its examination can define set of fine vascular glomes with diameter of 1-6 mm in the submucosal layer. Glomes lie in areolar and muscular tissues and make anastomosis to each other. On the cross section hemorrhoids has a spongy structure. At microscopy internal hemorrhoids are covered with a mucous membrane, and external – stratified flat epithelium. Vascular formations in hemorrhoids represent as cavernous bodies, consisting of the numerous cavities of various size divided by the thin muscular and connective tissue septa precisely bordering them from surrounding tissue. Presence of muscular fibres testifies to mobility of cavernous formations and about the certain functional unity of the vascular cavities, surrounded with the supporting fibrous-muscular frame. At the same time at clinically expressed hemorrhoids dystrophic changes are marked in muscular fibres.

**Clinical features.** Hemorrhoids can manifest as two basic syndromes – acute onset and chronic current of disease. In essence these syndromes are phases of the same process. The basis for development of acute hemorrhoids is thrombosis and inflammatory process of hemorrhoidal nodus. Inflammatory process develops in result of proctosigmoiditis and damage of wall of hemorrhoids by dense fecal mass. Thrombosis of hemorrhoids is accompanied with pains in the anal region. Quite often arising tissue oedema and inflammatory infiltrartion create impression of strangulation of hemorrhoids. In some cases acute inflammation is accompanied by oedema of perianal region and necrosis of piles. Usually thrombosis begins in internal piles and later spreads to external ones. This process is accompanied by sever pain in anal region. Less often there is isolated thrombosis of external piles manifested as thromboset round shape formation, wich is present during 2-3 months.

Typical symptoms of chronic current of disease are repeating bleeding assosiated with defecation and protrusion of hemorrhoids from the anus. Bleeding as a main symptom is present in more than half of the patients. The second frequent symptom is protrusion (bulging) of piles. There
is direct relation between increase in duration of disease, its stage and frequency of protrusion of piles.

Insignificant number of patients complains of protrusion of piles as a first symptom. With increase in duration of disease over 10 years the number of patients with protrusion of hemorrhoids almost 2 times exceeds number of patients with bleeding from anus. The most often reason of the primary visit to doctor is bloody dischag from the anus. In 80 % of patients there is scarlet blood discharge during defecation time or right after that. Bleeding from the anus in period between defecations is less often observed. In some patients constant bleeding results in decreased hemoglobin level and development of anemia. More often they have scarlet blood discharge without clots.

Constant dull pain in anal region is characteristic for disease with long duration and frequent exacerbations, and is the main reason for visit to doctor. In chronic hemorrhoids the main cause of pain is quite often accompanying chronic anal fissure. Discomfort and pruritus ani (especially expressed in patients with irritated large bowel syndrome or other gastrointestinal functional disorders) are more characteristic symptoms for late stages of disease.

In all patients with mucous rectal discharge accompanying diseases of rectum and large intestine are observed. These symptoms are characteristic not only for hemorrhoids. They can be present also in other pathological conditions of large bowel.

Complications. The bleeding is one of the main symptoms of hemorrhoids, but the unceasing bleeding from anal canal is already complication of disease. Long lasting discharge of scarlet blood from hemorrhoids results in the expressed anemia with reduction of hemoglobin level till 40-50 g/l.

The inflammatory process which has developed in surrounding cellular tissue as a result of thrombosis of piles (quite often resulting in acute paraproctitis) is a complication of hemorrhoids too. Complications of late stages of disease are perianal itch and anal fissure. Prolonged protrusion of hemorrhoids, especially in elderly patients, leads to insufficiency of anal sphincter and incontinence.

Diagnostics. Differential diagnosis. Recognition of hemorrhoids is not difficult. The diagnosis, as a rule is made at the first survey of the patient. At survey it is necessary to estimate condition of the perianal skin, the degree of protrusion of hemorrhoids, ability of their self reduction into the anal canal and expressiveness of bleeding. Hemorrhoids are determined as dark - cherry colored bulging formations in the rectal lumen having soft-elastic consistences and covered by mucous membrane. At manual rectal examination one should define the functional condition of anal
sphincter. It is also possible to establish presence of condensed piles, polyps or anal papillas. Protruding internal hemorrhoids distinctly bulge out from anus at straining. Besides hemorrhoids anorectal bleeding is a characteristic symptom for other diseases of large bowel. Appearance of this symptom is possible at diverticulosis, nonspecific ulcerative and granulomatous colitis, malignant tumours of the large bowel. Therefore at any displays of intestinal discomfort and especially in bloody discharge from the rectum it is necessary to perform manual rectal examination, rectoscopy, colonoscopy or irrigoscopy.

First of all hemorrhoids should be differentiated from anal prolaps - protrusion of rectal mucosa or all rectal walls, which usually manifests with protrusion of cylindrical formation with precise borders. The differential diagnosis should also be done with protruding hypertrophied anal papilas, pointed condyloma (verruca acuminatum), villous tumor and rectal cancer.

Classification. By the pathogenesis hemorrhoids are classified as:

- by current - acute and chronic,
- by the type - external, internal, combined.

By the clinical current acute hemorrhoids have three stages. The first stage is characterized by thrombosis of external and internal hemorrhoids without inflammatory process. For the second stage additional inflammation of hemorrhoids is characteristic. In the third stage on the background of thrombosis and inflammation of hemorrhoids the inflammation of subcutaneous tissue and perianal skin develops.

Chronic current of disease can be subdivided into four stages. For the first stage scarlet blood discharge from the rectum is characteristic at defecation, without protrusion of piles. The second stage is characterized by protrusion of hemorrhoids and their self reduction into the anal canal (with or without bleeding). For the third stage periodical protrusion of piles from anal canal is specific with necessity of their manual reposition (with or without bleeding). The fourth stage is a constant protrusion of hemorrhoids together with rectal mucosa, impossibility of their manual reposition (with or without bleeding).

Treatment. In initial stages of hemorrhoids conservative treatment is indicated. It is necessary to note, that prevention and therapy of disease first of all consists in normalization of activity of digestive tract and treatment of irritated large bowel syndrome which takes place approximately in half of the patients, and only then local therapy should be started. Normalization of stool includes daily emptying of the large bowels. For this purpose enzime preparation, the medications influencing on the intestinal flora and normalizing bowel’s (small and large) peristalsis are used. Vegetable fibres together with regular consumption of liquid are useful. As a source of cellulosa
wheaten bran, sea kale (laminaria) and a flax seed are used in their natural type or in the form of pharmacological preparations. Most of all plantain seeds or peelings are used, also a flax seed as such preparations, as Agiolax, Fiberlax, Fillinggood, possessing high water-retaining ability.

In acute hemorrhoids conservative treatment is preferable, which includes local application of analgetics and anti-inflammatory drugs, cleansing enemas, ointment bandages and physiotherapy. In complex treatment of acute hemorrhoids phlebotonics (Venorutin, Detralex) are used as a system treatment. These preparations increase resisstency of capillaries, improve microcirculation in cavernous bodies of piles on the background of changed venous outflow from them. At the choice of local treatment of acute hemorrhoids it is necessary to take into account the prevalence of one of symptoms - pain, thrombosis, extent of the inflammatory process. Inc case of bleeding evaluation of its severity and expressiveness of posthemorrhagic shock is necessary. The pain syndrome at hemorrhoids is mostly connected to strangulation of thrombosed hemorrhoids or occurrence of acute anal fissure. Therefore for elimination of pain not narcotic analgetics and the local combined anesthetizing preparations are used. To local therapy of acute hemorrhoids such preparations are applied, as Aurobin, Ultraproct, Proctogivenol, Relif and others.

The thrombosis of hemorrhoids is the indication to application of anticoagulants of local action. To this group of preparations concern Heparin and Troxevasin ointments, Ambenat, Hepathrombin G. In the majority of cases the thrombosis of piles is complicated with their inflammation and transition to subcutaneous cellular tissue and perianal skin. Thus the above-mentioned preparations are used in combination with the water-soluble ointments possessing powerful anti-inflammatory action. To them concern Levosin, Levomecol, Mafinit. During the period when inflammatory process starts to subside acute hemorrhoids are treated by the liniments, improving tissue regeneration (Solkoseril, Actovegin, Panthenol and others).

The bleeding is one of the basic symptoms of hemorrhoids. At continuous bleeding emergency operation is indicated - hemorrhoidectomy or ligation of hemorrhoids by the latex bands.

In patients with initial stages of hemorrhoids with prevalence of bleeding infra-red photocoagulation or sclerotherapy should be done. For acceleration of reparative processes it is desirable to supplement these types of treatment by the therapeutic laser. Ligation of hemorrhoids by the latex bands should be used in late stage of diseases when the basic symptom is protrusion of hemorrhoids. Contraindications for minimally invasive methods of treatment are thrombosis of hemorrhoids, anal fissure, acute and chronic paraproctitis and other inflammatory diseases of anal canal and perineum.
Surgical treatment of hemorrhoids still remains in the reference way to which other methods of treatment are compared. Currently in our country and in abroad the most of coloproctologists do the excision of three hemorrhoids. This operation is offered by Milligan and Morgan in 30-s' years of the twentieth century, but is used in various modifications till now.

Last years basically three variants of operations are used. The first is closed hemorrhoidectomy with restoration of mucosa of anal canal by the continuous or interrupted catgut stitches. This type of surgical intervention is mainly used in hemorrhoids of 3-4-th stages at absence of precise borders between external and internal piles.

The second technique - open hemorrhoidectomy at which external and internal hemorrhoids are removed together en block with the help of electrocoagulator knife. The pile pedicle is ligated by the catgut thread and the wound of anal canal is left open. This operation is used in patients with the same stages of disease mentioned above, but complicated with anal fissure and paraproctitis.

The third technique is submucosal hemorrhoidectomy, in essence carried out as a plastic operation. Advantages of this operation consist that the mucous membrane of the anal canal is not excised together with hemorrhoids, and is dissected by arched sections, then from submucosal layer sharply (with the help of coagulator) the hemorrhoidal bolus is separated, its pedicle is tied and the pile is cut and removed, leaving the stump of the removed pile in the submucosal layer.

**Prognosis.** The differentiated approach to the choice of treatment methods of hemorrhoids depending on its stage allows to reach good results in 98-100 % of cases.
ANAL FISSURE

**Definition.** Anal fissure is a spontaneously originating linear, ellipsoidal or triangular defect (ulcer) of the mucous membrane of anal canal (fig. 3,4).

![Anal fissure](image)

**Fig. 3,4. Anal fissure**

**Epidemiology.** Frequency of occurrence of anal fissure ranges from 11 up to 15 % among diseases of large bowel and makes 20-23 cases in 1000 adult population. Young and middle-aged women are affected more often (more than 60 % from all patients).

**Ethiology and pathogenesis.** The reasons of occurrence of anal fissure are multiple. Among them the following are considered as the most probable: mechanical, vascular disturbances, changes of perianal epithelium (paraceratosis), and neuromuscular changes of the anal sphincter. The most often reason of occurrence of acute fissure is the ulcer of anal mucosa, developing at passage of solid fecal masses. The long stretching of the anal canal with change of anorectal angle quite often results in traumatic damage of posterior wall of the anal canal, especially in men. This part of anal canal also has anatomic preconditions to formation of anal fissure: here deep distal parts of anal crypts are located. Besides mentioned on the posterior wall of the anal canal tendinous endings of anal sphincter muscles converge.

In women the weak zone of the anal canal is its anterior part where as though the vulva, the vagina and the fibrous center of perineum converge. Therefore fissure in the anterior part of the anal canal happens mainly in women. Fissures are seldom on the lateral walls of the anal canal.
Formation of fissure is connected to the vascular changes in the anal canal. The fissure is quite frequently combined with hemorrhoids. Some of the anal fissures certainty develops as a result of chronic inflammation in the area of anal crypts. The chronic inflammation of this zone can gradually result in fibrosis and loss of elasticity of the mucous membrane of the anal canal, with its further break and formation of acute and chronic fissures.

The reason of anal fissure formation can also be the neurogenic disturbances with long spasm of internal, and especially external anal sphincters. Thus, anal fissure is polyethiologic disease that it is necessary to take into account during its treatment.

**Morphology.** The part of the mucous membrane in the specified zones, being exposed to influence of highly virulent rectal florae, undergo scarrification, and then is condensed, deepened and thus the fissure - longitudinal defect of the mucous membrane with precise edges and bottom is really formed. On the bottom of such fissure - ulcer, owing to a constant nonspecific inflammation, nervous structures of the affected part of the anal canal are pathologically changed. The nervous endings lose their membranes, become uncovered, that result in the expressed pain syndrome. The upper pole of the defect remains within the bounds of dentate line i.e. does not pass to the mucous membrane of the rectum. At chronic current edges of such ulcer are hardened and thickened, especially in the distal parts of the fissure where thus polyp-like thickening of scar tissue (skin tag) is formed - “sentinal pile”. Sometimes hypertrophied anal papilla is defined at the proximal part of the fissure (at the dentate line). Normally anal papillas represent thickened distal parts of anal columns and have no relation to true polyps of anus.

Extent of fissure usually does not exceed 1 sm. At microscopy defect of stratified epithelium is determined with its thickening in the ulcer margines. The bottom of the ulcer is usually clean, represented by mature granulations and scar tissue. Sometimes the scar on the fissure bottom has expanded 2-5 mm deeper and involves nerves endings and muscles. In some cases the inflammation is poorly expressed or is absent at all, but in other cases the inflammation is significant, and is sometimes accompanied by occurrence of fistula.

**Clinical features.** Anal fissure represents as a triad of symptoms:

- pain in the anus,
- spasm of the anal sphincter,
- bleeding from the anus.

This is very typical and precisely observed at the first survey of the patient. If the fissure is combined with hemorrhoids, protrusion of piles and more plentiful bleeding is usually added to the
specified complaints. The pains amplify during defecation, and the pain itself causes spasm of anal sphincter, and the spasm only increases the pain. These two symptoms - pains and spasm are the major elements of known clinical triad of anal fissure. Its third component is bleeding from anal canal. These rather small discharges of blood during or right after defecation are simply due to damage of fissure walls by hard stool (especially at constipation).

In acute fissure pain, as a rule, is severe, constant, but rather short-term, only during defecation and 15-20 minutes after it. The sphincter spasm at such patients is usually sharply expressed, and bleeding is minimal. Usually in acute fissure just the painful area of the anal canal can be revealed, but the hardened and elevated margins of the fissure and the “sentinel pile” at its distal edge might be absent. At chronic fissure pain has longer character; amplifies not only after defecation, but also at long compelled (forced) position. Patients have such symptom, as "fear of stool". Patients more often start to resort to various laxatives, enemas; they become irritable and have sleeplessness.

**Complications.** Complications are the expressed pain syndrome caused by the spasm of anal sphincter, bleeding from anal fissure, and also acute paraproctitis, developing as a result of spread of infection through the defect of anal mucosa to pararectal cellular tissue.

**Diagnostics.** At inspection of the anus, after definition of the site of morbidity one should carefully move apart the patient’s buttocks. Thus almost in all cases it is possible to see distal part of the fissure - red color longitudinal or triangular ulcer going deep into the anus. These noninvasive manipulations should precede to manual examination which might be unsuccessful because of sharp morbidity. In such cases performance of manual exam of anal canal should not be forced.

In the patients with chronic fissure at manual rectal examination it is possible precisely to define not only exact localization of the fissure, but also condition of its edges (dense, elevated). Particularly manual rectal examination may give data of presence of spasm to the skilled doctor before sphincterotomy is performed: muscular tone of the sphincter is increased and the sphincter densely envelops the finger, further promotion of which becomes difficult, and manipulation becomes very painful. Instrumental methods of diagnostics (anoscopy and rectoromanoscopy) in patients with the expressed pain and sphincter spasm should not be done without anesthesia.

Presence of the long lasting intensive pain, arising after defecation, difficulties in defecation and sharply increased anal reflex are the most typical clinical symptoms of anal sphincter spasm. Basic changes of function are mostly related to the internal sphincter. Spasm of external sphincter is not usually observed.
**Differential diagnosis.** First of all anal fissure should be differentiated from incomplete internal fistulas of the rectum. At incomplete fistula, as a rule, the spasm of the sphincter is not observed, the pain is much less, and purulent discharges from the rectum are determined first of all. At manual examination precise deepening - cavity of the fistula is defined on the bottom of the painless ulcer. At chronic current of disease fissure is frequently accompanied with perianal itchig, proctitis (sphincteritis) or proctosygmoiditis.

At diagnostics of anal fissure one should be sure that it’s a “simple fissure”, but not the display of syphilis (gumma), tuberculosis, actinomycosis of rectum, any rare parasitic or other disease (for example - Crohn’s disease). Careful gathering of the anamnesis helps for correct diagnosis, because by the clinical picture "usual" anal fissure can proceed with different variants; and to differentiate it from specific disorders only with the help of manual rectal examination or anoscopy (rectoscopy) is very difficult. One should remember also about possible anal displays of Acquired Immune Deficiency Syndrom/AIDS/.

**Classification.** Anal fissure can be:

- By the activity of inflammatory process - acute and chronic,
- By the localization - anterior, posterior and lateral

In 85 % of cases anal fissure is posteriorly located (at 6 o'clock position), in 8-9 % fissure is observed anteriorly (at 12 o'clock position, basically at women), and extremely rarely (0,5% of cases) it has lateral position. Sometimes two fissures coexist in the anal canal (3-4 %), located anteriorly and posteriorly.

**Treatment.** Treatment of patients with anal fissure should be started with conservative methods. Normalization of stool should be started first. As well as in hemorrhoids, in many cases only regulation of passage of intestinal content through large bowels, change of stool consistence at constipation with the help of hydrophylic colloids and food additives, treatment of chronic diarrhea (more often caused by dysbacteriosis) are frequently effective and have stable effect (especially in acute postnatal fissures). For the period of treatment, which lasts about 2 weeks, salty, sour dishes and alcohol should be excluded from food. Patients use a number of suppositories, anesthetizing preparations and ointments. After defecation, before insertion of suppository, it is necessary to take warm (36-38 °C) hip-bath. The same manipulation is carried out for the night too. No antibiotic is used. The described treatment, as a rule results in significant improvement: intensity of pain reduces, the spasm of the sphincter decreases.

Failure of conservative treatment is indication for surgery. Surgical treatment especially is indicated in chronic anal fissure which usually doesn’t give response to conservative therapy.
Operation consists in excision of the fissure within the limits of healthy mucous membrane. Rectal mirror is inserted into the rectum; the fissure is outlined by the scalpel, and then is totally excised by the scissors from outside to inside. Hemostasis is done and wound is left open. The wound usually heals easily and quickly, within 5-6 days with formation of thin scar. During this operation it is most important to decide whether additional sphincterotomy is needed or no. Also the type of sphincterotomy should be properly choosen. Without this additional manipulation in most cases operation is not successful, relapse of fissure happens because of renewing of tonic contractions of sphincter. The majority of patients (in whom before operation the spasm was not defined or it was insignificantly expressed) can be permanently cured only by excision of the fissure within the limits of healthy mucous membrane. If the spasm is expressed and it is obvious, that the spasm shoult be permanently or temporarily released, in such situation lateral submucosal sphincterotomy is indicated. In the past the majority of coloproctologistys supported technics of posterior dosated open sphincterotomy, in which additional section of sphincter through the wound cannot be well controlled (different patients have different constitution and thickness of the rectal wall is not the same). These reasons have induced many coloproctologistys all over the world to use lateral subcutaneous sphincterotomy.

**Prognosis.** Conservative treatment and the surgical intervention, carried out in a view of functional condition of rectal sphincter (established on the basis of clinical-functional inspection), provide recovery of patients in 98-100 % of cases.
ACUTE PARAPROCTITIS

**Definition.** Acute paraproctitis –is an acute inflammation of pararectal cellular tissue, caused by infection from the lumen of rectum owing to the inflammation of anal crypts and the anal glands (fig. 5,6).

![Acute paraproctitis](image1.png)

**Fig. 5,6. Acute paraproctitis.**

**Ethiology.** In most cases the causative agents of paraproctitis is the mixed microflora. Staphylococci and streptococci in a combination with E.coli and proteus are more often found. Quite often presence of bacteroids, peptocooci, fusobacteriae is found (especially in abscesses of pelvirectal spaces) concerning to non spore-forming aerob bacteriae. Acute paraproctitis, caused by the mixed microflora, usually is named simple. The specific infection (tuberculosis, actinomycosis, and clostridium) is quite unusual (1-2 %).

In acute paraproctitise there are all symptoms of acute inflammation: pain, hypostasis, hyperemia, pus. If paraproctitis is caused by association of microorganisms and the leading role thus play non spore-forming aerobs, then putrefactive paraproctitis occur at which cellular tissue is affected in the big extent. Also true nonclostridial anaerobic paraproctitis may develop with defeat of not only cellular tissue, but also fasciae and muscles. Such paraproctitis are characterized by fast distribution of process with the expressed oedema of tissues, necrosis; instead of pus the foul liquid with detritus is allocated. Sometimes paraproctitis is caused by clostridias – the cause of gas gangrene.

Predisposing factors for occurrence of purulent process in pararectal cellular tissue are: weakening of local and humoral immunity in exhaustion, alcoholism, due to acute and chronic
infections (quinsy, flu, and sepsis); vascular changes in diabetes, atherosclerosis; functional disturbances (constipation, diarrheas); presence of hemorrhoids, anal fissure, cryptitis and others.

**Pathogenesis.** The anatomical border between rectum and anal canal passes through the anorectal line. At this level Morgani’s crypts are located - pockets, bottom of which is located approximately on the border of the upper and middle third of the anal canal. At the bottom of crypts excretory ducts of anal glands open (so called Herman’s glands). Glands basically are located in the thickness of the internal sphincter, for what we also call them intramuscular glands. Anal glands and Morgani’s crypts are very important elements in pathogenesis of paraproctitis. Intramuscular glands are embrionated during intra-uterine development and the child is born with them. But they start to function since the period of sexual maturity. For this reason paraproctitis, connected to the inflammation of crypts and glands, arises in adult people more often. In children of younger age the infection gets to the cellular tissue, as a rule, through macerative skin, and in newborns paraproctitis quite often is the next local center of infection at septicopyemia.

Anal glands represent ready canals into which the infection will penetrate from the lumen of rectum. If there is obstruction of duct of anal gland because of oedema of rectal mucosa (at diarrhea), microtraumas, cicatricial changes owing to cryptitis, etc., the acute inflammation of anal glands group may develop, opening in crypt, and thus there is a microabscess of the anal canal wall.

The microabscess which has arisen owing to the inflammation of glands is firstly located in area of crypt and does not go outside the borders of internal sphincter and in favorable current can be emptied through the crypt. At this stage illness can be considered as cryptitis. But if an abscess extend deeper, into the intersphincteric space, it is already paraproctitis. By septa of the intersphincteric spaces pus can go by different directions, causing formation of abscesses occupying extensive pararectal spaces.

The important element in pathogenesis of acute paraproctitis is the purulent tract by which pus from intersphincteric spaces gets to more remote regions. Localization of this tract has crucial importance in the choice of the surgical method. Pus from intermuscular space can get to another cellular space, bypassing external sphincter of anus, or passing through the latter.

**Clinical features.** Onset of disease, as a rule, is acute. After short prodromal period with indisposition, weakness, headaches, an increasing pain appears in the rectum, perineum or in the pelvis, accompanying with high fever and chills. The degree of expressiveness of symptoms of acute paraproctitis depends on localization of inflammatory process, its extent, character of the pathogenic organism, reactivity of the organism. In localization of abscess in the subcutaneous cellular tissue clinical displays are more and definitely expressed: painful infiltration in the anal region, hyperemia.
of the skin, rise in body temperature compel to address to the doctor in the first days after the beginning of disease.

Ischiorectal abscess in the first days of disease manifests by the general symptoms: chills, feeling bad, blunt pains in the pelvis and the rectum, amplifying during defecation. Local changes (asymmetry of buttocks, infiltration, and hyperemia of skin) appear in late stage (after 5-6 day).

Pelvirectal paraproctitis proceeds most severe in which the abscess is located deeply in the pelvis. In the first days of disease the general symptoms of inflammation prevail: fever, chills, headache, and pains in joints. Pains are located in the pelvis, in the bottom of the abdomen. Frequently the patient addresses to the surgeon, the urologist, and women - to the gynecologist. Duration of this period sometimes reaches 10-12 days. Further amplification of pain in the pelvis and rectum, stool and urine retention and expressed intoxication are marked.

If there is purulent fusion of the wall of rectum, pus breaks into the lumen of gut. In women break of pus from pelvirectal spaces to vagina may happen. In these cases the clinical picture of disease is smeared, pains decrease and the temperature reduces.

Stool retention, tenesmus, dysuric disturbances, pains in the bottom of abdomen especially frequently are at localization of abscess in the pelvirectal space, but can be at any other type of paraproctitis too.

**Complications.** The most dangerous complication of acute paraproctitis is spreading of inflammation to the cellular tissue of pelvis, purulent fusion of the wall of the rectum higher than the level of anorectal line. In this case intestinal contents get in pararectal cellular tissue and the opportunity of wide spread of infection opens. Cases of purulent fusion of urethra are recorded. Taking into account immediate vicinity with the pelvic peritoneum and connection of pelvic cellular tissue with retroperitoneal space, it’s impossible to exclude an opportunity of break of pus in to the abdominal cavity and retroperitoneal space. Such complications, as a rule, arise at the overdue reference to the doctor of the elderly, weakened patients, at presence of diabetes, vascular disturbances.

Other possible complications of acute paraproctitis are: break of pus from one cellular space into another, rupture of the abscess (pelvirectal) in the lumen of rectum or vagina, or burst of pus from the abscess cavity through the perineal skin (spontaneous opening).

After spontaneous or surgical opening of abscess without liquidation of purulent tract and affected crypt further fistula of rectum, as a rule, is formed.
**Diagnostics.** The first and the main task of diagnostics of acute paraproctitis - on the basis of complaints of the patient, clinic and survey to distinguish presence and localization of abscess in the surrounding rectum cellular space.

Diagnostics of subcutaneous paraproctitis is simple enough. The abscess located in subcutaneous cellular tissue of perianal region, appear quickly and brightly: pains, hyperemia of skin on the side of defeat, smoothness of perianal skin folds. Palpation in the field of inflammation is sharply painful, but fluctuation in the beginning can be absent- it is a late symptom. In spite of the fact that the diagnosis seems doubtless already at external examination and palpation, to execute manual rectal examination is inevitably. It is necessary not only to establish connection of the abscess with rectum or to find the affected crypt, but one should also remember, that the pus in subcutaneous cellular tissue can appear owing to its break from others cellular spaces.

Ischiorectal paraproctitis can give the changes seen by eye in late stage when expressed assimetry of buttocks and smoothing of pararectal folds appear. Therefore, if the patient has addressed concerning chills, deterioration of health state, sleeplessness and at the same time is disturbed by blunt constant pains in rectum and pelvis, amplifying at defecation, but there are no seen changes in the anal region, it is necessary to do manual rectal examination. By the end of the first week of disease infiltrate protrudes to the lumen of rectum, temperature increases in the rectum. Inflammatory infiltration can be spread to the prostatic gland and on urethra; in this case their palpation causes painful desire to urination.

Characteristic attributes of acute ischiorectal paraproctitis is presence of infiltration in anal canal at the level and higher than anorectal line (so it’s possible to reach by the finger the top border of infiltration), and amplification of pain at balloting palpation from the perineal region. If the diagnosis is clear, instrumental methods of investigation, as well as in subcutaneous paraproctitis, are not applied.

Submucosal paraproctitis is diagnosed by manual rectal examination. Usually protrusion of abscess in the lumen of rectum is expressed, pus can be spread downwards in subcutaneous cellular space, can go upwards, exfoliating mucosa of low ampular part of the rectum.

Pelvirectal paraproctitis proceeds most severly and is frequently diagnosed late. Inflammatory process is located deeply in the pelvis. The top border of the pelvirectal spaces is the pelvic peritoneum, the bottom border - the levator ani muscles. Therefore external examination of perineum usually does not allow diagnosing pelvirectal paraproctitis. Signs of pelvirectal paraproctitis, seen at external examination of the patient, appear only in the event that purulent process is spread to ischiorectal region and to the subcutaneous cellular tissue that is in the late stage.
**Manual rectal examination.** Already in the initial stage of pelvirectal paraproctitis by manual rectal examination it is possible to determine morbidity of one of walls of middle-ampulary and upper-ampulary parts of rectum, it is possible also to find out pasty intestinal wall or infiltration behind its borders. In later stage the bowel wall thickens, its compression from the outside is marked, and even later – bulging of an elastic tumor-like formation in the bowel lumen is found, fluctuation is sometimes defined. It is necessary to note, that in pelvirectal paraproctitis the top pole of the abscess usually is not achieved by the finger even at squatty position of the patient. Pelvirectal abscess, as a rule, can be determined, having applied only manual rectal examination. Frequently necessity for application of instrumental methods of diagnostics is not present. But if the diagnosis is not clear, it is necessary to use rectoromanoscopy and ultrasonography.

The variation of pelvirectal paraproctitis is retrorectal one. The clinical picture in this localization of inflammation is characterized by the expressed painful syndrome from the very beginning of disease. And in this type of paraproctitis the main diagnostic method is manual rectal examination.

It was already mentioned that the abscess is only a part of pathological process at acute paraproctitis. There is also affected crypt where the ducts of inflamed anal glands open, and there is a purulent tract through which pus spreads to the cellular spaces. Sometimes already during the first manual rectal examination it is possible to palpate the affected crypt. But more authentic data can be received during operation when it is possible not only to palpate the area of all crypt, but also, having introdused painting solution (methylen dark blue with addition of peroxide of hydrogen) in the cavity of abscess to see colouring of affected crypt. Often the purulent tract is found during operation too.

And so, after the primary survey we can formulate the diagnosis “acute paraproctitis” with the indication of localization of the abscess in the cellular space; in some cases we can suppose the approximate localization of affected crypt and the purulent tract in relation to external sphincter: intrasphincteric, transsphincteric and extrasphincteric. Intrasphincteric purulent tract happens very seldom, more often we deal with transsphincteric tract, and it may penetrate the sphincter in different levels.

**Differential diagnosis.** Acute paraproctitis, basically, should be differentiated from the following diseases: suppurated teratoma of pararectal cellular tissue, abscess of Douglas pouch, tumours of rectum and pararectal areas. As a rule, such necessity arises in ischiorectal, pelvirectal paraproctitis, that is at high localization of the abscess. In subcutaneus paraproctitis sometimes there is a doubt - whether this abscess is a suppurating furuncule or suppurating atheroma. If it is
paraproctitis the band is defined in subcutaneous cellular tissuee, going to the anal verge as infection goes from the lumen of the bowel.

To differentiated paraproctitis from suppurated teratoma not always is simple. Here it is important, that suppurated, but unopend cyst has no connection with the lumen of rectum. Cysts frequently have well defined capsula, precise borders, and their contents as against simple abscesses are gelatinous, curdled or putty form. If the cyst it was emptied into the lumen of the bowel this aperture, as a rule, is higher than the level of crypt while at paraproctitis affection of the crypt is present, being the entrance aperture for the infection from the bowel.

Differential-diagnostic distinctions between pelvirectal paraproctitis and Douglas’s pouch abscess are found out at gathering the anamnesis. The Douglas’s pouch abscess arises as complication of diseases of abdominal cavity organs or after surgical interventions concerning them. Bimanual and bidigital examinations through rectum and a vagina help in correct statement of the diagnosis. If in bimanual examination through rectum in men and through vagina in women it is possible to remove - to collate the tips of fingers even not on midline, but in lateral parts of the pelvis it is necessary to count, that the patient is having not the Douglas’s pouch abscess, but pelvirectal paraproctitis. In modern conditions the ultrasound examination is more oftent used allowing to define the localization of abscess enough precisely. Topical diagnostics is extremely important, as surgical access for drainage of abscess in paraproctitis differs from those in Douglas’s pouch abscess.

Acute paraproctitis happens as complication of the breaking malignant tumour of rectum. It is possible to define this applying manual rectal examination.

If inflammatory process of pararectal cellular tissue hase indurating character, it is necessary to exclude malignant process.

**Classification.**

1. By ethiology: specific, nonspecific, posttraumatic;
2. By localization of abscess: subcutaneous, submucosal, ischiorectal, pelvirectal, retrorectal;
3. By the localization of the affected crypt (an internal aperture): anterior, posterior, lateral;
4. By the relation to the sphincter: intrasphincteric, transsphincteric, extrasphincteric.

**Treatment.** Treatment of acute paraproctitis is only surgical.
Operation should be executed immediately after establishment of diagnosis, it concerns to the urgent category. The type of anesthesia plays the important role. Full anesthesia and good relaxation are necessary. Local anesthesia in operations for acute paraproctitis is contraindicated because of danger of spread of infection during injection of anesthetics, inadequacy of anesthesia and difficulties of orientation because of tissue infiltration with anesthetizing solution.

The primary goals of radical operation are - obligatory opening of the abscess, its drainage, search and finding of affected crypt and the purulent tract and their liquidation. If to liquidate connection with the bowel it is possible to expect for full recovery of the patient.

**Prognosis.** At duly and correctly executed radical operation in acute paraproctitis the prognosis is favorable. At operation of simple opening of abscess without liquidation of its connection with the bowel lumen recovery is improbable; most likely the fistula of rectum will be generated, or after some time there will be relapse of acute paraproctitis.

**Anaerobic paraproctitis.** The causative agents of anaerobic infections are the spore-forming bacteria of gas gangrene (Clostridia - Cl. Perfringens, Cl. Novyi, Cl. Septicum, Cl. histolyticum), as well as non spore-forming anaerobs (bacteroids, fusobacteria and others) which die at contact with oxygen.

Anaerobic clostridial paraproctitis is the heaviest form of paraproctitis. The incubative period of disease is very short, sometimes it makes only 3-6 hours or 1-2 days. The beginning of gas infection becomes apparent by appearance of inexplicable anxiety, fast increasing pulse rate, reducing of arterial pressure, frequently grey - bluish complexion arises. All the mentioned changes happen on the background of relativly well condition of the patient. Simultaneously with it there are strong pressing pains in perineum, frequently simply intolerable. Presence of so strong pain is explained by the tissue ischemia.

**Treatment.** Treatment consists in wide opening of the center of defeat, removal of all necrotic and poorly blood supplied tissues. Wounds are washed out by solutions of hydrogen peroxide, potassium permanganate, antiseptics and are drained. Intensive infusion and wide spectrum antibacterial therapy is carried out in combination with metronidazole. After surgical intervention good effect gives treatment by HBO (hyperbaric oxigenotherapy).
Definition. Fistula of rectum (chronic paraproctitis) - chronic inflammatory process in the crypt, in intersphincteric space and pararectal cellular tissue with presence of generated fistula tract. Affected crypt is thus an internal aperture of the fistula (fig. 7,8).

Fig. 7,8. Fistula of rectum.

Ethiology and pathogenesis. The majority of patients with fistulas of rectum connect the beginning of disease with previous incidence of acute paraproctitis, which not always is exposed to radical operation. Approximately in the half of this group of patients opening and drainage of abscess is only made without liquidation of the entrance gate of infection, which frequently results in formation of fistula of rectum. Constant infection occurs from the bowel lumen, the purulent tract is surrounded by the connective tissue wall – and this is already fistula tract. The external aperture of the fistula usually opens on the perineal skin, its diameter frequently does not exceed one centimeter. In improper drainage there can be infiltrations, cavities in cellular tissue by the course of fistula.

Morphology. The usual surgical specimen is exposed to morphological examination; as a rule it represents the site of the skin containing external fistula aperture and underlyng cellular tissue in which fistula tract is defined. On cross-sections diameter of the tract ranges from 1 up to 5mm, sometimes by the course of fistula expansions or branchings are found. At microscopic research it is found out, that the walls of fistula tract are formed by sclerotic connective tissue with focal congestions or diffuse infiltration by lymphocyts. The internal surface of fistula is represented by the granulations of different degree of maturity.
Clinical features. Much frequently disease proceeds wavy, on the background of existence of fistula there can be exacerbation of the inflammation at corking of the external aperture or fistula tract by purulent – necrotic masses or granulation tissue. Thus development of abscess is possible; after its opening and evacuating the acute inflammatory phenomena diminishes. The quantity of wound discharge decreases, pains disappear, the general condition improves; however the wound does not heal completely, small wound of no more than 1cm in diameter remains from which sanious -purulent discharge continues. It is the external aperture of the fistula.

At careful observance of hygiene the patient may not suffer from presence of fistula for long time. But the periods of exacerbations strongly disturbs well-being. Occurrence of new centers of inflammation, involving of anal sphincter, results in occurrence of new symptoms of disease. Owing to long existence of inflammatory process the general condition of the patient worsens, asthenia, headaches, sleeplessness, decrease in capacity for work are observed, the mentality is disturbed, the sexual potency is reduced.

Complications. Presence of fistula of rectum results in significant disturbances in the organism, especially in complex fistulas, with infiltration across its tract and frequent exacerbations of inflammatory process. Also there can be the local changes resulting in deformation of anal canal and perineum and cicatricial changes of the sphincter muscles, usually leading to insufficiency of anal sphincter. One more complication of chronic paraproctitis is pectenosis - cicatricial changes in the wall of anal canal, resulting in reduction of elasticity and cicatricial stricture. At long existence of disease (more than 5 years) in some cases malignant transformation of the fistula can be observed.

Diagnostics. Diagnostics of chronic paraproctitis is not so difficult. Usually patients address to the doctor with complaints of presence of fistula in the perineal region or purulent discharges from the anus. During external examination it is possible to see the external aperture, if it is a complete fistula of rectum. In incomplete internal fistulas there is only an internal aperture; the external aperture is not present on the skin.

It is natural, that the conversation with the patient should precede his (her) survey. During conversation duration of disease, feature of the beginning and current of process, frequency of exacerbations, character of the previous treatment is specified, presence of accompanying diseases is found out. During conversation it is also necessary to pay attention to the general condition of the patient (weight loss, pallor), his (her) psychological status. Inquiry about character and amount of discharge from the fistula can help with diagnostics of other diseases described by occurrence of fistulas too (actinomycosis, teratoid formations) to assume presence of purulent leakages and
cavities at plentiful discharge of pus. Separately it is necessary to ask about functions of intestines and anal sphincter (constipation, diarrheas, bleedings), especially if before the patient has underwent operations on anal canal.

Survey of the patient with a fistula of rectum is better to do after clarification of the bowel from contents (enemas, laxatives). It is more convenient to carry out inspection in a special armchair in position of the patient on the back with the legs drown aside. At survey attention is paid to condition of perineal skin and buttocks; the distance from fistula external apertures till anus is estimated. Localization of fistula opening on the anal circle is marked, using thus a principle of a clock dial scale - on 3, 5, 6, 11 hours and so on. The arrangement of fistula internal opening is roughly possible to assume by the localization of fistula external opening. The tract which is located inside from external sphincter or passing through its small portion frequently has an external opening near the anus. Presence of one external aperture is typical of fistulas of rectum owing to previous acute paraproctitis. If openings are observed to the right and to the left of the anus it is necessary to think about horse-shoe fistula. Presence of multiple external apertures is more typical for any specific process. At survey the amount and character of discharge from the fistula is estimated. Usual paraproctitis is characterized by the purulent discharges of yellow color, without any smell. If at pressing on the affected area pus is plentifully allocated, it means, that alonge the fistula tract there is a cavity (cavities).

Seldom there is malignant transformation. Thus character of discharges from the fistula varies. They become bloody with a mucus admixture.

At external examination it is necessary also to pay attention to presence of deformations of perineum, scars, whether there is gaping of anus, maceration of perianal skin, comber traces and other. If the patient complains on bad fecal and gas continence, checking of perianal skin reflexes and cremasteric reflexes is obligatory by drawing strokes on the skin with the help of a probe or not sharp needle. It should be done before palpation and manual rectal examination.

Palpation of perianal region and perineum allows defining the degree of cicatrical process by the course of the fistula. In localization of fistula tract in subcutaneous – submucosal layer (that is intrashpincteric) or when the tract goes in a small portion of anal sphincter, it can be determined easily as a band, going from external fistula aperture to rectum. When fistula tract goes in deep portions of external sphincter and is not determined at palpation, certanly the fistula is high transssphincteric or extrasphincteric. At palpation it is possible to find out infiltrations, leakages.

A lot of information can be received by manual rectal examination. First of all the tonus of the anal sphincter is checked without strong-willed effort and during strong-willed compression by
the patient. Long existence fistulas with exacerbations of inflammatory process quite often result in
development of insufficiency of anal sphincter; previous operative interventions also can have
consequences, therefore it is necessary to concern to type of investigation very attentively. At
manual rectal examination localization of the internal aperture of fistula is defined, it usually settles
down in one of Morgani’s crypt. By the localization of internal aperture the fistula is called:
posterior, anterior, lateral. More often (65 %) fistulas are posteriorly located.

    It is useful to add manual rectal examination with palpation from perineal region, that is to
do bimanual examination. At manual rectal examination it is possible to reveal other diseases of
rectum and anal canal, diseases of prostatic glands. In women vaginal examination is done. It is
better to judge about presence of fistula tract going to the vagina, and also about the condition of
rectovaginal septum by simultaneous examination through rectum and vagina.

    Test with dye should be applied at all patients with a fistula of rectum. For this purpose 1 %
solution of Methilen blue is more often used. The dye marks the internal aperture of the fistula.
Colourized crypts are best visible during anoscopy. Absence of colouring of the internal aperture
even at addition of hydrogen peroxide testifies that there are no connections with the bowel, and that
in the field of internal aperture there is an inflammatory process and the fistula tract temporarily was
closed. In such situation it is necessary to appoint washing of the fistula tract by antiseptic solutions
within several days and then to repeat test with a paint. To performe fistulography for revealing the
tract and the internal aperture at negative test with paint is inexpedient – examination becomes
informative in good passableness of the fistula.

    One more examination should be done in presence of fistula apertures on the skin - that is a
probing of fistula. It enables to judge a direction of fistula tract, its branching in tissues, presence of
purulent cavities, the relation of tract to the external sphincter. In multiple external fistula openings
all tracts are usually probed.

    For all patients with fistulas of rectum it is obligatory to do rectoromanoscopy with the
purpose of revealing the condition of rectal mucosa, presence of other diseases (tumors, nonspecific
inflammatory diseases and other). If at survey the impression was created, that the patient has
transsphincteric or extrasphincteric fistula of rectum, it is better to do additional fistulography. X-ray
examination by barium enema is usually used in diagnostics of rectal fistula as auxiliary method if it
is necessary to differentiate chronic paraproctitis from other diseases. An effective method of
estimation of function of anal sphincter is sphincterometry. In presence of fistula of rectum the basic
methods of investigation are: inspection, palpation, manual rectal examination of anal canal and
rectum, test with dye, probing, anoscopy, rectoromanoscopy, and fistulography in high fistulas characterized with plentiful discharges and fluctuation at probing.

**Differential diagnosis.** Fistulas of rectum usually should be differentiated from the following diseases: cysts of pararectal cellular tissue, an osteomyelitis of sacrum and coccyx, actinomycosis, tubercular fistulas, fistulas at Crohn’s disease, epithelial pilonidal tract.

Cysts of pararectal cellular tissue, concerning to teratomas, frequently suppurate and rupture outside, then in the perianal area the fistula is formed which needs to be differentiated from paraproctitis. In great majority of cases of presence of cystic formations palpation of the perineal skin and manual rectal examination allows to find a round tight-elastic formation with precise borders. More often cysts are drained through the fistula to the skin and then there is no connection of the external aperture of the fistula with the lumen of rectum. The probe, the paint do not reveal this connection, it simply is not present. But cyst can be sometimes opened both on the skin and in the lumen of rectum then the full fistula is formed. But, as a rule, the internal aperture in rectum is highly located, higher than the level of crypt.

The osteomyelitis of pelvic bones can lead to formation of perineal fistulas. At chronic paraproctitis external fistula opening is often single, at osteomyelitis they can be multiple, and they are located usually far from anus, they have no connection with the lumen of bowel. X-ray of pelvic bones and vertebrae allows making the correct diagnosis.

Fistulas at actinomycosis are usually plural and long, well palpated under the skin of perineum and buttocks; there is no connection with the bowel lumen. The skin surrounding the external aperture of fistula is usually cyanotic. There is poor discharge from the fistulas.

At tuberculous process in the lungs and intestines there can be simple fistulas of rectum, the cases when from fistulas liquid pus is plentifully allocated cause suspicion on specific process. At histological examination numerous of merging granulomas with caseous necrosis are found.

Fistulas at Crohn’s disease arise as its complication. Characteristic for Crohn’s disease is presence of ulcer-fissure in the bowel, but at usual fistulas inflammatory changes of the mucosa of rectum are basically absent.

Fistulas of rectum frequently should be differentiated with the fistulas caused by inflammation of epithelial pilonidal tract, when they open near the anus. Detection of primary apertures of pilonidal tract and absence of connection of these fistulas with the lumen of rectum helps.

Seldom, malignisation a fistula of rectum happens, thus allocations from it become bloody with the mucus admixture. A reliable method of diagnostics is cytology of scrape from fistula tract.
Classification.
1. By etiology: specific, nonspecific, posttraumatic;
2. By current of inflammatory process: chronic and chronic recurrent;
3. By the arrangement of internal aperture: anterior, posterior, lateral;
4. By the relation to the sphincter: intrasphincteric, transsphincteric, extrasphincteric.

Treatment. Radical method of treatment of fistulas of rectum is surgery. Certainly, there are also contraindications to radical operation; basically these are severe, chronic and complicated diseases of various organs and systems.

The choice of a method of operation is defined by:
1. The localization of fistula tract in relation to external anal sphincter;
2. The degree of development of cicatricial process in the bowel wall, area of the internal aperture and by the course of fistula;
3. Presence of purulent cavities and infiltrations in pararectal cellular tissue.

Section of fistula in the lumen of rectum is usually used in submucosal and, so-called regional fistulas when the tract settles down inside from the sphincter very superficially and is not surrounded by scars. Thus the section of fistula on all its length with liquidation of the internal aperture is enough for treatment of the patient.

In intrasphincteric fistulas exision of fistula in the lumen of rectum is more often applied. Named the author this refers to Gabriel's operation. The essence of operation consists that after colouring the tract through the external aperture and passing the probe the section of fistula tract with its subsequent economical exision together with both external and internal apertures is done; and also giving the wound of triangle form which top is inverted to the lumen of the bowel, and the basis is located on the perianal skin. Thus, it turns out, that the size of the wound in the bowel lumen is much less, than on the skin. Such kind of wound promotes uniform healing on its all length as in the bowels wound heal longer, than on the skin.

Extrasphincteric fistulas with presence of purulent leakages and cicatricial changes of the bowel wall and pararectal cellular tissue are more often and are treated by excision of fistula with passing the thread (ligature method), especially in localization of the internal aperture on the posterior crescent.

Prognosis. Surgical treatment of marginal, submucoasl fistulas of rectum, and also low transsphincteric fistulas results in stable recovery and is not accompanied by any serious complications. High level fistulas (deep transsphincteric and extrasphincteric) can be cured without functional infringements too. In recurrent fistulas, long existing inflammation, presence of leakages
and cicatricial changes in the bowel wall, sphincter and pararectal cellular tissue results of recovery are much worse.
EPITHELIAL PILONIDAL TRACT

**Definition.** Epithelial pilonidal tract represents epithelial immersing under the skin as the narrow canal. It is located in sacro-coccygeal region and opens by one or several dot apertures (primary) strictly on the midline between buttocks (fig. 9).

**Ethiologiy.** Epithelial pilonidal tract is a congenital disease caused by defect of development of caudal end of the embryo at which tract covered with epithelium remains under the skin. Such anomaly meets enough frequently. At routine inspections of children and teenagers in 4-5 % from surveyed epithelial pilonidal tract has been revealed. Many foreign experts naming the tract as a hair cyst consider that the reason of tract formation is wrong growth of hair of the skin, that at presence of deep intergluteal fold and a plentiful scalp results to ingrow (immersing) of hair in the skin and to formation of cyst.

**Morphology.** Pilonidal tract has length of 2-3 sm; it terminates in subcutaneous cellular tissue blindly and has no connection with coccyx. Epithelium, covering the tract, contains hair bulbs, sudoriferous (sweat) glands and sebaceous glands and is surrounded with connective tissue fibres.

**Clinical features.** Presence of epithelial pilonidal tract does not have appreciable influence on development of the child and in the first years of life does not give clinical displays (the asymptomatic period). Clinical display of disease begins, as a rule, with approach of a sexual maturity. During this period in the lumen of epithelial tract hair start to grow, products of activity of sudoriferous (sweat) and sebaceous glands accumulate. The affinity of anus causes abundance of microflora on the skin of sacro-coccygeal region and in the tract. When primary apertures of the tract do not provide sufficient drainage, in the tract the inflammation can proceed which spreads to the surrounding cellular tissue. Development of inflammation is promoted by traumas, a plentiful
scalp of the skin of the sacro-coccygeal region, non-observance of hygiene. If inflammation develops in the epithelial tract there are pains in the sacral and coccygeal regions, there are discharges from primary apertures of tract. In spreading of inflammations to the surrounding cellular tissue pains are strong enough, there is hardening and hyperemia of the skin. More often such center of inflammation localizes laterally to the intergluteal fold. Local changes can be accompanied by the rise of body temperature of the patient. This period of disease is designated as an acute inflammation of epithelial pilonidal tract. **Stage of infiltration and stage of abscess formation** are distinguished in acute inflammation. If at this stage the patient does not address to the doctor, after spontaneous opening of abscess probably improvement and even disappearance of external attributes of inflammation may happen. But formation of secondary purulent fistula, draining the inflammatory center in epithelial tract is also possible. In the event that the patient has addressed to the doctor during acute inflammation, but for any reasons radical operation was not performed and only opening of the abscess was done, recovery does not come too, the chronic inflammation of tract with formation of infiltrations, fistulas, and recurrent abscesses develops.

Thus, if once the arisen inflammation of epithelial pilonidal tract has independently subsided, even in absence of pains and discharges from primary apertures of tract it is impossible to count the person completely recovered as he (she) still has focus of inflammation.

**Classification.** Disease is classified as follows:

- □ not complicated epithelial pilonidal tract (without clinical displays);
- acute inflammation of epithelial pilonidal tract;
  a) stage of infiltration,
  b) stage of abscess formation;
- chronic inflammation of epithelial pilonidal tract;
  a) stage of infiltration,
  b) recurrent abscess,
  c) purulent fistula;
- □ Remission of inflammation of the epithelial pilonidal tract.

**Complications.** Inflammatory changes in epithelial tract and surrounding cellular tissue at long refusal of radical treatment can lead to formation of multiple secondary fistulas opening far enough from sacro-coccygeal region: in the area of perineal skin, on the scrotum, inguinal folds and even on the anterior abdominal wall. Presence of secondary fistulas with purulent discharge sometimes results in development of pyoderma. It is especially difficult to treat the patients with
warbled form of pyoderma when all skin of perineum and sacro-coccygeal region represents system of epithelized tracts in which hair grow; products of sebaceous glands and pus are present.

**Diagnostics.** Diagnostics of not complicated epithelial pilonidal tract is not difficult. Presence of primary apertures in the intergluteal fold is pathognomonic symptom. Occurrence of symptoms of inflammation in sacro-coccygeal region, formation of fistulas on the place of abscesses at presence of primary apertures in the midline of the intergluteal fold makes the diagnosis of complicated epithelial tract doubtless.

However, even if at survey of sacro-coccygeal region there are all symptoms confirming presence of epithelial tract, it is necessary to carry out manual rectal examination for exception of other diseases of this area. It is necessary to palpate sacral and coccygeal vertibrae through the back wall of rectum; there should not be any changes. For exception of disease of large bowel in all patient rectoromanoscopy should be carried out, and at presence of guarding symptoms colonoscopy or irrigoscopy are done.

Introduction of dye in the fistula opening with the diagnostic purpose, as a rule, is not done. Fistulography is applied only in difficult cases, if necessary carrying out of the differential diagnosis.

There is an opinion, that x-ray of the sacrum and coccyx should be done to all patients with epithelial pilonidal tract, for revealing one more anomaly - nonclosure of arches of sacral bones- spina bifida.

**Differential diagnosis.** It is sometimes necessary to differentiate presence of epithelial pilonidal tract with the following diseases: fistula of rectum, coccygeal cyst, posterior meningocele, presacral teratoma, and osteomyelitis.

Differential diagnostics between fistula of rectum and complicated pilonidal tract is carried out on the basis of the data of manual rectal examination, probing, colouring of fistula tracts and fistulography. In presence of fistula of rectum by carefull examination the internal aperture of the fistula is found in the area of Morgani’s crypt; the probe goes trough the fistula tract not to coccyx, but to anal canal. The paint entered through ahe external aperture, will penetrate into the lumen of the bowel, painting the affected crypt. Fistulography is one more confirmative method of presence of connection with the bowel.

Epidermoid coccygeal cysts are located in the sacro-coccygeal region, they are palpated under the skin and if there is no inflammation, they are mobile and painless. These cysts can suppurate and then the impression of epithelial tract is created. But coccygeal cysts as against the latter have no primary apertures.
Posterior meningocele is located by the midline in the intergluteal fold too; it looks like an oval eminence. The skin above it is not changed, to the touch it is tightly-elastic formation, almost motionless. There are no primary apertures (wich is specific for the epithelial tract). At careful inquiry of patients presence of infringements of function of pelvic organs (as a rule, urine incontinance - enuresis) is found. X-ray of sacral and coccygeal bones and also the further observation and treatment by neurosurgeons are necessary.

Presacral teratoma can have so-called emembrionic tract, opening on the skin closely to anus as an epithelized infundibulum, sometimes very similar to the primary aperture of the pilonidal tract. The opening of embryonic tract is more often located behind the anus on the midline. Teratomas themselves can be the cause of purulent fistulas of sacro-coccygeal region too. Presacral teratomas are located between the posterior wall of rectum and the anterior surface of sacrum. It can be established at manual rectal examination. Thus tumor-like formation of tight-elastic or solid consistences can be identified on the anterior wall of sacrum while epithelial pilonidal tract is located under the skin on the posterior surface of sacrum and coccyx. Ultrasound examination (and at presence of fistula fistulography as well) will allow to establish the correct diagnosis.

The osteomyelitis of sacrum and coccyx may manifest by the presence of fistulas on the skin of sacro-coccygeal region and perineum too. At presence of osteomyelitis palpation of sacrum and coccyx through the anus can establish presence of puttynes, protrusion in to the lumen of the bowel, pathological mobility of bones. At suspicion of osteomyelitis x-ray of pelvic bones, ultrasound are necessary, at presence of fistulas also fistulography should be used.

**Treatment.** Treatment of epithelial pilonidal tract is only surgical. It is necessary to remove the basic source of inflammation - epithelial canal together with all primary apertures (as well as the changed tissues around the tract and secondary fistulas, if there was an inflammation).

The question about terms and methods of operation is the most convenient for considering, using above mentioned clinical classification.

Not complicated epithelial pilonidal tract (when there is tract with primary apertures, but there were not and there are no inflammatory complications) should be operated in the scheduled order (elective surgery). Operation in this case consists of colouring of tract through primary apertures (usually dark methilen blue, that there should be no unnoticed primary opening), and excision by making incisions bordering the strip of skin of intergluteal fold with all primary apertures opening there and surrounding cellular tissue in which the tract is located. All this is excised in one block up to the fascia, covering coccyx. Operation in this stage is favourable for the several reasons: in epithelial tract and surrounding cellular tissue there is no inflammation; the
microbic flora in the tract and on the skin is not aggressive; the wound after excision of not complicated tract is not so extensive, and it means, that there is no big tension of tissues after tying the stitch.

Surgical treatment in acute inflammation of pilonidal tract is necessarily carried out in a view of the stage and prevalence of inflammatory process:

a) In the stage of infiltration if it does not spread outside the limits of intergluteal fold and is located along the tract, it is possible to execute the radical operation at once - excision of the tract and primary apertures;

b) In presence of abscess it is possible to make radical operation at once, to excise the tract and walls of the abscess. More often it is done at the small sizes of the abscess (up to 3 sm in diameter). The wound thus is not sutured at all or wound edges are sutured to the bottom of the wound. The extensive infected wound usually heals rather for long, rough scar is formed. Therefore many specialists prefer to operate by 2 stages in acute inflammation of epithelial pilonidal tract: in the beginning the abscess is opened, sanified (daily washings, introduction in the cavity of abscess and in the tract of ointments on a water-soluble basis). After the inflammation calms down the radical operation is performed. The delayed operation can be executed in 4-5 days after the first stage, without discharging of the patient from the hospital. The second stage of operation can be executed in the scheduled order and in later term - in 2-3 months.

In the stage of chronic inflammation epithelial pilonidal tract elective radical operation with excision of the tract, primary apertures and secondary fistulas are carried out. At remission of the inflammation of epithelial pilonidal tract elective radical operation with excision of the tract and cicatricial tissues is usually carried out.

It is necessary to note, that at radical operation concerning complicated epithelial pilonidal tract for long terms there are different approaches by the way of wound suturing. There are supporters of application of Donati’s deaf sutures in all stages of disease. Experience of the specialized departments show, that deaf sutures are safe only in not complicated tract. If though once there was an inflammation, operation needs to be finished with suturing of wound edges to the bottom of the wound. Thus it is possible to use various modifications of stiches which allow maximally reducing the sizes of the wound and at the same time its effective drainage.

Prognosis. In radical treatment of epithelial pilonidal tract in any stage of disease there is a favorable outcome, there comes full treatment. After the operation patient should be observed at the doctor before full recovery; periodically growing hairs on the wound edges should be shaved or epilated till complete healing of the wound. It is not recommended within the first 2-3 months after
operation to wear narrow clothes from a dense tissue with a rough treads in avoidance traumatization of the region of the postoperative scar. And, certainly, it is necessary to observe hygiene, regularly to be washed and to carry fresh linen (preferably from cotton fibres).
DIVERTICULAR DISEASE

**Definition.** Diverticular disease (diverticulosis) of large bowel represents as a morphofunctional pathological process, which is characterized by presence of saccular outpouchings of the walls of large intestine.

**Ethiology and pathogenesis.** The description of diverticula of large bowel in the literature concerns to first half of the XIX century. The disease was established at studying of morphological material and was considered as consequence of constipation.

Diverticula are display of various pathological conditions; among them leading importance have dystrophic changes in the muscular layer of the wall of colon, discoordination of its motility, the congenital or aquired weakness of the connective tissue, and vascular changes in the wall of gut.

There are certain anatomical preconditions to development of diverticula in the colon. To them concern:

- Feature of formation of the second external muscular layer as a fusion of three taeniae, that undoubtedly weakens the gut ahead of internal and external influences;
- Character of vascular architectonics - presence of arterial and veinous perforants of the muscular layer, therefore places of the least resistance are formed:
- Presence of haustrations in which increased intraintestinal pressure can be generated.

Modern conception about development of diverticulosis also include vascular factor - at spasm of muscular layer there is compression of intramural vessels, an infringement of microcirculation: an ischemia and delay of venous outflow. All mentioned above results in dystrophic changes and expansion of perivascular spaces which afterward become a mouth (orifice) of diverticulum. Thus, diverticulum is the final display of disease of the intestinal wall, garnetting of the circular muscular layer, its atrophy and distension in "weak" places.

In ethiopathogenesis of diverticular disease the important role belongs to the change of character of food and lifestyle of people in the industrial countries.

**Morphology.** In the morphology of diverticular disease can be distinguished properly diverticula and predisposing to their occurrence structural changes of intestinal wall at the tissue and cellular level.
Diverticula represent saccular protrusions of mucosal and submucosal layers out of the bowel wall, covered with visceral serous layer. The substratum of diverticular disease is so-called false diverticulum wall of which doesn’t involve the muscular layer of the gut. As against it, in true diverticula there are all layers of the intestinal wall (mucosa, submucosa, muscular and serous).

To preceding changes of the bowel wall are related garneting of circular muscles to separate bunches, hyperelastosis of the muscular layer, and also various types of myo- and neuropathies of the bowel wall. On the background of myopathies the atrophy of smooth muscles happens, and on the background of neuropathies - hypertrophy of muscular layer with expansion of paravascular spaces usually develops.

**Classification.** The accepted clinical classification of diverticular disease, which allows estimating the condition, the prognosis and main – to choose correct individual medical tactics, is:

1. Asymptomatic diverticulosis.
2. Diverticulosis with clinical displays.

The first group includes the patients with absence of intestinal semiology, diverticula are found during investigations done for other diseases.

**Clinical features.** Clinically expressed not complicated diverticulosis is manifested by pain syndrome of various character and intensity, stool impairments.

Pains are located more often in the left iliac fossa and in left mesogastrium - in the projection of sigmoid colon. Pain has spastic character, amplifying parallel to filling of large bowel with fecal masses, after defecation the pain syndrome usually decreases. The part of the patients marks some dull pain in the same parts of abdomen during the periods between spasms. At palpation not always is possible to determine localization of the pain that speaks about absence of the organic reason of pain syndrome which in this case is connected with discoordination of motility of the bowel. Duration of pain syndrome varies from several days and weeks up to constant pains for long time.

Disturbances of stool manifest as constipation, also the patients may complain of feeling of incomplete evacuation of the bowels and distension of abdomen. In some patients alternation of constipation and occurrence of liquid stool is observed.

**Complications.** Clinical symptomatology considerably changes at development of complications of diverticular disease.

Diverticulitis (the inflammation of diverticulum) is the most frequent complication of diverticular disease. The inflammation of diverticulum develops due to dystrophy of the bowel wall,
loss of barrier properties of epithelium, influence of pathogenic intestinal microflora. Because of the hyperemia and oedema diverticula with the part of adjoining wall increases in sizes, the serous layer of the bowel becomes covered by fibrin. Inflammatory changes can be so expressed, that the lumen of the affected segment decreases, passage of intestinal contents is broken (endoscopic picture).

Diverticulitis is accompanied by occurrence of constant pains in the abdomen, rise in body temperature up to subfebrile measures. The mesentry of sigmoid colon, the greater omentum, neighbouring organs adjoin to the center of inflammation and form the paracolic infiltration which is palpated as an inflammatory tumour in the left half of thr abdomen.

The inflammatory tumour can be located in the left iliac region, above the pubis, in the projection of left lateral canal and simulates malignant process. Formation of abscess changes intensity and character of pain, there is amplification of the fever quite often getting hectic character in the evening time. On the background of infiltration there is narrowing of the bowel lumen resulting in delay of the stool, there is distension of abdomen, nausea, vomiting.

Perforation of diverticulum into free abdominal cavity leads to development of peritonitis, perforation to the mesentry of sigmoid colon results in development of retroperitoneal phlegmon. If the abscess was opened to the skin of abdominal wall or to the nearby located hallow organ internal and external fistulas are formed, connecting the bowel lumen to the skin, urinary bladder, less often – to small bowel or vagina. Fistulas have no tendency to spontaneous closing and demand surgical treatment.

Bloody discharges with stool are presence in 20-30 % of patients with diverticulosis; however the intestinal bleeding at diverticulosise seldom has profuse character. At the expressed atrophy of mucosa its damage by firm fecal masses can lead to damage of the vessel and loss of significant volume of blood during defecation and also out of defecation.

**Diagnostics.** Careful interrogation of the patient allows receiving the important information for definition of the exact diagnosis. Complaints to discomfort in abdomen, spastic pains and a periodic delay of stool, and also presence in the anamnesis of episodes of rise in temperature connected to intensive pain syndrome in left iliac region, testify to the possibility of diverticular disease. Palpation of abdomen allows revealing painfull areas. Usually it is the left iliac and left mesogastral regions. Symptoms of peritoneal irritation testify to more dangerous complications: perforation of diverticulum, break of paracoilic abscess into the abdominal cavity. At increase of the phenomena of infringement of intestinal passableness it is possible to reveal distension, asymmetry of the abdomen, by percussion increased volume of large and small bowel loops are defined,
Peristalsis is amplified. The important clinical symptom of infringement of integrity of hollow viscus is disappearance of hepatic dullness at percussion.

The most informative method of revealing of diverticulosis of large bowel is irrigoscopy (done by barium enema). In not complicated diverticulosis the intestinal wall has rough contours and forms saccular outpouchings, having narrowing at the basis (mouth). The sizes of these outpouchings range from 0.2 - 0.3 up to 1.0-2.0 sm, (fig. 10), more often in sigmoid and descending colon. The radiological method allows to reveal narrowing of the lumen of sigmoid colon in case of infiltrate formation, and also to fill fistulas with contrast (fistulography).

Not less informative method of revealing diverticulosis is colonoscopy which, except for definition of presence of diverticula, allows to specify extent of inflammatory changes in the bowel lumen, the localization of diverticula and the condition of their mucous membrane (fig. 11).

**Fig. 10,11. Radiological and endoscopic picture of diverticulosis of the large bowel.**

**Differential diagnosis.** Distinctly to confirm presence of diverticular disease frequently is a hard problem: especially, if the first demonstration of disease at once has been connected to inflammatory complications.

Diverticulitis and cancer are differentiated by the following criteria: in malignant process there is longer anamnesis, gradual development of disease, quite often "small" symptoms of cancer, anemia are present. Barium enema allows to reveal presence of extended stricture in the zone of diverticula with rather precise borders, for the cancer more typical is suprastenotic dilatation of the bowel connected with long developing impairment of intestinal passableness. Endoscopy at suspicion on diverticulitis should be done quite carefully because of danger of perforation; however visual survey allows establishing inflammatory changes of mucosa distally to narrowings that is more typical for diverticulosis. Detection of tumorous tissue in the bioptic material confirms
malignancy, though its absence does not exclude cancer. In some cases ultrasonic colonoscopy can be used. However quite often final establishment of diagnosis is only possible after morphological examination of the specimen of large intestine removed during operation.

Crohn’s disease also can have similar with diverticulitis clinical picture. For statement of the correct diagnosis the anamnesis with characteristic for Crohn’s disease diarrhea, mucus and blood in stool, and also rectal inspection and rectoromanoscopy help. At investigation of rectum inflammatory changes, longitudinal ulcers - fissures, and also traces of perianal lesions (frequently meeting at distal forms of Crohn’s disease) are found.

To differentiate diverticulosis and ischemic colitis character of pain syndrome helps - the long anamnesis of pains, also their less intensity; often desires on defecation; localization of process in the left flexure of large intestine.

In all cases of any local infiltrative process developed on the background of colonic diverticula morphological examination should always be executed. At impossibility of such examination surgical treatment is indicated, as any of differential criterias cannot absolutely exclude malignancy. Thus it is necessary to remember, that the cancer of large bowel on the background of diverticular disease happens more often, than in persons without diverticula coli.

**Treatment.** Depending on the features of ethiology, pathogenesis and stages of disease corresponding approaches to treatment of diverticular disease are choosen.

Asymptomatic diverticulosis, casually found at investigation of the patient, does not demand special therapy. Prevention of complications in this case is regulation of bowel function with the help of diet in order to prevent constipation first of all. At propensity to constipation laxatives (better is oil type) are given.

In selection of treatment of clinically expressed and complicated diverticulosis it is necessary to establish ethiology of the condition at the specific patient. In elderly patients constipation, connected with atony and dystrophy of intestinal wall, is treated by the oil laxatives in combination with diet rich of vegetative fibers; and also plentiful drinking (1500 ml of liquid per day) is much helpful.

If symptoms of discoordination of motility of large bowel prevail in middle-aged patients, the complex directed on systemic treatment of this condition is used. It includes preparations, normalizing bowel peritalsis and preventing spastic contractions of intestinal wall (No-spa, Platiphylline, Spasmolysin), prokinetiks (Debritad, Motillium). Disturbansec of digestion is corrected by enzyme preparations (Festal, Mezim Forte, Pancreatin). Correction of dysbacteriosis developed on the background of chronic infringement of the large bowel evacuation has great
importance. It is observed by the analysis of intestinal microflora and is corrected by administration of eubiotics (Bificol, Lactobacterin, Hylak-Forte, Florodofilus). It is also necessary to pay attention of the patient to necessity of balanced feeding - diet should contain enough of ballast substances, and food reception should be in established time and in sufficient volume.

In inflammatory complications (diverticulitis, paracolic infiltration) tactics of treatment varies. In moderately expressed intoxication oil laxatives (vaselin oil) are given for softening of feces, also low-residue diet is advised with restriction of fibers. Broad spectrum antibiotics (Cephalosporins, Metronidazole) and antispasmodics (No-spa, Papaverin, Platypylline) are indicated. To exclude perforation of large bowel x-ray of abdominal cavity is done in upright position; dynamic ultrasound is for control of infiltration. It is preferable to perform operation when an inflammatory phenomenon has subsided. If nevertheless despite spent treatment the condition of the patient worsens, symptoms of intoxication increase, ultrasound attributes of suppuration and symptoms of peritonitis appear, then more active surgical tactics is opening of abscess with formation of proximal colostomy, resection of the affected segment also with imposing of temporary stoma.

In 80 % of cases the bleeding can be stopped by conservative measures (hemostatics, infusion therapy, bed rest, irrigoscopy which in some cases has medical effect). In case of failure of these actions operation is indicated – removal of the large bowel segment with bleeding vessels (usually left-side hemicolecotomy).

As a whole indications of surgical treatment can be divided on absolute and relative. To absolute indications concern: perforation, massive bleeding, failure of conservative therapy of diverticulitis, intestinal obstruction, impossibility to exclude a cancer.

Relative indications of operation are the following: periodically arising intestinal bleedings, chronic recurrent diverticulitis, fistulas of large bowel, infiltration. More often resections of the large bowel segment are done. Those segments are mostly resected, which contain diverticula or zones of complications (perforation, infiltration, fistula, etc.). Various types of resections of large intestine or seromyotomy are possible, the choice of specific operative intervention is influenced with the following factors: prevalence of diverticula, presence of inflammatory changes (surgical treatment in this case is performed in several stages), age and the general condition of the patient. Presence of inflammatory complications, and also high risk of anastomotic leakage owing to atrophic changes in the intestinal wall form the big group of patients in which it is necessary to refuse formation of primary anastomosis and to share surgical treatment into some stages.
Particularly, this is necessary in bowel obstruction, diverticulitis, perifocal inflammation, intestinal fistulas, and severe somatic pathology.

**Prognosis** is favorable in duly preventive maintenance of development of complications, and also at active medical tactics in case of clinically expressed diverticulosis. Fast development of purulent complications, occurrence of symptoms of "acute abdomen" make the prognosis of disease more doubtful, as in other emergency surgical diseases of purulent character of organs of abdominal cavity.
**NONSPECIFIC ULCERATIVE COLITIS**

**Definition.** Nonspecific ulcerative colitis (NAC) is the chronic disease characterized by the hemorrhagic-purulent inflammation of mucosa and submucosa of large intestine with development of local and systemic complications.

**Epidemiology.** Frequency of NAC is about 40-117 patients over 100000 human population, and most of all these are 20-40 years old patient. The second peak of disease is marked in the senior age group after 55 years. The highest parameters of death rate are marked within the first year of disease (due to extremely severe and fulminant cases) and in 10 years after its beginning (because of development of colorectal cancer).

**Ethiology.** Exact ethiology of NAC is not known till now. Three basic concepts are discussed:

- NAC is caused by direct influence of some exogenic factors of environment which are not established yet, and the infection is considered as the main cause;
- The autoimune mechanism - in presence of genetic predisposition of the organism by the influence of one or several "starting" factors the cascade mechanisms are initiated, directed against own antigens;
- Dysbalance of immune system of the gastrointestinal tract: on the background of that influence of various adverse factors results in the excessive inflammatory response which arises because of the hereditary or aquired disturbances in the mechanisms of immune system regulation.

**Pathogenesis.** Numerous mechanisms of tissue and cellular damage are involved in development of inflammation at NAC. Bacterial and tissue antigens cause stimulation of T and B lymphocytes. At exacerbation of NAC deficiency of antibodies is noted, which promotes penetration of microbes, compensatory stimulation of B cells with immunoglobulins M and G secretion. Deficiency of T-suppressors results in amplification of autoimmune reactions. Amplified synthesis of M and G immunoglobulins is accompanied by formation of immune complexes and activation of complement system.

Infringement of both - barrier function and ability of regeneration of intestinal mucosa has important role in pathogenesis of NAC. It is considered, that through the defects of mucosa various particles of food and bacterial agents may penetrate, which can launch the cascade of inflammatory and immune reactions.
Morphology. In severe chronic current of NAC the bowel is shortened, its lumen is narrowed, haustrations are absent. The muscular layer usually is not involved in inflammatory process. For NAC strictures are not typical. In acute stage of NAC there is marked oedema and hyperemia of mucous membrane with thickening and smoothness of intestinal folds. Parallel to progression of process or its transition to chronic stage destruction of mucous layer happens; mucosal ulcers are formed, penetrating up to the submucosa, rarely up to the muscular layer (fig. 12). For chronic NAC presence of inflammatory polyps is typical.

![Fig. 12. Nonspecific ulcerative colitis, total affection.](image)

They represent as islands of mucous membrane, saved during its destruction; or conglomerates, formed in result of superfluous regeneration of epithelium. In NAC all large bowel is diseased. Intensity of inflammation in its different segments can be various, gradually passing to normal mucosa without precise borders. However the rectum is always involved in the pathological process which has diffuse and continuous character.

Classification. Modern clinical classification of NAC considers extent of process, expressiveness of clinical displays and character of recurrence. By the extent of process the following types of disease are distinguished:

- **Distal colitis** (proctitis or proctosigmoiditis);
- **Left-side colitis** (affection of large intestine up to its right (hepatic) flexure);
- **Total colitis** (affection of all large bowel).

By the severity of clinical symptoms mild, moderate and severe current of disease are distinguished.

By the character of recurrence NAC can be:

- **Acute** type (the first attack);
- Fulminant type (as a rule, with a lethal outcome);
- Chronic relapsing type (with repeating exacerbations, mostly of seasonal nature);
- Continuous type of disease (exacerbation lasts more than 6 months).

There is correlation between extent of process and degree of expressiveness of semiology that in turn determines the volume and character of treatment.

**Clinical features.** Local symptoms (intestinal bleedings, diarrhea, pains in abdomen, tenesmus, and sometimes constipation) and the general displays of toxemia (fever, weight loss, nausea, vomiting, weakness, etc.) are characteristic for the clinical picture of NAC. Intensity of symptoms at NAC correlates with extent of pathological process in the bowels and severity of inflammatory changes.

For severe total affection of the large bowel profuse diarrhea with admixture of significant amount of blood (sometimes with clots) in feces, cramping pain in the abdomen before defecation, anemia, symptoms of intoxication (fever, weight loss, expressed general weakness) are characteristic. At this type of NAC life threatening complications may develop, e.g. toxic megacolon, perforation of large bowel and massive bleeding. Especially unfavorable current of NAC is observed in patients with fulminant type of disease. Mortality in severe type of NAC is high.

In exacerbation of moderate type of disease frequent stool (up to 5-6 times per day) with admixture of blood, cramping pain in abdomen, subfebril temperature, and fast fatigue are marked. In some patients extraintestinal symptoms are observed - arthritis, erythema nodosum, uveitis etc. Moderate attacks of NAC in most cases are successfully treated by conservative therapy including modern anti-inflammatory preparations, first of all corticosteroids.

Severe and moderate exacerbations of NAC are characteristic for total and, in some cases, left-side affection of the large bowel. Mild attacks of NAC in total colitis manifest by insignificant increase of frequency of stool with bloody admixture. In the clinical picture of proctitis and proctosigmoiditis much frequently not diarrhea, but constipation is present, quite often with false urges to defecate with discharge of fresh blood, mucus and pus, and tenesmus. If through inflamed distal parts of the large bowel transit of intestinal contents is accelerated, in proximal segments stasis is observed. In distal colitis constipation is connected with this pathophysiological mechanism.

**Complications.** In NAC the significant number of various complications is observed: local and systemic.
Local complications include perforation of large bowel, acute toxic dilatation of the large bowel (or toxic megacolon), massive intestinal bleedings, cancer of the large bowel.

Acute toxic dilatation of the large bowel is one of the most dangerous complications of NAC. It develops due to severe ulcerous-necrotic process and the corresponding toxicosis. Patients with toxic dilatation of large bowel at initial stages of disease require intensive conservative therapy. In its inefficiency surgical intervention is carried out.

Perforation of large bowel is the most often reason of death in fulminant type of NAC, especially at development of acute toxic dilatation. Besides stretching of intestinal wall the main role in occurrence of perforation is played with infringements of microcirculation and proliferation of bacterial flora, especially E.coli with pathogenic properties. In the chronic stage of disease this complication happens seldom and proceeds, basically, as a pericolic abscess. Treatment of perforation is only surgical.

Massive intestinal bleedings happen rather seldom and as a complication is less dangerous, than toxic megacolon and perforation. In the majority of patients with a bleeding adequate anti-inflammatory and hemostatic therapy allows avoiding operation. At continuous massive intestinal bleedings surgical intervention is indicated.

The risk of development of colon cancer at NAC sharply grows at duration of disease over 10 years.

Systemic complications of NAC are also named as extraintestinal displays. Patients may have affection of the liver, the mucous membrane of the oral cavity, the skin and the joints. Erithema nodosum happens not only as a reaction to reception of Sulphasalazin, but also is observed separatly. Gangrenous pyodermia, episcleritis, primary sclerosing cholangitis are rather seldom complications.

**Diagnostics.** Diagnosis of NAC is established on the basis of the estimation of the clinical picture of disease, datas of rectoromanoscopy, endoscopy and radiological methods of investigation.

Endoscopically 4 degrees of inflammatory process in the bowel are defined: minimal, moderate, expressed and sharply expressed.

- □I degree - is characterized by oedema of mucous membrane, hyperemia, absence of vascular pattern, easy contact bleeding, punctulated hemorrhages;
- □II degree - is characterized by oedema, hyperemia, granularity, contact bleeding, presence of erosions, merging hemorrhages, fibrinous fur on the walls;
• III degree - is characterized by occurrence of plural merging erosions and ulcers on the background of the above described changes in the mucous membrane. There is pus and blood in the lumen of the bowel;
• IV degree – besides the listed above changes in the bowel there are pseudo-polyps and bleeding granulations.

For NAC in the active stage of process at barium enema the following radiological attributes are characteristic: absence of haustrations, smoothness of contours, ulcerations, oedema, dentation, double contour, pseudopolyposis, longitudinal reorganization of mucosal folds, and presence of free mucus (fig. 13).

![Fig. 13 The radiological picture of Nonspecific ulcerative colitis.](image)

After evacuation of large bowel from barium absence of haustrations, mainly longitudinal and rough transversal folds, ulcers and inflammatory polyps can be defined. Radiology is of great importance not only in diagnostics of the disease, but also for its serious complications, particularly in acute toxic dilatation of the large bowel. For this purpose plain x-ray of abdomen is performed.

**Differential diagnosis.** NAC should be differentiated from many diseases of large bowel of infectious and non infectious etiology. The first attack of NAC can proceed under the mask of acute dysentery and salmonellosis. Datas of rectoromanoscopy and bacteriology help for correct diagnostics.

Other types of colitis of infectious origine, demanding differentiation from NAC, are viral diseases, gonorrhoeal proctitis, and pseudomembranous enterocolitis.

**Treatment.** Medical tactics in NAC is defined by localization of pathological process in the large bowel, its extent, severity of attacks, presence of local and systemic complications.
Conservative therapy is directed to the fast management of attack, the prevention of recurrence and progress of disease.

The food of the patient should be high-caloric and include products, rich of fibers, vitamins, with restriction of fats of animal origin and exception of rough vegetable fibers. Fatless meat (beef, hen, turkey, rabbit) and boiled type fish are recommended; also frayed porridge, potato, the eggs, the dried bread, walnuts. Raw vegetables and fruits, milk products are excluded from diet.

All medical preparations used in treatment of NAC are conventionally divided into two groups. The first unites basic anti-inflammatory preparations and includes aminosalicillats, corticosteroids, and imunosupressors. All other preparations play an auxiliary role.

The most effective anti-inflammatory means in the treatment of NAC are steroid hormones which surpass aminosalicillats by the activity in severe types of disease.

In ulcerative proctitis and sphincteritis suppositories of Prednisolon are much effective.

**Surgical treatment of Nonspecific ulcerative colitis.** The surgical method of treatment NAC is radical, but is accompanied by removal of large intestine with formation of ilestomy. Mutilating character of the surgical method, and also successes of conservative therapy force to resort to operation only by strict indications, which are divided into three basic groups.

1. Inefficiency of conservative therapy. In some patients progress of inflammatory process cannot be prevented by medicamentous means (including hormonal preparations). Surgical treatment allows suspending application of corticosteroids, as long hormonal therapy causes severe side-effects.

2. Complications of NAC.

   a) Bleeding. Loss of blood through rectum in NAC usually is not so menacing. However in some cases loss of blood accepts life threatening character, cannot be managed and compels to make a decision for operation.

   b) Toxic megacolon. Toxic megacolon results from the cessation of peristalsis of large bowel that leads to accumulation of the intestinal contents in the lumen, to distension of the large bowel till critical diameter (15 sm). Dilatation is a life menacing complication. By the severity of distension of bowel lumen three degrees of toxic dilatation are distinguished: I - 6 up to 9 sm, II - 9 up to 11 sm, III - 11 up to 15 sm.

In inefficiency of conservative therapy and increase dilatation urgent operation is indicated.
c) Perforation of large bowel. Usually occurs during progressive toxic dilatation and refusal of duly operation when necrotic changes of the bowel wall appear. X-ray of abdomen reveals presence of free gas in the abdominal cavity. The success of operation directly depends on timeliness of establishment of diagnosis and remoteness of development of peritonitis.

d) Cancer. In NAC the so-called "total" form of colorectal cancer can be seen, when endophytic growth of the tumour is found by histology in all departments of the bowel, while visually the bowel may remain unchanged.

**Choice of volume of surgical intervention.** Effective operation at surgical treatment of NAC is the subtotal resection of large intestine with formation of ilostomy and sigmostomy. If preservation of part of sigmoid colon is inexpedient, colectomy with formation of ileostomy is performed. Stump of the rectum is closed tightly.

In the remote postoperative period in terms from 6 months till 2-3 years the problem of the second stage of surgical treatment is solved. In absence of relapses in the switched-off rectum reconstructive ileorectal anastomosis is performed (with or without preventive ileostomy). In development of stricture of rectum there is a necessity for its removal - abdomino-anal resection of the remnant parts of sigmoid colon and rectum. The reconstructive stage in this case can consist in formation of the reservoir from the small bowel (autografting of ampoula of rectum), formation of ileoanal anastomosis with preventive ileostomy. In both cases preventive ileostomy is closed in 1-6 months after healing of anastomosis.

In combination of cancer of large bowel and NAC also colectomy combined with abdomino-anal resection or extirpation of rectum are applied. Operation in cancer usually is finished with formation of permanent terminal ileostomy.

**Postoperative complications.** Complications are connected frequently to bad regeneration of tissues in the weakened patients (eventration, leakage of the stitches of ileostomy), abscesses of abdominal cavity, dysfunction of ileostomy, pneumonia and also serous peritonitis and pleural effusion are observed as displays of polyserositis.

**Prognosis.** Timeliness of operation, dynamic supervision makes the prognosis favorable. The majority of patients are invalid for long duration.
HIRSHPRUNG’S DISEASE

Definition. Hirshprung’s disease is a congenital anomaly of intramural nervous system of a part or all large bowels as an absence or reduction of number of muscular plexus, accompanying with significant expansion and hypertrophy of proximal parts of the bowel (fig. 14,15).

![Fig. 14,15. Radiological and endoscopic picture of Hirshprung’s disease.](image)

Disease is named in honour of the Danish pediatrist who in 1887 for the first time described two patients with chronic expansion of large bowel and complete absence of self-dependent stool.

Ethiology. The reason of congenital underdevelopment of intramural nervous system of large bowel till now remains not clear. Frequency of this defect under the relation to all born is defined as 1:4000 - 1:5000. In boys this anomaly happens 4-5 times more often, than in girls. This developmental anomaly is not heritable, but for posterity from parents with Hirshprung’s disease the risk of occurrence of anomaly grows up to 3-4 %.

Morphology. Macroscopical changes in the large bowel at Hirshprung’s disease are so characteristic, that allow making correct diagnosis just by the appearance of the bowel. In typical cases by the appearance it is possible to allocate 3 parts in the large bowel. Proximal departments (caecum, ascending colon and the first third of transverse colon) have completely not changed appearance. Haustrations are saved, bowel tonus is usual, its color and vascular figure is normal, taenia are well determined.

Gradual expansion of the lumen of transverse colon begins approximately in its middle part. The walls of the left parts of the colon, especially in sigmoid colon, are sharply thickened, bowel diameter sometimes achieves 15-20 sm. Haustrations are absent, and taeniae are so extended, that
make as though a continuous layer of longitudinal muscles. In the lumen plenty of contents are defined by palpation.

All these changes sharply interrupt in different patients at different levels - distal part of sigmoid colon, rectosigmoid part or supraampular part of rectum. Sometimes this transition from the site of abdominal cavity is imperceptible, as disappears under the pelvic peritoneum.

In the mentioned third part the large bowel, keeping all characteristic macroscopical attributes, appears narrowed not only in comparison with the expanded part, but also in comparison with norm.

Also three types of microscopic picture are determined. In the first part microscopically the large bowel appears completely normal. All layers and structures of its wall are well developed, Meissner’s and Auerbach’s (intramural) nervous plexus are precisely defined.

In the second part rough changes are found first of all in the muscular wall of the bowel, where along with the expressed hypertrophy of muscular fibres the significant fatty dystrophy is marked. Significant sclerotic changes are marked in all layers of the muscular wall.

In the third distal parts of the large bowel at the place of intramural nervous plexus the greatest changes are found down to full absence of intermuscular and submucosal plexus. At the place of plexus some bunches of nervous fibres are defined only. Nervous trunks are more often large, do not form plexus. Sometimes plexus are observed, but nervous cells are not present in them.

In cases of hypogangliosis in the intermuscular plexus single and badly generated ganglions are found, sometimes completely not containing nervous cells.

**Pathogenesis.** Impossibility or sharp reduction of evacuator activity of aganglionic (or hypoganglionic) parts of the large bowel lays in the basis of clinical picture of disease.

Gradually (in children with the big aganglionic zone right after the birth) stagnation of intestinal contents in the proximal bowel loops happens, that is intestinal obstruction. Constant attempts of the gut to push the contents distally initially result in hypertrophy of muscular structures, then to their sclerosis and replacement by the connective tissue. In result this department of bowel looses evacuatory function, and the constant congestion of fecal masses and gases in the bowel lumen results in its expansion (megacolon), that worsens the pathological process. Chronic large bowel obstruction is developed, that results in constant intoxication and polyorganic insufficiency.

**Classification.** Spreading of aganglionosis in the large bowel ranges from several santimeters in supraanal (below the ampula) parts of rectum till total defeat. In the latter case aganglionosis is accompanied not with megacolon, but with megaileum.

By the extent of aganglionic areas the following forms of disease are distinguished:
- supraanal
- rectal
- rectosigmoidal
- left-sided
- subtotal
- total

For Hirshprung’s disease obligatory spreading of aganglionic zones to distal direction up to the internal sphincter is characteristic. Cases of segmentary aganglionosis are extremely rare. In children extended forms of aganglionosis (rectosigmoidal) are more often, in adults - shorter (rectal) forms are more often. At the same time the zone of megacolon in adults is much more, than in children, and often occupies more than 2/3 of the large intestine.

**Clinical features.** The earliest and basic display of disease is the difficulty in emptying of the large bowel, down to full absence of self-independent stool. The distension of abdomen quickly joins to this, sometimes getting extremely expressed character.

In adults leading symptoms are also absence of self-independent stool and distension. Occurrence of other symptoms (pain in the abdomen, nausea, absence of appetite, weight loss) depends on duration of chronic intestinal obstruction and measures on its elimination. Quite often usual conservative actions (cleaning enema) are ineffective. Gradually in the expanded bowels fecal stones (fecoliths) are formed, riching in some cases diameter of 20-25-30 sm.

Expanded, atonic bowel is a place of constant congestion of gases, therefore distension is one of the most constant symptoms of Hirshprung’s disease in adults. Distension and large intestine expansion gradually result in deformation of the abdomen and thorax. The abdomen is considerably increased in sizes; a costal corner is turned as in lung emphysema. At palpation of abdomen congestion of fecal masses is defined, especially expressed in the left parts of the bowel and sigmoid colon. Some patients on the background of long absence of stool suddenly have the uncontrollable diarrhea, quite often accompanied with collaps. These, so-called paradoxical diarrheas are caused by occurrence of inflammatory process in not emptied bowel loops, formation of stercoral ulcers in them and the expressed dysbacteriosis.

Character of development of disease, duration concerning the well-being period depend on many factors. They are defined first of all by the length of the zone of anomaly, degree of expressiveness of this anomaly (aganglionosis or hypoganglionosis), compensatory opportunities of the large bowel and the organism, and also adequacy of spent medical measures.
During disease it is possible to allocate three stages - compensated, subcompensated and decompensated.

It is necessary to note, that adult patients address to the doctor, as a rule, in sub- or decompensated stages when neither laxatives, nor cleaning enemas result to full emptying of the large bowel.

**Diagnostics.** Diagnostics of Hirshprung’s disease in adults is based on careful studying of the anamnesis, clinical signs, results of radiological, endoscopic and functional methods. Occurrence of constipation in the early childhood or since a birth is typical of Hirshprung’s disease. Results of survey of patients have great value (characteristic attributes of Hirshprung’s disease are described above).

Manual rectal examination and rectoromanoscopy have big diagnostic value. In Hirshprung’s disease the tone of the anal sphincter is preserved or even is a little bit increased; the ampoule of rectum is of normal sizes and does not contain fecal masses.

During time of rectoromanoscopy complicated passage of the instrument through distal departments of rectum or through all rectum is marked. Then the tube of rectoscope as though falls in sharply expanded overlying departments containing fecal masses, despite of preparation of the bowel for investigation. It is difficult to overestimate the role of radiological method, first of all irrigoscopy. However this method in inexperienced hands gives the big percent of diagnostic mistakes. The main mistake is the insufficient (wrong) estimation of condition of distal parts of large bowel. All attention of the radiologist concentrates on the characteristic of the expanded departments. Meanwhile there is a number of the attributes specifying presence of Hirshprung’s disease:

- □ The normal or a little bit narrowed lumen of rectum;
- □ Sharp transition from normal distal to the expanded part of large bowel;
- □ Attributes of thickening of the wall of the expanded departments, absence of haustrations;
- □ Presence of contents in the expanded part of the large bowel, including fecal stones.

At detection of these attributes it is not necessary to resort to contrast investigation of GI tract with barium suspension as it can worsen evacuation from the large bowel. For revealing of short aganglionic zone in infraampouliar parts of rectum it is necessary to use polyposition proctography.
Colonoscopy does not give any additional information for revealing Hirshprung’s disease, however in adults this method is necessary for revealing possible tumours.

In adults for reliable diagnostics it is necessary to use transmural biopsy of the rectum 3-4 sm above the anorectal line (biopsy by Swenson). The purpose of biopsy is definition of structure of intramural nervous plexus, that is presence of intermuscular plexus. Absence of plexus or their significant reduction testify to presence of Hirshprung’s disease.

**Differential diagnosis.** Hirshprung’s disease should be differentiated first of all from other forms or types of megacolon (obstructive, psychogenic, endocrin, toxic). Quite often in adults it is not possible to establish the reason of expansion of the large bowel. Similar cases should be classified as an idiopatic megacolon.

All listed methods of diagnostics of Hirshprung’s disease are also used for differentiation of megacolon. At the same time for revealing the reason of chronic expansion of large bowel it is necessary to investigate carefully condition of endocrine systems and psychogenic sphere, to exclude any possible toxic influence or any mechanical reasons.

Process of differentiation is sometimes tightened for weeks and even months, but these efforts are not vain because they first of all help to avoid unnecessary (sometimes even mutilating) operations.

**Treatment.** The purpose of treatment of patients with Hirshprung’s disease is normalization of evacuation of contents of large bowel. This purpose can be achieved only by removal or switching off aganglionic zones if overlying departments of large bowel are not in decompensated condition as, for example, in patients of early childhood.

In adults the expanded departments of large bowel, as a rule, are decompensated and also are not capable to carry out evacuation of contents, as well as aganglionic zone. Therefore during operation in adults it is necessary to resect not only aganglionic zone, but also the expanded departments. In some patients it means, that it is necessary to remove not only the whole rectum but also the whole large intestine. Such operation entails either formation of constant ileostomy, or formation of ileoanal anastomosis, that is extremely undesirable from the point of view of the further rehabilitation of the patients. On the choice of method of surgical treatment the big attention renders the general condition of the patient quite often sharply weakened because of chronic intoxication.

Both for children, and for adults there are some variants of surgical tactics - one-stage operation (removal of aganglionic zones, resection of the expanded departments of large bowel, restoration of anal defecation) and multistage treatment when the listed components of surgical
treatment are separated to some stages. Thus, in one variant at the first stage simply colostoma or less often ileostoma is formed for liquidation of the chronic colonic obstruction. Later the resection of the bowel and restoration of natural passage is done.

At the other variant, first of all only removal of aganglionic and decompensated zones with formation of colostomy is done, and restoration of anal defecation is done in the following stage.

Thus, surgical tactics in Hirshprung’s disease is defined by:

- the length of aganglionic zones;
- the extent of decompensated expanded departments;
- the general condition of patients.

**Prognosis.** Results of surgical treatment in long existing Hirshprung’s disease are good in more than 80 % of cases.
ANATOMY OF THE COLON

Large intestine (intestinum crassum) is the distal part of the digestive tube that extends from Bauhini’s valve up to the anal canal. The following parts of the large intestine are distinguished: cecum with the appendix, colon, rectum and anus. The length of the large intestine varies from 1 to 2 meters. Its width in the caecum reaches 6 to 11 cm, it gradually decreases, reaching about 3-5 cm at the descending colon. Diameter of the sigmoid colon is 3.5-4 cm. Colon is the longest division of the large intestine - it consists of the ascending colon, transverse colon, descending colon and sigmoid colon. Also right (hepatic) and left (splenic) flexures of the large intestine are distinguished. The large intestine is different from the small one by location, shape and structure, as well as by color (large intestine has a grayish hue, in contrast to the pink color of the small intestine). Appearance of large intestine is different from small intestine not only by significant diameter, but also by the following features:

- Presence of the longitudinal muscle taenias along its entire length,
- Characteristic bulgings (haustrae)
- Appendages of the serous membrane, containing fat.

The rectum does not have all these mentioned features.

Three taenias of the colon, starting at the base of the appendix and, being located approximately at equal distances from each other, are drawn to the rectum. Each taenia has its own name – taenia libera (free taenia), taenia mesenterica and tenia omentalis. Taenia libera passes by the anterior surface of the caecum and the ascending colon, on transverse colon is located on the posterior surface due to rotation of intestine around its axis, and on the descending colon once again moves to the anterior surface. Taenia mesenterica runs along the posterior-medial surface of ascending and descending colon, and on the transverse colon - by the lines of attachment of the mesentery. Taenia omentalis on the transverse colon goes through the attachment of the greater omentum, and on ascending and descending colon turns to the anterior surface.

If the gut is somewhat inflated, then haustrae are visible from inside as saccular recesses. Outside, they have the form of diverticulums located between the taenias. The origin of haustrae because the taenias are somewhat shorter (about 1 / 6), than the main gut itself.

Fat pendants (epiploic appendices, appendices epiploicae) represent the serous membrane protrusion in the form of 4-5 cm long processus along the taenia libera and taenia omentalis. In undepleted people appendices epiploicae contain fat.

Mucosa of the colon is tender and has a smooth surface, devoid of villi. It consists of large number of tubular glands, the so-called crypts and solitary follicles. There is no
Peyer's patch. Transverse semilunar folds consist of all layers of bowel wall. Semilunar folds represent a functional adaptation, depending on the activity of the neuromuscular system of bowel.

Saccular bulges significantly increase absorbing and secretory mucosal surface of the colon. In pathological conditions protrusions (haustrae) become smoothed. This contributes to serious disturbances of motor and secretory function of the large intestine, which cause pathological changes in its excretory and secretory functions.

Throughout the whole large intestine there are marked physiological narrowings of its lumen. These narrowings are due to the presence of sphincters in these places, resulting due to hypertrophy of the circular muscle layer. The number of these sphincters is ten. Normally they never contract so as to hermetically close the intestinal lumen. During certain pathological conditions, especially for functional lesions, severe spasm of sphincters may occur, accompanied by severe pain, nausea and other phenomena.

Caecum and appendix are the initial divisions of the large intestine, they are located on the right iliac fossa. From all sides they are covered by peritoneum. Dimensions of the caecum are variable and fluctuate in a wide range: its length is 1-13 cm (mean 5-6 cm), width is 6,5 cm. From the posteriomedial wall of the caecum appendix stars. The length and position of the appendix are highly variable, the length is 4-12 cm. The position of the appendix is closely linked with the position of the caecum.

At the confluence of ileum into the caecum flap of the large intestine (valva ileocaecalis, Bauhini's valve) is visible from inside. It consists of two semilunar folds or bridles, which are formed by immersion of the wall of the small intestine into the lumen of large intestine. At the base of these folds a layer of circular muscle lies, which forms ileo-cecal sphincter (sphincter ileocaecalis). Flap (valve) and the sphincter together form a device that regulates the promotion of food from the small intestine into the large and prevent the reverse passage of the contents.

Ascending colon is a direct continuation of the caecum, and the place of confluence of ileum serves as boundary between them. This part of large intestine often has no mesentery. Almost without bending it rises to the lower surface of the liver, where it bends as acute angle, forming the hepatic flexure and passes into the transverse colon. The anterior surface of the transverse colon is adherent to the greater omentum. In the left upper quadrant it turns sharply, forming splenic flexure, which passes into the descending colon. Similarly with ascending colon, it has no mesentery. Transverse colon is the longest sections of the colon. Its length is 50-60 cm, while length of ascending colon is about 12 cm, and the descending colon - 10 cm. Approaching the left ileac fossa, descending colon gradually becomes the sigmoid colon. It is covered by peritoneum from all sides and has quite broad mesentery. The shape, size and number of loops of
sigmoid colon are susceptible to many individual variations. At long (dolichosigmoid) or long and wide (megadolichosigma) sigmoid colon often there is persistent constipation. Its length ranges from 20 to 75 cm. Approaching to the promontory of sacrum, the sigmoid colon is gradually losing its mesentery, and at the second sacral vertebra it passes to the rectum.

The source of arterial blood supply of ileocecal section of bowels is ileo-colic artery, which is the most powerful branch of the superior mesenteric artery. Blood supply to the terminal ileum is executed by the anastomosis, formed by the ileac branch of the ileo-colic artery and the final branch of the superior mesenteric artery. Blood supply to the ascending colon and hepatic flexure is executed by branches of ileo-colic artery, right and middle colic artery from the basin of the superior mesenteric artery. Transverse colon is supplied with blood from several sources - the middle and left colic artery, and sometimes also from accessory branches of middle colic artery. Perfusion of the zones of splenic flexure is carried out by ascending left colic artery, and venous outflow is to the basin of the inferior mesenteric vein (portal system). Blood supply of descending colon is executed by arteries that are branches of the left colic artery and the ascending branch of the first sigmoid artery. Veins accompany these arteries, they participate in formation of the portal system.

Blood supply to the sigmoid colon is due to several (1-4) sigmoid arteries, originating from the inferior mesenteric artery. Venous drainage is carried out into the portal vein system.

For all departments of colon characteristic is presence of well-expressed network of extraorganic arterial and venous anastomosis between higher and lower located branches (for example – Riolan’s arch). They form a parallel (marginal) vessel, which is located in some distance from the mesenteric edge of the colon. The marginal vessel is a collection of sections of the vascular arcades of the first order, from which the "straight" vessels originate, taking part in the blood supply to the wall of the colon.

Lymph vessels and nodes, draining lymph from the colon, are mainly located along the arteries feeding the intestine. They take the lymph to the central group of lymph nodes which are lying along the upper and lower mesenteric artery.

Innervation of the large intestine is due to branches of the solar, upper and lower splanchnic plexus. Sympathetic and parasympathetic nerves take part in regulation of these nerve plexus.

The rectum is the distal part of the large intestine, located in the pelvic cavity and elapsing at the perineum as an anus. It has a length of 12-18 cm. The transition region of sigmoid colon to the rectum is slightly below the sacral promontory and is called rectosigmoid part. At this level mesentery of sigmoid colon disappears, and the longitudinal muscle layer is evenly distributed around the whole circumference of the rectum. That is, the muscular sheath of the
rectum consists of two layers: external - the longitudinal and the inner - the circular. The rectum goes down to the lesser pelvis in front of the sacrum, forming two flexures in the anterior-posterior direction, and 3-4 flexures in the transverse direction. The upper one of the anterior-posterior direction of bending corresponds to concavity (incurvation) of the sacrum and is called the sacral flexure. At the edge of the coccyx rectum is rotated backward and downward, forming a second flexure – perineal, facing by its concavity to back. Accordingly to concavities of flexures, transverse folds are formed on the inner surfaces of the side walls of the rectum - traces of semilunar folds. Often they are two on the left and one on the right.

There are two main divisions of the rectum: pelvic and perineal. The boundary between them is held in place of attachment of levator ani muscle. In the lumen of the intestine, this boundary corresponds to the dentate (anorectal) line. In the pelvic division supraampullar (short, 2-4 cm long) and ampullar (length 8-12 cm) parts are distinguished. In relation to the peritoneum there are three parts in the rectum. The upper part from all sides is covered by peritoneum (supraampullar division). The middle part is covered by peritoneum in anterior part and sides (upper and middle ampullar sections). The lower part is devoid of peritoneum (the lower ampullar and perineal departments). When the gut is empty, the mucosa of the rectum forms numerous folds due to developed submucosal layer. In the lower ampullar section, longitudinal columnar folds are located, which become more pronounced (high and wide) in the anus. Their bottom edges are connected to each other with semilunar folds, forming between the columns "pockets". They are called Morgagni’s sinuses. These crypts and sinuses are frequently injured in constipation or diarrhea, contributing to acute paraproctitis, rectal and anal fissures. Number of Morgagni’s crypts and columns is 6-12. Ring-like space between the sinus and the anus is called the hemorrhoidal zone to where the cavernous bodies are located. Their pathological changes are called hemorrhoids. When you mobilize the rectum during the operation, its folds are smoothed, so the length of the intestine is increased by 5-6 cm. Longitudinal muscle fibers of the posterior wall of the rectum are interwoven with mixed - smooth and striated muscles, going from the anterior wall of the sacrum. They form the recto-sacral muscle. Muscular layer of the rectum consists of continuous muscle layers along its entire length. Circular muscle layer in the anus is much thicker and forms the internal sphincter, which ends at the junction of the anal canal with the skin. Just beneath the skin a ring of striated muscle fibers - external sphincter is superficially located, which is part of the muscles of the perineum. Based on the structure and function, external sphincter muscle is divided into three portions. Muscle fibers of superficial portion intersect anteriorly to the anus and attach to the skin surrounding the anus. Second (more deep-seated) portion starts from the tendineous centre of perineum. Muscle fibers of that portion cover the rectum from all sides and partially attach to the skin and to the periosteum covering the
coccyx. Deepest - the third portion of external sphincter, which consists of circular muscle fibers in the form of a cylinder and covers the internal sphincter of the rectum. Between them always there is a certain amount of cellular tissue. Fibers of deep portion attach to the back of the coccyx, and anteriorly they merge with bulbous-cavernous muscles in men, and in women - with the vaginal sphincter. From above, between the lateral surface of the external anal sphincter and rectum fibers of three portions of levator anus muscle are woven, which is almost circularly covers the rectum. Lateral surface of the external sphincter is in contact with the cellular tissue, filling the pararectal space. At rest, the anal canal is in closed state. Smooth muscle internal sphincter is in constant state of maximum contraction. At rest, it provides 50 to 80% tonic contractions of anal sphincter, and only 25-30% of the tonic contractions are provided by external sphincter. The remaining 5-15% of the tonic continence is provided by the internal hemorrhoidal plexus. The role of the cavernous tissues in this process is poorly investigated. The main function of anal sphincter complex is an active contraction, provided by external sphincter muscles. In addition to the permanent (anatomical) folds, with have transversal direction, a lot of temporary (physiological) longitudinal folds can be found in peristalting intestine during sigmoidoscopy or colonoscopy. The structure and shape of the mucous membrane of the colon are conditioned by the functional features of this section of bowel. In the left parts of the colon, performing function of mixing of chyme and the formation of feces, the folds of the mucous membrane have cross (transversal) direction, and in the left parts they are directed longitudinally. At sigmoidoscopy the upper limit of the rectum (or more precisely - the place of transition of the sigmoid colon to rectum) is defined by a transverse fold (by "hauston’s flap").

Anteriorly the rectum prostate gland, vas deferens and seminal vesicles, urinary bladder are located in men, and in women - the vagina and uterus. The posterior wall of the vagina in its entirety is separated from the bowel with a thin layer of connective tissue called rectovaginal septum. In men, the rectum is separated from the mentioned above organs with recto-vesical fascia. The fascia with its top edge attaches to the peritoneum of the bottom of the recto-vesical concavity, and with its lower edge attaches to the urogenital diaphragm and to the tendinous centre of perineum. The most powerful ligamentous formations are tendinous plate of levators and Valdeyer-Pirogov’s fascia, located behind the rectum. Important clinical significance has Denonvilliers aponeurosis, located between the anterior semicircle of the rectum and posterior vaginal wall in women and urethra in men.

Anal canal is a transition zone between the external opening of the anus and rectum. Its length is 2-4 cm from the edge of the skin to anorectal (dentate) line. The canal is covered with stratified squamous not ceratinizing epithelium, which doesn’t have any epidermis. Above that the entire surface of the mucosa and crypts is covered by single layer columnar epithelium. The
lower edge of the anal canal is the white line or Hilton’s line. The axis of the anal canal is
directed to the umbilicus, in contrast to the axis of the rectum, which is directed to the
promontory of sacrum. Different directions of axes’ is determined by the development of
puborectal fundiform muscle. That's it fixes the rectum in this position and contributes holding
function. In women this muscle is weak and may result in rectocele. In young children the
direction of both axes is almost identical. Under certain conditions this circumstance might be
one of the reasons for prolaps of the rectum.

In this connection, when plastic surgery is done, aimed to eliminate anal incontinence, we
are always trying to create the angle between the damaged anal canal and lower ampullary part
of rectum. The same is done in formation of perineal colostomy and creation of anal sphincter
complex from muscular formations (great adductor muscle of thigh (musculus adductor
magnum), musculus gracilis) after abdominoperineal extirpation of the rectum.

Blood supply of the rectum is provided with five arteries. Among them unpaired upper
rectal artery is a direct continuation of the inferior mesenteric artery. Middle paired rectal artery
originates from the internal iliac artery or from the internal pudendal artery. Lower paired rectal
artery originates from the internal pudendal artery in ischiorectal fossa. Veins pass parallel to the
corresponding arteries. From the walls of the rectum venous blood is drained to the portal system
via upper rectal vein as well as to the inferior vena cava via middle and lower rectal veins.
Between the two above-mentioned systems there are multiple anastomosis. The absence of
valves in the upper rectal vein (similarly with the whole caval system) contributes to stagnation
of blood and dilatation of veins of the distal part of the rectum. In the wall of the distal colon
densely are located venous plexus - subcutaneous, submucosal, and subfascial. They are located
around the anus and the external sphincter.

Lymph vessels and nodes of the rectum are located mainly in the direction of the blood
vessels and are divided into upper, middle and lower divisions. They are very important in the
spread of infection and metastasis of rectal cancer.

Innervation of upper ampullar and ampullar parts of the rectum are executed by the
sympathetic and parasympathetic system. Perineal division of the rectum is innervated by
pudendal nerve. This explains the considerable sensitivity of perineal division of the rectum and
the spread of pain from the anal canal to the genitals, sacrum etc.
BASIC PHYSIOLOGICAL FUNCTIONS OF LARGE INTESTINE

The main physiological functions of large intestine are absorption, secretion, and the evacuation of food residue from the body. All of them are in close relationship, disturbance of one of them lead to disorders of others. In functional point of view right and left half of the colon have some differences: the absorption and secretion occur mainly in the right divisions, in the left parts of colon accumulation, formation of the stool and its promotion to the exit take place. The rectum serves as a reservoir and in the same way (similarly with anal canal) plays an important role in the formation of fecal contents and its evacuated at defecation.

Absorption. Normally one to two liters of chyme passes from the small intestine to the proximal colon daily, but no more than 200 ml of liquid is extracted with feces. Motility of the proximal parts promotes mixing of the contents and its optimal contact with the surface of mucous membrane, which creates conditions for an adequate intake of water and electrolytes. 90% of water is absorbed in the right parts of the colon; and transverse colon gets intestinal contents already in the form of soft stool. Absorption of water occurs in the distal parts too, including the rectum. So, in deficit of body water (exsicosis) drip method of liquid introduction through the rectum is widely used.

Secretion. Amount of juice, produced by the glands of the colon, is small (about 6-7 times less than in the small intestine). It contains a lot of mucus. The bulk of the enzyme (alkaline phosphatase, peptidase, lipase and amylase) are allocated in the mucus. Liquid component of the intestinal juice is poor of enzymes and has an alkaline reaction. The wall of the colon produces intestinal juice and also fatty acids, cholesterol, salts of heavy metals.

Important role in the function of large bowels has intestinal microflora possessing enzymatic, vitamin synthesizing and protective properties. Intestinal flora of the colon is very abundant (in 1 gramm of caecal content there are more than 2 billion organisms) and diverse (over 400 species). The ratio of obligatory anaerobic and aerobic bacteria in the colon ranges from 100:1 to 1000:1. Due to micro-organisms ultimate splitting of food residues takes place in the proximal parts of large intestine. Up to 75% fibers are digested in the caecum. Daily in the bowels 20 to 70 grams of carbohydrates undergo fermentation. Degradation of proteins under the influence of anaerobic and aerobic intestinal flora is the same type as their splitting by digestive enzymes. This leads to formation of toxic compounds: indole, skatole, phenol, which are absorbed into the blood, enter the portal system of the liver, where they are neutralized. In the human colon daily up to 20 grams of protein enter which is degraded by bacterial enzymes. Of these, only 1 g is excreted with feces. Microorganisms, which are present in the intestine, actively participate in maintaining of the pH level of the intestinal contents at 7,2-7,4.
Acidophilic bacteria have the main role in the oxidation of the intestinal contents to maintain the desired pH. Reduction of lactic acid in the colon leads to the growth of gram-negative bacteria and dysbacteriosis develops. Intestinal microflora contributes to the synthesis of vitamins B, C, K. The protective function of microbes of large intestine expresses in the ability to suppress the vital activity of pathogenic and putrefactive microorganisms. Intestinal microflora is involved in maintaining of the body's immune response. A special role is played by bifidobacteria and acidophilic lactobacilli, which are able to absorb from the intestinal lumen microelements: zinc, iron, copper and selenium.

Disturbances of the microbial intestinal flora (dysbacteriosis) affects the state of the human immune system, leads to dysfunction of the colon.

**Evacuating function of the large intestine.** Promotion of intestinal contents trough division of large intestine is due to motor activity of the intestinal wall. In the colon there are 4 types of movements: segmental, peristaltic, antiperistaltic and so-called mass-contraction.

Segmental contractions represent local contractions of the circular muscle fibers with decrease of intestinal lumen diameter and increase of intraintestinal pressure. They do not contribute to the transit of content, since it is moving slightly in both the proximal and the distal end. Their function basically is to mix the chyme.

Peristaltic contractions are coordinated movements of circular muscle fibers, they have a propulsive activity and facilitate the transit of contents.

Antiperistaltic contractions lead to retrograde movement of chyme and contribute to its better mixing and condensation.

Mass-contractions usually occur infrequently - 3-4 times per day. They involve big part of intestine and provide evacuation of its large parts, moving the contents of the right colon to left or left to the distal sigmoid colon and rectum. In the proximal colon segmental and antiperistaltic contractions dominate; they contribute to the mixing of content and its contact with the mucous membrane. They create the conditions for long-term presence of chyme in the intestine and the digestion of cellulose by enzymes of intestinal bacteria. Evacuation from this part of colon takes place due to mass contractions. In the distal part peristaltic waves are more pronounced, which in combination with contractions of longitudinal muscles help push the fecal bolus to the distal end of the digestive tube. Intestinal motility changes under the influence of reflex impulses from other parts of the gastrointestinal tract. Main reflexogenic zones are: the pylorus, Bauhin's valve and rectosigmoid part.

**The rectum** carries reservoir and evacuation function. Ability to retain bowel contents and empty the rectum only in certain circumstances is important to humans. There are two phases of retention: the intestinal and anal. Intestinal retention is due to the motor activity of
large intestine, coordinating with the state of the overlying gastrointestinal tract. The influence of the cerebral cortex does not extend on this phase. Anal retention, in contrast, is regulated by the cerebral cortex at the expense of the obturator apparatus of the rectum at increase of intraabdominal and intraintestinal pressure. Of course, anal retention correlates with intestinal retention. For the retention of intestinal contents particular importance has the existence of a zone of high pressure in the anal canal. In rectal lumen pressure is recorded from 5 to 25 mm Hg, while in the anal canal pressure ranges from 25 mm to 120 mm Hg. This prevents the involuntary exit of feces from the rectum. Anal sphincters are the sources of high pressure in the anal canal. Internal sphincter has big importance, but external sphincter playes main role for voluntary continence. Urge to defecate is caused by irritation of interoreceptors of rectal ampulla. Normally it happens in tension of rectum by fecal masses. In pathological states (proctosigmoiditis) urge to defecate and tenesmus are possible in empty ampulla. This is due to inflammatory changes of mucosa of distal colon.

In the evacuation of intestinal contents from the rectum cerebral cortex is involved too. Defecation is a complex reflex act with participation of coordinating center, located in the lumbosacral part of the spinal cord. In the sigmoid colon there is some delay of the intestinal contents, and then under the influence of propulsive waves, it passes into the rectum, so that it rises intraintestinal pressure. Upon reaching the threshold internal sphincter relaxation occurs. Intestinal contents come into contact with sensitive area of the walls of the anal canal, where the differentiation of content (gas, feces) takes place. At the same time there is contraction of external sphincter of the rectum and the puborectal muscles. Reduction of the latter increases the anorectal angle. Consensual muscle contraction brings the wall of anal canal together. If emptying the bowel is not possible (there are no suitable conditions), there is a reflex contraction of external sphincter, complemented by voluntary contraction of all striated muscles of obturator apparatus. Tone to the internal sphincter restores, and intestinal content goes back to the lumen of the rectum, colon adapts to the present volume of content and reflex of emptying quenched. In the presence of suitable conditions act of defecation takes place. Bringing the thighs to the abdomen is straightening the anorectal angle, which contributes to the evacuation of intestinal contents. The resistance of the internal sphincter is overcome by increased intra-abdominal pressure, relaxation, and the descent of pelvic floor muscles. The walls of the anal canal and distal rectum are stretched, at which time electrical activity of muscles of obturator apparatus of rectum slows. After evacuation of the bulk of feces electrical activity of muscles recovers by voluntary increase in abdominal pressure, alternating muscle contraction leads to the final removal of intestinal contents. Simultaneously with the beginning of defecation peristalsis of the distal colon increases, where it can be intermittent, with frequent contractions and short intervals
of rest, and may also be continuous. In consequence the feces passes to the rectum by portions or at once. This fact is apparently responsible for the character of defecation – one stage or multiple stages. Healthy person empties his/her bowels regularly, at the same time of day, most often in the morning.
METHODS OF INVESTIGATION OF COLOPROCTOLOGICAL PATIENTS

Number of special methods is used in investigation of patients with diseases of the colon, anus and perineum in addition to common clinical studies. The survey should begin with a thorough clarification of patient’s complaints, anamnesis and general examination, paying particular attention to the clinical symptoms that characterize diseases of the colon.

In gathering of medical history one should find out the beginning of the disease, the order of occurrence of individual symptoms and their relationship. It is important which treatment is carried out and by whom, how it was effective, what measures had been taken by the patient. General clinical examination is essential for the diagnosis and provides the basis for selection of special methods of investigation of the large intestine.

**Inspection of perineum and sacrococcygeal region.** Survey should be conducted with adequate lighting and a convenient position for inspection. These conditions are:

- Lying on your left side with both legs (or only left leg) bent in the hip joints
- Knee-elbow position, with support on the left shoulder
- On the back in the gynecological chair with a moderately adduced to the abdomen limbs, located on the foot rest
- lying on the abdomen on the gynecological chair in the knee-elbow position with slightly lowered head end (invert) position;
- Squatting position.

First of all, one should pay attention to the condition of the skin around the anus, inner surfaces of the buttocks and sacrococcygeal region. In this case, skin condition (traces of scratching, excoriations), the depth of the anal canal (inverted or flat anus), the state of the anus (closed, yawning), the presence of pigmentation and depigmentation, hyperkeratosis, infiltration and maceration of the skin are marked. Perianal polypoid tumor formations and protrusions (skin fimbriae, external hemorrhoids) are revealed; their characteristics (location, size, texture) are recorded. It is important to detect fistula openings (localization, their diameter, the condition of the tissues around them, the character of discharge from the fistula). Attention should be paid to the presence of scars, cicatricial deformities of anus.

In order to register the topography of pathological changes identified in the inspection of the anus and perineum, it is decided to use the circuit of clock scale, which is projected onto the perineum of the patient who is in supine position.

**Manual rectal examination:** Is a very valuable method of diagnosis, is compulsory for all patients, having any complaints related to the rectum and anal canal. Finger examination is excluded only patients with severe strictures of the anus and is delayed till subside of the pain in
patients with acute anal fissure and severe widespread thrombosis of hemorrhoids. This study is
performed by right index finger wearing rubber gloves. Before examining finger plentifully
smeared with vaseline and with care deeply inserted into the rectum. In coloproctological
practice digital rectal investigation has double meaning: position-finding and purposeful. The
direct objectives of the position-finding manual study of rectum are:

- assessment of the condition of the tissues of the anus and anal sphincter complex
  function;
- assessment of the rectal mucosa;
- definition of the state surrounding the rectum of organs and tissues;
- identifying and preliminary identification of the pathological process;
- assess the nature of discharge from rectum;
- determine the conformance of colon preparation for endoscopy;
- selection of the optimum position of the patient to perform basic purposeful survey.

Purposeful digital rectal investigation serves to detail the local characteristics of the
disease with the involvement of additional diagnostic methods. Digital rectal investigation of the
anal canal is carried out by consecutive feeling of its walls, starting most often from the back
(less – from the front) of his half-circle. Examination allows to determine the mobility, elasticity,
the nature of the mucosa and to identify any changes in various layers of the walls of anus.

Investigation of ampullar part of rectum is the most important stage of position-finding
manual rectal examination. Staging palpation of the rectal walls and its doubling are important
for detecting tumors, especially small sizes. Connection of the rectum with the vagina and uterus
can be well assessed by combined two-handed (bimanual) examination of the vagina and rectum.
It should be noted that the choice of position for the finger investigation of the rectum depends
on the patient, physician experience and knowledge, allowing choosing the optimum conditions
for the survey, while respecting the principles of maximum sparing of patients.

**Rectoromanoscopy.** Rigid rectoromanoscopy is a common and popular method of
endoscopic research. It is an obligatory component of proctological examination of patients.
Rectoromanoscopy allows visual estimation of the inner surface of the rectum and distal sigmoid
colon up to the level of 25-30cm from the anus. Practically there is no contraindication for
rectoromanoscopy. However, under certain conditions and diseases (profuse intestinal bleeding,
narrowing of the lumen of the intestine, acute inflammatory diseases of the anal canal and the
abdominal cavity, acute anal fissure), the investigation should be postponed for a while, or
should be performed with great cautious at sparing the patient's position or after anesthesia. At
skillful performance this study is painless or a little painful and requires no pre-anesthetics. It is
necessary to observe some caution and special technique while using the apparatus.
Rectoromanoscopy is performed only after the manual rectal examination. It is usually performed in the knee-elbow position of the patient, as this position is very convenient for the investigation. At the same time anterior abdominal wall hangs a little, which facilitates passing the tube of rectoscope from the rectum to the sigmoid colon. During the study one should pay attention to color, luster, moisture, elasticity and relief of the mucous membrane, the nature of its folding, especially of vascular pattern, presence of pathological changes. Also the tone and motor function of inspected departments should be evaluated.

In a healthy person mucosa at sigmoidoscopy has an intense pink color, glossy, smooth, moist surface, it is elastic, vascular pattern is gentle or absent. The mucous membrane of the distal sigmoid colon is pink in color with smooth circular transverse folds; thickness and height of the folds does not exceed 0.2 cm. Vascular pattern has a delicate network and is defined more clearly. Tone of the bowel wall is determined during extraction of the tube. Normal tone of intestine is characterized by cone-shaped uniform narrowing of the lumen with saved relief of mucosal folds.

**Investigation with rectal mirror.** Rectal mirror examination is done by special indications for inspection of the anal canal. Tool is widely used during surgery for many diseases of the rectum, to extract foreign bodies from its luminal. Slowly moving apart the branches of instrument and extending the anal ring up to 2.5 cm one can see the anterior and posterior walls of the bowel. The sidewalls are examined when you turn the mirror on 45°. The tool is extracted from the rectum in the extended state of branches that would not strangulate the tissues.

**Additional methods of investigation**

**Anoscopy.** The method is used for qualification the diagnosis of hemorrhoids, the identification of tumors, inflammatory diseases of the mucosa, to perform biopsy and to take smears. The tool is used when performing therapeutic manipulations - sclerotherapy for hemorrhoids, cryodestruction, infrared coagulation or ligation, coagulation of polyps, injection of drugs. Anoscopy can be performed in all positions of patient, but the best position for inspection is the patient’s position on his back in the gynecological chair.

**Investigation of sphincter mechanism.** For the preliminary ideas about the function of sphincter, the doctor has the following methods of examination: inspection, digital rectal examination of the anal canal and examination of the anal reflex. Objective assessment of anal sphincter power is done by sphincterometry.

**Investigation of the anal reflex.** Anal reflex is present in all healthy people. It can change - increase, decrease or completely disappear for many reasons of functional or organic nature. Anal reflex is checked by the hachures (dashed) perianal skin irritation. The presence of reflex is identified by intensity of tonic contractions of external sphincter, manifested by gain of radial
folding relief of the anal skin and its indrawing. The best condition for the determination of the anal reflex is created when the position of the patient is on his back on a gynecological chair.

**Sphincterometry.** Method objectively evaluates the state of the anal sphincter. It allows identifying the sphincter’s tone, the maximum strength of contraction and indicator of voluntary efforts. Changes in these quantities have a definite practical significance. The magnitude of tonic contraction mainly characterizes the functional ability of involuntary (internal) sphincter, and the indicator of voluntary effort reflects mainly the contractile ability of voluntary (external) component of the contraction apparatus. The average dates of sphincterometry in healthy men and women are equal: the tone is 600 and 500g, maximum strength is 900 and 775g; effort is 300 and 275g. However, it should be remembered that the final assessment of the functional state of sphincters is determined based on clinical data and indicators of instrumental studies. Investigation of the obturator apparatus using different models of sphincterometry is a necessary part of the full survey of proctological patient. The functional state of the colon and anal sphincter can be assessed using a multiprocessor complex. With its help we study motor-graphic (ballonography) and electrical activity of the large intestine, the contractile ability of the anal sphincter (sphincterometry, myography). One of the functions of the multiprocessor complex is to provide electrical stimulation of motor activity of various parts of the gastrointestinal tract, including large intestine with anal sphincter.

**Investigation by the probe.** The method is applied to study the topography of anorectal fistulas. For this purpose, metallic probe with a round bulge at the end (bulbous-end probe) is used. Investigation with probe in the presence of fistula is a compulsory procedure. When the localization of fistulas is in the skin of the perineum, probing should be done in the position of the patient on his back on a gynecological chair. Bulbous-end probe is introduced into the fistula tract through the external opening. The probe is pushed into the depth of the fistula as much as possible, being careful and avoiding violence. One should keep in mind that this manipulation is often painful for the patient; in addition, forced action may lead to the formation of a false tract. While probing it is necessary to obtain the following information: the direction of the fistula and its relation with the bowel wall, the length of the fistula, and the presence of tortuosity of the tract, presence of cavities and level of penetration of the probe in to the intestine. An important fact is revealing of the fistula connection with the bowel lumen. Presence of such connection in the zone of the anal canal characterizes the main feature of chronic paraproctitis. Its absence sets additional diagnostic task for the examiner.

Fundamental importance for the treatment of fistulas of the rectum is the definition of topographic relationships between fistula tract and sphincter muscles. This problem is solved using a probe-finger examination.
**Probe-finger examination.** The essence of the method is to determine the thickness of tissue between the probe, which is entered into fistula tract, and finger, located in the lumen of the anal canal. The thicker the layer of tissue, the more data for complex fistula, and conversely, if the thickness of the bridge of tissue over the probe at the distal half of the anus does not exceed 1 cm, you can be sure there is a simple fistula.

**Test with dye.** Method is used for recognition, differential diagnosis of acute and chronic diseases of the rectum, pararectal cellular tissue and sacrococcygeal region, as well as providing invaluable assistance to coloproctologist during surgical interventions. Test with dye is typically used in paraproctitis, epithelial coccygeal tracts, teratoid formations of tissue of the pelvis and other diseases associated with fistula formation. 1% solution of methylene blue is used as a dye in a small amount (from 0.5 up to 1.5-2.0 ml). Often it is added to 3% hydrogen peroxide solution at a ratio of 1:3. It should be noted that the test with a dye allows not only clearly contrasting the altered tissues, but also acts as an antiseptic. The method is simple but has some peculiarities. Dye after preliminary careful introduction of the probe (do not make a false tract) is introduced into the fistula via the cannula of the syringe by blunt injection needle. In this case, the syringe is tightly pressed to the tissues surrounding the fistulous opening. To recognize the connection of the fistula with the bowel lumen (for labelling of the inner hole) there are a few methods. To detect the localization of the internal fistula opening within the anal canal a gauze swab is placed in the lumen of anal canal, and then the test is performed. The results of the test are evaluated after removing the swab from the intestine. Removing of the tampon should be careful, without changing its original position relatively to the walls of the anal canal. Presence of the spot of paint on the tampon speaks about presence of fistula in the intestine and shows the localization of its internal opening. If you suspect the connection of the fistula with ampulla of rectum it is better to carry out the test simultaneously or sequentially with endoscopy (sigmoidoscopy). It should be remembered that a positive result is not always achieved with a single study. Usually this occurs in the diagnosis of chronic paraproctitis. Therefore, the test with dye have to be repeated several times.

**Additional special methods of examination.**

**Biopsy.** Intravital pathomorphological study of changed tissues of the colon can solve many related clinical questions. First of all, this method is important to recognize the nature of the tumors. Microscopic confirmation of the diagnosis of cancer is important to avoid unnecessary operations in inflammatory diseases and benign tumors. Histological examination of tumor tissue determines the structure and degree of differentiation of cellular elements, which strengthens the position of physician in the diagnosis and allows the correct choice of surgical intervention. Method is able to provide medical assistance in recognizing the inflammatory and
functional bowel disease. In inflammatory diseases of the colon biopsy allows to objectively evaluate the severity of the pathological process in the intestinal wall and monitor the effectiveness of therapy. Tissue biopsy for microscopic examination of the distal colon is usually produced during sigmoidoscopy. Biopsy is carried out by different instruments of coloproctological endoscopic set. In some cases, it is important to get the specimen from the border of lesions. To study the malignant tumor, tissues are taken from its edges on the border with intact mucosa. During mucosal biopsies those sites are chosen that appear in the lumen of intestine. The obtained piece of tissue is fixed in 10% solution of neutral formalin.

One should keep in mind that biopsy is a surgical procedure that requires accuracy of performance, control of hemostasis and related documentation. Usually bleeding from the bed of removed part of the tumor or mucosa is small and terminated independently. In more intense bleeding it should be stopped by pressure by gauze ball, which should be soaked by hydrogen peroxide solution, epinephrine, aminocaproic acid; or electrocoagulation can be used.

**Cytodiagnosis.** Cytological examination of discharge from the inner surface of the intestine is less informative than histological method, but it gets particular importance in cases when it is impossible to make biopsy. In order to rapidly clarify the malignant type of growth cytodiagnosis can provide invaluable assistance. In this sense, the method can be used in both stationary and, especially, in the outpatient setting.

Taking of biopsy specimens for cytodiagnosis is usually produced by rectoromanoscope. By the small gauze or foam-rubber ball on a long instrument, introduced in the intestine through a tube system, takes fluids and transferred it to degreased object-plate for further study.

**Colonoscopy.** In the survey of coloproctological patient colonoscopy has important place in investigation of the entire large intestine. Colonoscopy is a valuable method for diagnosing of large intestine, which is performed using special apparatus - colonoscope. Colonoscope has a device for photographing, performing biopsies and removing tumors. Method specifies the diagnosis of diseases of the entire colon. If rectal polyps and cancer of the distal colon are found during rectoromanoscopy, the entire colon must be examined to exclude synchronous tumors or inflammatory changes in the overlying sections. Colonoscopy is indispensable for the dispensary observation of patients after removal of polyps and surgery for colon cancer, evaluation of conservative treatment of ulcerative colitis.

It should be mentioned, that irrigoscopy and colonoscopy are complementary.

**Radiological diagnosis.**

**Irrigoscopy.** X-ray is the most accessible and widely used method for studying the final portion of the digestive tract. X-ray examination of the colon should begin with irrigoscopy, which is a great diagnostic value and differential diagnostic significance.
During irrigoscopy the following techniques should be used: tight filling of bowel with contrast, study of the topography of the mucous membrane after emptying the bowels of the contrast mass, double contrast study.

Tight filling of the colon with barium suspension allows you to get an idea about the shape and location of the organ, length of intestine as a whole and its divisions, elasticity and extensibility of the walls of intestines, as well as identify the gross pathological changes and functional state of Bauhin’s valve. Degree of emptying of the colon makes it possible to evaluate the character of the functional state of its various departments. Study of the relief of the mucous membrane has the highest value for the diagnosis of various forms of colitis, manifested by functional disorders and organic changes in the walls of the colon.

Double contrast is one of the most informative methods of identifying tumors of the colon, specifies the condition of the gut - its flexibility and mobility. In order to identify the motor-evacuation activity of the colon the method of oral intake of barium suspension is used, followed by periodic (in 3,9,34,48, etc. hours) X-ray control over its promotion trough the colon.

**Fistulography.** This method is used for the recognition and differential diagnosis in diseases of the anorectal and the sacral regions with the presence of fistula to the skin. The main task of fistulography is to identify direction of the fistula, its length, branching, presence of cavities and their relationship with adjacent organs and tissues. Suspension of barium sulfate, sergozin, cardiotrast, yodolipol etc is used for investigation. Introduction of contrast medium into the fistulous tract is carried out by coloproctologist. Radiographic images are performed in anterioposterior and lateral projections. Evaluation of survey data is done by radiologist.

Other radiographic techniques - parietography, lymphography, angiography are applied in coloproctological practice less frequently and for special indications.

**Ultrasound (U.S.)**. In coloproctological clinics ultrasound diagnosis (sonography) is used to diagnose colon cancer. It reveals the extent of tumor, metastases in the abdominal cavity, and the degree of invasion into the wall of the colon and affection of regional lymph nodes. Ultrasound is used in many diseases of the large intestine and anal canal. The coincidence of U.S. and postoperative study of the removed specimens shows the wide possibilities of this technique.
THE MAIN CLINICAL MANIFESTATIONS OF DISEASES OF LARGE INTESTINE

Clinical manifestations of diseases of large intestine are varied and not always clearly defined. In most of them there is a latent period, then there are poor signs of the disease, which manifest by "intestinal discomfort": there is a periodic acceleration of stool or its delay, discomfort in the abdomen or a feeling of distension, sensation of foreign body in the rectum. These initial manifestations of diseases of large intestine over time become intense and constant, accompanied by severe pain, severe constipation or diarrhea, mucus and bloody discharge, perineal itching, fever, exhaustion, intoxication.

**Abdominal pain** - quite a characteristic symptom of disease of the colon and rectal ampulla, but they can not be considered as an early manifestation. Pain may be constant or cramping, and irradiate to the lumbar region, back, supraclavicular space. Cramping pain is evidence of limited narrowing of intestine as a result of various pathological processes (cicatricial stricture in ulcerative colitis and Crohn's disease of the colon, adhesive disease, benign and malignant tumors). Less commonly, they are marked in intestinal dyskinesia with prevalence of spastic component.

Persistent abdominal pains are more characteristic of progressive inflammatory lesions. They are observed in granulomatous and ulcerative colitis, irritable bowel syndrome, bowel tumors with perifocal inflammation, diverticulosis with diverticulitis and inflammatory infiltrate formation or peritonitis. Dull pains in the epigastric region are often the first manifestation of diffuse familial polyposis of the large intestine and can be attributed to the disturbances of the secretory and motor functions of the stomach.

**Pains in the anus and perineum** are often permanent, of straining nature or are twitching and burning. In acute anal fissure, acute thrombosis of hemorrhoids, acute paraproctitis they can become intolerable after the act of defecation. A number of diseases of the rectum (benign tumors, chronic fistulas, cancer, etc.) can flow without long-term pain. In the most common disease of the rectum - uncomplicated hemorrhoids, pain usually does not happen or it is poorly expressed.

Discharge of mucus and pus from the anus can be observed only during defecation or can be permanent (in rectal and anal sphincter insufficiency). In the latter case often maceration of the perianal skin occurs, there are multiple erosions and poorly healing deep cracks, which is accompanied by itching, burning and sharp pains. The admixture of mucus and pus in stool is usually observed in chronic and acute proctitis, proctosigmoiditis, ulcerative and granulomatous
colitis, as well as villous adenoma and carcinoma of the rectum and the sigmoid colon. Discharge of mucus and pus in these cases is often combined with admixture of blood.

**Bleeding** or bloody stool is a common symptom of disease of rectum and colon. Appearance of drops of red blood, or even jet bleeding (usually at the end of the act of defecation) is characteristic of hemorrhoids and anal fissures. Sometimes this hemorrhage leads to a loss of 100-200 ml of blood per day and with frequent repetitions causes anemia. Visible blood in stool and blood clots are usually seen in inflammatory diseases, diverticulosis and tumors. As proximal is the source of bleeding in the colon, as more homogeneous is admixture of blood to the stool and the darker the color. When bleeding takes place from the ceacum and the ascending colon, blood can be changed under the influence of intestinal enzymes so much that feces takes a typical tarry appearance (melena), similarly with bleeding from the upper gastrointestinal tract. Minimally changed liquid blood or blood clots may be released during defecation in patients with ulcerative colitis and Crohn's disease, in diverticulosis of the colon, as well as in disintegration and ulceration of villous and cancerous tumors. Profuse bleeding is rarely observed in diseases of large intestine. It may occur in diverticulosis of large intestine, rarely - in ulcerative colitis and Crohn's disease of large intestine.

**Anemia** in diseases of the colon develops due to chronic or acute blood loss and is hypochromic nature. In cancer, localized in the right parts of the colon, anemia is observed frequently and is due to chronic blood loss, and disturbance of hematopoiesis due to intoxication. Iron deficiency anemia is a characteristic feature in the diffuse polyposis, teratoid and dermoid tumors of pararectal cellular tissue, II-III degree insufficiency of an anal sphincter and high level complex rectal fistulas. The pathogenesis of this anemia is complex, and one of the leading factors is disturbance of the synthesis of iron-albumin as a result of purulent intoxication, or the consequence of disbacteriosis of intestines, leading to disturbances of fermentation of intestinal contents and absorption of vitamins.

**Constipation** - difficulty in the act of defecation and delay of stool up to its absence for a few days and weeks - is a common symptom of both functional and organic diseases of the large intestine. Genesis of this symptom is very complex, its development is caused by central reflex and endocrine disorders, systemic changes in metabolism and blood circulation, as well as reflex, morphological and organic (scarring and tumorous narrowing of bowel, malformations) features and lesions. Functional constipation can be atonic and spastic, and depending on the type may proceed with less or more severe pain syndrome. In organic narrowing of large intestine (cicatricial stricture, tumor, compression from the outside, etc.), constipation usually precedes bowel obstruction or is one of symptoms of partial bowel obstruction, often progressing up to the complete obstruction.
Large bowel obstruction - syndrome of disorders of passage of the bowel contents, manifested by the absence or delay in stool, difficulty passing flatus, distension and stretching of the abdomen, constant cramping pain, the progress of other dyskinetic phenomena (disturbance of appetite, nausea, vomiting, etc). Obstruction may be partial or complete, and often observed in organic lesions of the bowel, but also can be found in functional changes - in spastic and atonic constipation, coprostasis et al. With the progression of large bowel obstruction there is increasing both local (abdominal distension, manifestations of peritoneal inflammation) and general (symptoms of intoxication and metabolic disorders) disorders. Partial obstruction of large bowel is characterized by intermittent, but incomplete discharge of stool and gas; sometimes interchange in constipation and diarrhea, temporary cessation of pain and distension, short or long periods of remission with improvement of general condition, especially under the influence of therapeutic measures (enemas, laxatives).

Distension may occur not only with constipation and intestinal obstruction. It is often associated with flatulence caused by alimentary disorders, congenital or acquired enzyme deficiency (especially in the upper gastrointestinal tract), and dysbacteriosis of the large intestine. Dysbacteriosis occurs most often because of the wide application of various antibacterial and antiseptic agents, and irrational nutrition (prevalence of high-calorie foods of animal origin with high content of fat and protein and small amount of fibers).

Diarrhea - frequent liquid stool, is a typical symptom of a number of non infectious diseases of the large bowel. In ulcerative and granulomatous colitis diarrhea is often accompanied by tenesmus.

Tenesmus - frequent false urge to defecate without excretion of stool or with discharge of small amount of mucus, blood or liquid intestinal contents. They are exhausting the patient and may be accompanied by perianal skin maceration, the formation of cracks and erosion. Tenesmus are a consequence of reflex excitation of motor activity of distal colon, especially the rectum. They develop as a result of inflammatory changes in the sensory area of the mucous membrane lower ampullar and anal departments of the rectum.

Fecal and gas incontinence is observed in congenital or acquired anatomic lesions of sphincter apparatus of the rectum or the disturbance of its reflex regulation of the central or peripheral nature. Basically there is three degree of anal sphincter insufficiency.

First degree - gas incontinence, second degree - incontinence of gas and liquid stool, a third degree - incontinence of gas, liquid and solid stool.

Many expressed forms of bowel disease of inflammatory and neoplastic nature proceed with significant disturbances of metabolic processes. Observed increase in weakness, wasting, stunting and delay of development of the patient, dysfunction of the genital organs. These
clinical signs are confirmed by laboratory tests: hypo-and dysproteinemia are defined, disturbances of water-electrolyte metabolism, anemia, and decline in immune reactivity. Other main symptoms of large bowel diseases are revealed by special investigations.
RECTAL PROLAPSE

**Definition.** Rectal prolapse is falling out of all layers of the rectum through the anus. In addition, most researchers distinguish so-called internal rectal prolapse. The basis of the latter is intrarectal intussusception of the rectum without escape of the part of intestine to outside (Fig. 18,19).

![Rectal prolapse](image)

*Fig. 18,19 Rectal prolapse.*

**Epidemiology.** There is no unified view on the incidence of the disease in men and women. Total prolapse of the bowel wall occurs at any age. Most often it occurs in older women aged 70 years do 80. Female to male ratio ranges from 10:1 to 6:1.

**Etiology.** There are many reasons for the rectal prolapse. Almost always there is combination of different unfavorable factors conducive to development of disease. However, in most patients leading etiological factor can be determined, that is very important to choose an adequate method of treatment. These factors may only predispose to the development of pathological process, but they can also directly cause rectal prolapse. The following are related to the predisposing factors: hereditary factors, especially the constitution of the organism and the structure of the rectum, acquired degenerative changes in sphincter muscle unit and in the wall of the rectum. To promoting factors are related: acute and chronic gastrointestinal diseases, hard physical labour, exhaustion, blunt abdominal trauma, difficulties in birth.

Constitutional anatomical features of the organism are considered as the main reasons that predispose to rectal prolapse: the inherent weakness of the ligaments, the deep pocket of the pelvic peritoneum, dolichosigmoid, excessive mobility of the sigmoid colon and rectum, etc. Dysfunction of the intestine (especially constipation), female gender, infertility, neurological changes (spinal cord injury, cauda equina injury, senile changes) contribute to development of the disease too.
**Pathogenesis.** There are two main variants of rectal prolapse development: the type of sliding hernia and the type of intussusception. In hernia type weakening of pelvic floor muscles and the constant increase of intra-abdominal pressure leads to the fact, that abdominal Douglas pouch gradually shifts downwards, grasping the anterior wall of the rectum. Formation of deep Douglas’ space accompanies by divergence of levator muscles, especially at elevated intra-abdominal pressure. In the future, with an increase of unfavorable circumstances, there is prolapse of the anterior wall of the rectum through the anal canal to outside. With time, the zone of displacement of the bowel wall increases and becomes circular. Unfavorable circumstances are getting an increasing number of small intestinal loops to move down Douglas pouch (enterocele). Sometimes the contents of hernia-like Douglas pocket is changed sigmoid colon (sigmocele).

**Pathological anatomy.** In rectal prolapse there is a gradual compression of submucosal vessels, and therefore the mucous membrane of the prolapsed area is mostly exposed to changes. Due to the vascular plethora and stasis, mucosa appears edematous, hyperemic, but retains a characteristic luster. While squeezing the supplying vessels, it becomes cyanotic, while the long severe compression of the walls of the anal canal may cause necrosis. Depending on tone and contractility of individual groups of muscle fibers, prolapsed portion of the rectum may have a shape of cylinder, cone or ball. After reposition of gut blood flow is restored and the mucosa becomes normal.

For the internal prolapse of the rectum characteristic is development of solitary ulcer, that forms on the anterior wall of the rectum just above the dentate line. The ulcer has a polygonal shape, its size usually does not exceed 2-3 cm in diameter. The edges of the ulcer are flat; do not have the characteristic granulation shaft: the bottom is shallow, in some places is covered with fibrin. Instead of ulcers focal edema and hyperemia can develop on the anterior wall of the rectum.

Histology of ulcers is mainly characterized by inflammation, stasis, and plethora of vessels of the mucous membrane of the rectum. Microcirculation disturbance leads to swelling, proliferation of connective tissue and lymphocytic and plasmocytic infiltration of submucosa. Characteristic is proliferation of smooth muscle cells of the muscular plate of the rectal mucosa. In the muscle layer along with the growth of connective tissue thickening and vacuolation of nerve fibers are observed. Nerve cells in the muscular plexus undergo dystrophic changes until the lysis of individual neurons. There are also signs of degeneration of nerve and muscle elements of the external sphincter of the rectum.
**Clinical picture.** Often the disease has a sudden onset, caused by heavy physical exertion, childbirth or the weakening of the pelvic floor and anal sphincter after a strong cough, sneeze, etc.

From complications of the disease should first be noted the strangulation of the prolapsed rectum. It can occur in almost every patient, if the prolapsed bowel is not reduced in time or if reduction was done roughly. Rapidly increasing swelling not only hampers the reduction, but also impairs blood flow to intestines that leads to formation of necrotic areas and ulcers. Especially dangerous is simultaneous strangulation of small intestinal loops into the peritoneal pocket between the walls of the rectum. In these cases acute intestinal obstruction and peritonitis may develop.

**Classification.** Greatest practical interest is the classification of 3 degrees of prolapse. The first degree - rectum prolapses only during defecation. Second degree - prolapse of the rectum happens not only during defecation, but also during physical loading. Third degree - rectum prolapses even when walking and even when taking vertical position.

An important clinical criterion is the ability to self-reposition of the prolapsed part of bowel, which indirectly indicates the degree of compensation to the pelvic floor muscles. If the muscles are able to not only contract but also to maintain the tone, then this condition is characterized as a compensated, and vice versa. Thus, if the bowel reduces itself, the pelvic floor muscles, especially levator, are being compensated. The need for manual reposition of the rectum indicates decompensation of pelvic floor muscles that should be taken into consideration when choosing a method of treatment. Also the degree of insufficiency of anal sphincter should be determined, which is characteristic for the majority of patients with rectal prolapse.

**Diagnosis.** The apparent ease of detection of the rectal prolapse is only partially true when patients come themselves to the doctor with a "ready" diagnosis. Even the appearance of the rectum from the anus in light straining or in the upright position is not the final diagnosis, but only its beginning. In cases when the patient comes with complaints of foreign body sensation or tenesmus, you must use special techniques of inspection, especially in the "squat down" position. And in this case patient’s straining helps. Then the patient should be placed on the inspection chair and perform manual rectal examination. One should pay attention to the condition of hemorrhoids, tone and voluntary contractions of the sphincter, the presence of any pathological entities, such as polyps.

During the inspection of the prolapsed part of the rectum its shape and size, the state of the mucous membranes, dentate (anorectal) line are evaluated. In prolapse of only the rectum a circular space between the wall of the rectum and anal canal is revealed, this space disappears if there is prolapse of not only the rectum, but the anal canal too. The long length of prolapsed...
bowel (more than 12-15 cm) indicates the involvement in the pathological process of the sigmoid colon.

Spherical or ovoid shape of the prolapsed part is noted in severe loss of tone of the intestinal wall, as well as the presence of loops of small intestine between its walls.

In the case of an internal rectal prolapse (intussusception) big role in the diagnosis belongs to the digital rectal investigation and sigmoidoscopy. In digital rectal investigation determined the pathological formation, smooth, elastic consistency, easily dislodged relative to the walls of the rectum, which may disappear in knee-elbow position and, conversely, increased straining and coughing. Rectoromanoscopy in these cases helps to identify the nature of the observed formation and to confirm the presence of intussusceptum, the existence of so-called solitary ulcers, usually located on the anterior wall of the lower-ampullar part of the rectum, can be determined. Further examination of the patients should be aimed to identify the cause of the pathogenesis of rectal prolapse. Endoscopic examination of the large bowel is needed to identify tumors, diverticulosis and other lesions of the colon.

An important element of diagnosis is radiographic examination (including fecography), with which not only on anatomical (presence of intussusceptum, loops of small intestine in the drop-peritoneal pocket) but also functional changes (severity and extent of colostasis, state of compensation for the pelvic floor muscles) can be determined.

It is also necessary to perform physiological studies aimed to assessing the functional state of sphincter apparatus of the rectum, motor-evacuation function of the colon and the activity of the pelvic floor muscles.

**Differential diagnosis.** Prolapse of the rectum first of all should be differentiated from prolapse of hemorrhoids. The difference is in the lobulation of the structure of hemorrhoids, with the folds of mucous membrane located lengthwise, and not in the transverse direction, as in the rectal mucosa.

Large polyps or villous tumors are sometimes taken as a rectal prolapse. Digital rectal investigation could quickly correct the wrong diagnosis.

Great difficulties arise in the presence of internal prolapse and the solitary ulcer. The latter case must be differentiated from endophytic tumors using morphological methods (smear, biopsy).

Sometimes you need to differentiate between internal intussusception from rectocele. Differential characteristic feature is the way of manual reduction, to which are forced the patients during defecation. In rectocele finger is introduced into the vagina for fixing the anterior wall of the rectum. Patients with internal prolapse introduce the finger into the rectum, trying to dislodge intussusceptum and free exit from the rectum.
Yet the differential diagnosis in such cases should be based on dates of X-ray examination. Particularly videodefecography is valuable in such situations.

**Treatment.** Currently, only surgical methods are used in the treatment of external rectal prolapse. At the same time treating all patients with internal prolapse (intussusception) should begin with a mandatory set of conservative therapy. In more than one third of patients conservative treatment gives stable positive effect. The best results of conservative treatment are observed in young and middle-aged patients with non-advanced forms of the disease, with a history of disease no more than 3 years. All methods of surgical treatment are classified by their principal characteristics in 5 main options.

Operations on the prolapsed part of the rectum:

- Cauterization of the prolapsed rectum;
- Resection of the prolapsed rectum in patients with severe concomitant diseases;
- Narrowing of the anus with copper (silver) wire by Tirshu.

All of these suggestions into the practice have failed because of the large number of postoperative complications and high percentage of recurrence rate of the rectal prolapse.

**Pelvic floor plasty by sewing** the edges of the levator muscle with or without suturing to the rectum gives good results, but not as a separate operation, but it complements the other surgical interventions aimed to elimination of the rectal prolapse.

Intraperitoneal resection of the distal colon, including rectum, is a radical method of treatment for prolapse, but pathogenetically is not justified. Hence arose chronic colonic stasis, followed by a permanent increase of intraabdominal pressure, in turn, leads to inevitable relapse.

Resection of the sigmoid colon and rectum in prolapse of the rectum should be pathogenetically justified and should not be carried out as an independent operation, but in combination with other surgical methods (eg, fixation), which preclude other pathogenetic links of the pathological process.

Fixing operations are aimed at retaining the rectum in its normal anatomical and physiological position. Among the numerous methods, currently the most widely are used:

- Zerenin-Kümmel’s method -fixation of the rectum to the anterior longitudinal ligament of spine in the sacral promontory by single interrupted suture
  - Ripshteyn’s method -fixation of the rectum to promontoriumu with teflovon mesh
  - Modification of the Ripshteyn’s method posterior-loop fixation of the rectum to the sacrum using synthetic mesh.

Zerenin-Kümmel’s operation can reliably allow to fix the rectum, but at the same time, some patients enhances constipation. Therefore, this way of fixing is expedient to be used in young patients (under 35 years) with a history of illness less than 3 years. In other cases
posterior-loop fixation of the rectum to the sacrum using a Teflon mesh is indicated. This technique allows you to preserve intact the anterior wall of the rectum, without disturbing its evacuation function.

In recent years laparoscopic surgical treatment of fixation of the rectum is used with similarity to the posterior-loop fixation of the rectum using Teflon mesh. This method, along with the reliable fixation of the rectum, has a very important quality - less traumatic intervention.

Combined methods. In number of patients, suffering from prolapse of the rectum against the backdrop of long-term constipation, it is reasonable to use a combination of fixation of the rectum with resection of non-functioning left parts of colon or dolichosigmoid. The indication for this type of surgery is delayed passage on the left divisions of the colon more than 72 hours (according to X-ray or scintigraphy).

In presence of internal rectal intussusception (internal prolapse), accompanied by formation of solitary ulcers, the most appropriate is resection of distal colon in the volume of the anterior or abdomino-anal resection.

**Prognosis.** In proper selection of the method of surgery treatment prognosis is generally favorable. In 72-75% of operated rectal prolapse can be eliminated and evacuation function of the colon can be improved. Factors, contributing to disease, should be eliminated, and, first of all, primarily normalization of the gastrointestinal tract and elimination of heavy physical exertion.
CROHN'S DISEASE

**Definition.** Crohn's disease (CD) is a chronic relapsing disease of the gastrointestinal tract of unknown etiology, characterized by segmental transmural spread of inflammation with development of local and systemic complications.

**Epidemiology.** In recent years in developed countries are experiencing increases in the incidence of ulcerative colitis (UC) and CD. Prevalence of CD-30-50 cases per 100,000 inhabitants.

**The etiology and pathogenesis.** There is currently no common point of view for the etiology of CD. Discussion continues on whether UC and CD are two independent nosological forms, or they are different clinical and morphological variants of the same disease. Most scientists believe that the UC and CD are caused by various etiological factors which, when exposed to the human body, triggers the same universal pathogenic mechanisms of autoimmune inflammation. Mycobacterium paratuberculosis and measles virus are considered as the main etiologic factors by the supporters of contagious theory of Crohn's disease. Commonality of the clinical picture of CD and intestinal tuberculosis, as well as the presence of granulomas, makes you to think about the tuberculous etiology of the CD. However, a negative Mantoux test and failed attempts to antituberculous treatment suggest non tuberculous nature of the CD. Proponents of the viral etiology believe that measles virus can cause vascular disorders in the intestinal wall, which define the peculiarity of the clinical picture of the CD. However, measles virus in the tissues of the intestine can’t be detected. One argument in favor of an infectious etiology of CD is a positive clinical effect of antibiotic therapy. To develop chronic inflammation characteristic of CD, genetic predisposition is needed, manifested by defective immune system of the intestine.

**Pathological anatomy.** In affection of large bowel with Crohn's disease its length varies not so obviously as in the UC. Its diameter is not increased, and in some places you can find the narrowing of the bowel. In the lesion deep, narrow ulcers are located with smooth edges that resemble knife cuts. Ulcers are usually orientated along and across the colon, have smooth, not undermined edges; edematous mucosa of intestine persisting between these ulcers has appearance of cobblestone pattern. (Fig. 16).
Segmental affections of large bowel with narrowing of the lumen extending from 5 to 10 cm ("suitcase handle") are found; both above and below this area the intestinal wall is not altered. Sometimes narrowed areas are of great length and wall thickening, which makes them similar to the hose. It is very characteristic presence of few sites of lesions, separated by intact mucosa.

One of the significant microscopic differences of Crohn's disease from UC is the spread of the inflammatory infiltrate to all layers of the intestinal wall (transmural nature of the inflammation). CD is characterized by presence of granulomas, but they are revealed by microscopic examination relatively rarely. Granulomas in CD are very similar with granulomas in sarcoidosis, so they are called sarcoid granulomas. They are composed of epithelioid and Pirogov-Langhans type giant cells, are surrounded by a belt of lymphocytes, do not have clear boundaries; and fibrous band is not found around them, which is characteristic of sarcoidosis. In contrast to tuberculous granulomas there is no caseous necrosis in them.

**Classification.** Most often classification by Bocus is used, according to which seven forms of Crohn's disease are distinguished: jejunitis, ileitis, jejunileitis, enterocolitis, granulomatous colitis, anal lesions, panregional intestinal affection with involvement of the upper gastrointestinal tract (stomach, duodenum).

In everyday clinical practice, we use the classification proposed by Fedorov V.D. and Levitan M.H.. It distinguishes three forms of bowel CD - enteritis, enterocolitis and colitis. In most cases, this classification provides a sufficient conception of the disease, facilitates the choice of treatment and prognosis.

**Clinical picture.** In the clinical picture of CD local and general symptoms and extraintestinal manifestations of disease can be distinguished.

Local symptoms include abdominal pain, diarrhea, bleeding, caused by affection of the gastrointestinal tract. Anal and perianal lesions (rectal fistulas, pararectal abscesses, anal
fissures), strictures of various parts of bowel, infiltrates and abscesses in the abdomen, external and internal fistulas are considered as local complications of CD.

Abdominal pain is a classic symptom of CD and occurs in 85-90% of patients. Since most often inflammation in CD is localized in the terminal segment of the ileum, the disease is characterized by recurrent pain in the lower right quadrant of the abdomen, where it can simulate the clinical picture of acute appendicitis or intestinal obstruction. At the same time, many patients may have no severe pain, and primary manifestation of disease is discomfort, heaviness in abdomen, distension and cramping in mild intensity, aggravated by abuse in diet.

Diarrhea occurs in 90% of patients and usually is less severe than at UC. With involvement of the small bowel stool frequency ranges from 2 to 5 times, and in cases of enterocolitis - from 3 to 10 times. Consistency of feces is often mushy than liquid. However, even in those patients whose lesion is located only in the small intestine, the stool can be liquid or watery. Severe diarrhea is observed in patients with advanced lesions, such as jejunoileitis.

Anal and perianal lesions are characterized by sluggish paraproctitis, multiple anal fissures and fistulas. Perianal lesions may take place both isolated and in combination with lesions in the bowels, especially the colon. Anal fissures in CD are noted by sluggish and slow recovery. Usually, these are broad with elevated edges fissure- ulcers, on the background of the swollen purple-bluish perianal tissues. Rectal fistulas are formed as a result of spontaneous or surgical opening of perianal or ischiorectal abscesses.

**Complications. Intestinal bleeding** is more common for UC than for CD. The sources of bleeding in CD are deep ulcers, fissures of the intestinal wall. In the presence of melena one should exclude exacerbation of gastric and duodenal ulcers, bleeding from the varices of the esophagus due to portal hypertension, tumors of gastroduodenal region. When source of bleeding localized in the small or large intestine, it is necessary to carry out differential diagnosis with UC, ischemic colitis, angiodysplasia, cancer, hemorrhoids.

**Perforation** into the free abdominal cavity is a characteristic complication for UC than CD. Symptoms of "acute abdomen" are usually vague by hormone therapy. The presence of free gas in the plain x-ray of abdomen is determined not always. The diagnosis is finally confirmed by immediate laparotomy. Most of the perforations are located on the antimesenteric edge of the intestine.

**Toxic dilatation** in CD is extremely rare. As a rule, its development is conditioned by receiving antidiarrheal drugs, irrigoscopyey or colonoscopy, infection, or due to late diagnosis of the disease.

**Infiltrates and abscesses** in the abdominal cavity are often observed in CD at predominant localization of process in the right iliac region. At the mentioned above location,
CD must be differentiated from appendicular infiltrate, cancer and tuberculosis. In most cases the correct diagnosis can be established only by endoscopic or combined radioendoscopic investigations, detecting changes in the mucosa of the colon and small intestine, characteristic for granulomatous colitis. Considerable difficulties arise in combination of infiltration with strictures, located distally to infiltrate, which makes impossible to pass the endoscope. In some cases the only available method of diagnosis is the passage of barium through the bowel.

**Bowel obstruction** is a pathognomonic sign of CD, especially in the localization of changes in the small intestine. Inflammation of the intestinal wall, edema, spasm, and subsequently cicatrical changes in the gut lead to narrowing of the lumen and disturbance of passage of intestinal contents. Development of complete small or large bowel obstruction is usually not observed, that allows us to choose conservative treatment of obstruction in CD.

**Common symptoms** in CD are due to inflammation in the bowel or immunopathological reactions. These include fever, general weakness, and weight loss.

Increase in body temperature is a main manifestation of CD and is registered in one third of patients in exacerbation of disease. Fever is usually associated with the presence of purulent processes (fistulas, infiltrates, abscess) or systemic complications of toxic-allergic nature.

Weight loss at CD, as well as at UC, is associated with insufficient nutrition. The main metabolic changes include anemia, steatorrhea, hypoproteinemia, avitaminosis, hypocalcaemia, hypomagnesaemia and other microelement deficiencies.

The affection of the small intestine leads to malabsorption syndrome, sometimes dominating the clinical picture of the CD.

**Diagnosis.** The diagnosis of CD is established on the basis of characteristic clinical picture of disease, the results of endoscopic, radiological and morphological investigations.

X-ray diagnosis of CD is based on the presence of interruptive character of intestinal lesions, involvement of small and large intestine, the right localization of process in the colon, formation of deep ulcers, fissures, internal fistulas, retroperitoneal abscess with fistula and blind sinuses formation in cases of involvement in the small intestine.

Leading radiological symptom of CD is the narrowing of the affected area of the bowel. Degree of narrowing is directly proportional to duration of the disease. In some cases, the intestine narrows uneven and eccentric. In not advanced cases haustrae are smoothed and take an irregular shape, with the progression of the process they completely disappear. In addition to the narrowing, there is also a shortening of some segments of the large bowel. In involvement of the rectum in the pathological process its size is greatly reduced, curves are smoothed, retrorectal space enlarges.
Endoscopic picture in CD is characterized by aphthoid ulcers on the background of intact mucosa. With the progression of disease the ulcers increase in size, take linear form. The alternation of the islands of preserved mucosa with deep longitudinal and transverse ulcers and fissures create a picture of "cobblestones".

**Differential diagnosis.** Crohn's disease have to be differentiated from many diseases. Granulomatous lesion of the small intestine is often diagnosed as appendiceal abscess or acute appendicitis, so as to differentiate them is extremely difficult. Sometimes it is impossible to distinguish CD from inflammation of Meckel diverticulum and other acute diseases of the abdominal cavity. Crohn's disease with the localization of process in the small intestine and right parts of the colon is not easy to distinguish from intestinal tuberculosis, because the latter can occur without lung affection. Therefore, the absence of pulmonary process does not exclude tubercular nature of the disease. Sometimes malignant lymphoma is mistaken for CD. You can not always be sure that the stricture of the small intestine is the consequence of only granulomatous changes. In localization of the stricture in the splenic flexure of the colon, ischemic nature of the lesion should be suspected. Fever, joint pain and erythema nodosum may even dominate in the clinical picture of inflammatory bowel disease and thereby cause collagen disease.

If the granulomatous process is localized only in the large bowel, it can be taken as tuberculosis of the caecum and the ascending colon, ischemic stricture, cancer and amebiasis.

The most difficult is differential diagnosis between CD and UC, from which it differs by the following: no lesions in the rectum in half the cases, deeper ulcers of the colon, asymmetric and interrupted process and the tendency to formation of strictures and fistulas (Fig. 17). Unfortunately, there are currently no clinical, endoscopic and histological criteria that would clearly indicate the presence of ulcerative colitis or Crohn's disease.

**Treatment.** Clinical experience allows us to recommend products of mesalazane for maintenance treatment of CD, but their daily intake should be higher (3-4 gramm), compared with schemes of maintenance therapy in UC.

**Treatment of complications.** Bleeding in CD is rarely profuse, so hemostatic agents and blood transfusions are usually effective.

**When perforation** is suspected, the urgent surgical intervention is indicated.

**Toxic dilatation** - if there are no signs of perforation into the free abdominal cavity and peritonitis, treatment begins with conservative measures. The patient stops the intake of fluids, food and medicines. Aspiration of gastric contents through nasogastric tube is done. Steroids, antibiotics, nutrition are implemented by parenteral way. Usually this is enough to solve the complication. If necessary, hemosorption, plazmosorption, ultraviolet blood irradiation are
carried out. If toxic megacolon is not solved within 24 hours on the background of medical therapy, then surgical intervention is indicated.

In the treatment of inflammatory infiltrates and early suppuration we currently use two medication schemes: either a combination of aminosalicylates, azathioprine, Trichopol, or a combination of prednisolone, azathioprine, Trichopol, preferring the latter. Because of more pronounced reduction or complete elimination of the inflammatory infiltrate, rapid elimination of intoxication, improvement of general condition, weight gain, we can not agree with the opinion of those who considers inflammatory infiltrates as undoubted contraindications for corticosteroids. Even with a significant fever in patients with inflammatory infiltrates, we do not refuse treatment with prednisolone, but only include antibiotics in the treatment schemes, preferably the last generation antibiotics. If there is no effect and purulent intoxication increases, there is a need for open drainage of abscess under general anesthesia. Drainage must be adequate and kept for long time. Obligatory outcome of drainage is formation of gastro-cutaneous fistula. Perforation of mesenteric abscess into the free peritoneal cavity with the development of peritonitis is extremely rare.

Bowel obstruction. Regardless of the level of restriction and the presence of active inflammatory process, medical therapy should be started with, which typically eliminates the phenomenon of partial intestinal obstruction, probably by eliminating the inflammatory component of the constriction. On the other hand, in the presence of scar stricture, even in remission, accompanied by signs of partial intestinal obstruction, planned (elective) surgical treatment is indicated.

Surgical treatment of Crohn's disease, unlike ulcerative colitis, is not of radical nature, since granulomatous inflammation can develop in any part of the gastrointestinal tract. The aim of surgical treatment for Crohn's disease is struggle with complications and improvement of life quality of patients when this can not be achieved only by medication. Moreover, unnecessary re-resection of the bowel in Crohn's disease carries the risk of development of the "short bowel" syndrome, disturbances of digestive processes.

Absolute indications for surgery in Crohn's disease of the small intestine are the intestinal scarry stenosis and external fistulas.

Crohn's disease of the colon takes the form of segmental colitis, total affection (pancolitis), and proctitis with perianal lesions (ulcers, fissures, fistulas, accumulations of pus). Indication for surgery is bad tolerance or ineffectiveness of conservative therapy, at which intoxication increases, metabolic abnormalities and septic complications develop. The other indications are: formation of fistulas, intraabdominal absceses, retroperitoneal phlegmon. The operation also is indicated in the progression of perianal septic complications, beyond the local
and systemic drug therapy. It is reasonable to impose double-lumen ileostomy as the first step in surgical treatment, most carried out by laparoscopic method. Later, after stabilizing of the patient's condition it is possible to perform segmental resection or colectomy. If the entire colon is affected, colectomy with abdominal-anal resection of the rectum is performed, while in absence of process in the rectum the latter is preserved and the operation is finished with formation of ileorectal anastomosis.

In segmental lesions resection of the large bowel segment is performed by the same rules as the resection of the small intestine. In the presence of fistulas or perifocal inflammation, the surgical treatment is divided into two or more stages, finalizing the first with imposition of the stoma. In limited narrowings of large bowel intraoperative biopsy is required to exclude malignancy. In cicatricial stenosis increasingly popularity gets stricturoplasty as organ-preserving operations.

**Prognosis.** It should be noted that surgical treatment of Crohn's disease is particularly difficult and unconventional problem. An important condition for reducing the recurrence rate after surgery is an adequate drug preventive treatment.
**COLON CANCER**

**Definition.** Colon cancer (colorectal cancer) combines different form, location and histological structure of malignant epithelial tumors of the caecum, colon and rectum and anal canal (Fig. 20,21).

![Colon Cancer](image1)

**Epidemiology.** The frequency of colorectal cancer has increased substantially in recent years. Annually 500-600 thousand new cases of colon cancer are registered in the world. Colorectal cancer is most common in the United States, Canada, Western Europe and Russia; less common in Asia and very rare in Africa.

Incidence per 100000 population in Russia is 33 patients, and in Armenia-17 patients. The incidence of colon cancer among men and women basically is the same. Rectal cancer is more common in men. Ratio of incidence between men and women is 1,6:1. Age of the majority of patients with colorectal cancer varies from 40 to 70 years.

**The etiology and pathogenesis.** For the occurrence of colon cancer, combination of several unfavorable factors is required; main of them are diet, environmental factors, chronic diseases of the colon and heredity. Colorectal cancer is more prevalent in areas where diet is dominated by meat and limited consumption of fiber. Meat meal causes an increase in the concentration of fatty acids, which during the process of digestion convert into carcinogenic agents. Less frequency of colon cancer in rural areas (villages) and in countries with traditional herbal diet (India, Central Africa) demonstrates the role of fiber in preventing of colon cancer. Theoretically, large amount of fiber increases the amount of faecal mass, dilutes and binds the possible cancer-causing agents, reduces the transit time of the contents of the intestine, thus limiting the contact time of the intestinal wall with carcinogens.
These judgments are close to chemical theory, which relates the cause of the tumor to number of mutagenic exogenous and endogenous chemical agents (carcinogens) in intestinal epithelial cells, among which the most active are the polycyclic aromatic hydrocarbons, aromatic amines and amides, nitro compounds, oflatoxin, as well as metabolites tryptophan and tyrosine. Carcinogenic substances (benzpyren) can be formed in irrational thermal processing of food products, smoked meat and fish.

In patients with chronic inflammatory diseases of large intestine, especially with ulcerative colitis, the frequency of colon cancer is significantly higher than in the general population. Crohn's disease of large intestine increases the risk of cancer, but the incidence is lower than at UC. Colorectal polyps significantly increase the risk of cancer.

Certain role in the pathogenesis of colon cancer has hereditary. First-degree relatives of the patient with colorectal cancer have high degree of risk of malignant tumors. Some hereditary diseases (such as familial diffuse polyposis syndrome, Gardner's syndrome, Turco’s syndrome) are accompanied by high risk of development of colon cancer.

Colon cancer has its own characteristics. Thus, the growth and spread of colorectal cancer is relatively slower than, for example, cancer of the stomach. Over a long period of tumor is located within the organ, not extending to depth of bowel wall more than 2-3 cm from the visible boundary. Slow tumor growth is often accompanied by local inflammatory process with transition to the neighboring organs and tissues. Within the inflammatory infiltrate continuously cancer centers invade to the adjacent organs, which contributes to the emergence of the so-called locally advanced tumors without distant metastases.

In turn, distant metastasing modifies its own features too. The most frequently lymph nodes are affected, although there is affection of other organs too, particularly the lungs.

The feature of colon cancer is quite often found multicentral growth and occurrence of multiple tumors in the colon and in other organs at the same time (synchronous) or sequentially (metachronous).

**Classification.** Currently the most widely is used classification by the type of growth of colon cancer: exophytic tumor - growing mainly in the intestine; endophytic - spreading mainly in the wall of the intestine; plate form cancer - combining elements of two previous forms as a tumor-ulcer.

In determining the histological structure of colon cancer one should follow the international classification.

Tumors of the colon

1. Adenocarcinoma (highly differentiated, moderately differentiated, poorly differentiated).
2. Mucous adenocarcinoma (mucoid, mucous, colloid carcinoma).
3. Signet ring cell (mucocellular) cancer.
4. Undifferentiated carcinoma.
5. Not classified cancer.

**Tumors of the rectum**

In addition to the mentioned options, there are also:
8. Basal cell (basalioid) cancer.

Among all malignant epithelial tumors the most common is adenocarcinoma, accounting for more than 80% of all cancers of large intestine. For prognosis of disease the degree of differentiation, depths of invasion, preciseness of boundaries of the tumor, the frequency of lymphatic metastasis are very important.

The most informative classification system is international system of TNM, allowing comprehensive evaluation of the stage of tumor development.

T - Primary tumor;
Tx  - insufficient data to assess the primary tumor;
To  - the primary tumor is not determined;
Tis - intraepithelial tumor or invasion of the mucous membrane;
T1 - tumor infiltrates up to submucosa;
T2 - tumor infiltrates the muscular layer of intestine;
T3 - tumor invades all layers of the intestinal wall;
T4 - tumor invades serous layer or directly spread to other organs and structures;
N - regional lymph nodes;
No  - no lesion of regional lymph nodes;
N1 - Metastasis in 1-3 lymph nodes;
N2 - Metastasis in 4 or more lymph nodes;
M  - distant metastases;
Mo  - no distant metastases;
M1  - remote metastases are present.

Determining the stage of disease should be based on preoperative examination, dates of intraoperative revision and postoperative study of the removed segment of the colon, including a special technique for investigation of the lymph nodes.
Clinical picture. The most characteristic symptoms of colon cancer are: intestinal bleeding, impaired stool, abdominal pain and tenesmus. Intestinal bleeding, bloody stools or the presence of occult blood is noted in practically all patients. Presence of red blood is typical for cancer of anal canal and rectum. Dark blood is more typical of the left half of the colon. In this case, blood mixed with feces and mucus is more reliable sign. In cancer of the right half of the colon more common is hidden bleeding, accompanied by anemia, pale skin and weakness.

Disturbance of the stool, usually in the form of difficulties in defecation, is characteristic of late forms of cancer of the left half of the colon and rectum. Sometimes cancer of the colon at once manifests with acute intestinal obstruction requiring urgent surgical intervention.

In rectal cancer patients often complain of feeling of incomplete emptying or false urging to stool. Abdominal symptoms are often absent, patients mainly complain of weakness, loss of appetite, weight loss. In the later stages of the disease hepatomegaly and ascites join to above mentioned symptoms.

Diagnosis. Currently, there is an opportunity to identify colon cancer in almost all cases. It is only necessary to follow two conditions:

- Observe the diagnostic algorithm
- You must take full advantage of diagnostic methods.

Algorithm for diagnosis of colon cancer:
- Analysis of complaints and medical history
- Clinical examination
- Digital rectal examination of the rectum
- Sigmoidoscopy
- Clinical analysis of blood
- A blood test for occult blood
- Colonoscopy
- Irrigoscopy (in questionable data of colonoscopy or their absence)
- Ultrasound examination of abdomen and pelvis
- Endorectal ultrasound
- Biopsy of the detected tumor.

Most tumors (70%) are localized in the distal colon (rectum and sigmoid), that is why the role of simple diagnostic techniques, such as manual rectal examination, sigmoidoscopy, should not be overstated. For example, to detect cancer of the lower ampullar part of rectum practically only manual rectal examination is enough. To use all the diagnostic abilities of applied techniques it is very important to properly prepare the colon and examination. Otherwise gross diagnostic errors are possible.
Ultrasound is an important method for diagnosis of tumorous process. With its help not only the presence of distant metastases is established, particularly in the liver, but also the extent of local tumor spread, as well as the presence or absence of perifocal inflammation is evaluated. It is advisable to use 4 types of ultrasound: transcutaneous, endorectal, endoscopic, intraoperative.

In complex cases of tumor invasion into the surrounding organs and tissues it is expedient to use computer tomography and MRI.

**Complications of colon cancer.** The most frequent complications are: disturbance of intestinal permeability, down to acute intestinal obstruction, intestinal hemorrhage, perifocal inflammation and perforation of intestine or in the zone of the tumor, or so-called diastatic perforation due to hyperextension of the intestinal wall during obstruction. In right-sided localization of tumor anemia often occurs due to long-term ongoing hidden bleeding.

All complications require appropriate treatment, sometimes urgent, and even emergency surgery (such as diffuse bleeding, acute intestinal obstruction and perforation) to save the lives of patients.

In patients with advanced forms of cancer listed complications can be combined, greatly increasing the risk of worsening the prognosis and surgical treatment. Prevention of complications mainly consists in timely early diagnosis of colon cancer.

**Treatment of colon cancer.** The main method of treatment of colon cancer is radical removal of the tumor and its zone of regional lymphatic metastasis. General principles of surgical treatment of colon cancer are: radicalism, ablasticity, asepticity and creation of unimpeded passage of intestinal contents by the natural way as far as possible. Success of surgical treatment, observance to its principles largely depends on proper preparation of the colon.

Ablasticity and asepticity of surgical treatment of colon cancer is achieved by observance of set of measures. The main ones are - the careful handling of the bowel and avoidance of contact with tumors, early ligation of the main feeding vessels, and mobilization of bowels with sharp instruments. Operation radicalism is achieved by adequate volume of resection of colon with tumor and removal of the corresponding zone of the regional lymphatic metastasis.

In some severe cases surgical treatment is symptomatic nature: the formation of colostomy because of symptoms of intestinal obstruction if the tumor can not be removed. By volume surgical interventions are divided into typical, associated, extended and combined.

**Surgical treatment of cancer of transverse colon.** In cancer of transverse colon resection volume ranges from the distal resection of the sigmoid colon to the subtotal resection of the transverse colon, depending on the location of the tumor. The most frequently resection of the
distal sigmoid colon, left-sided hemicolectomy, resection of the transverse colon, right hemicolectomy, subtotal resection of the colon are performed.

When lymph nodes are affected, expanded volumes of resection should be performed.

Resection of the transverse colon should complete with formation of the anastomosis with the restoration of the natural intestinal passage in presence of the following conditions: good preparation of bowels, good blood supply to anastomosed departments, and the absence of tension in the area of estimated intestinal anastomosis. For the formation of anastomosis double-row interrupted stitching by atraumatic needle is most widely used. It is also possible to use other options of anastomosis: stapled mechanical stitches, mechanical stitches from biodegradable material or a metal with shape memory, single hand-stitch, etc.

In complications of the tumor, for urgent or emergency operations on unprepared bowel preference should be given to multistage treatment. In the first stage one should not only solve these complications, but also to remove the tumor itself, in the second stage - to restore the natural intestinal passage. These methods include: surgical operation by Mikulich with formation of double-lumen colostomy; and Hartmann’s operation - formation of single-lumen colostomy and closure of distal segment of colon tightly. Restoration of natural intestinal passage is performed in 2-6 months after normalization of the status of the patients.

**Surgical treatment of rectal cancer.** When the location of the tumor is in the anal canal and lower ampullar part of the rectum, it is reasonable to perform abdominoperineal excision (extirpation) of the rectum with formation of colostomy. The essence of the operation is removal of the rectum together with sphincter apparatus. In this, pararectal cellular tissue is completely removed, levator anus muscle is intersected and cellular tissue of the small pelvis is removed. In the left iliac region retroperitoneal colostomy is formed.

When the location of the tumor is 7-10 cm from the edge of the anus, abdomino-anal resection can be done, which is performed by two teams of surgeons, abdominal and perineal (as well as in excision).

**Combined and complex treatment of colon cancer.** This treatment creates more favorable conditions for surgery and reduces the possibility of implantation of tumor cells: not only antiblasticity but also assepticity is increased as perifocal inflammation becomes significantly reduced. Long-term results of combined treatment of colon cancer indicate a significant effect of this treatment method, especially when the tumor in the right half of the colon. It is advisable to irradiate locally spread tumors.

In combined and complex treatment of rectal cancer the picture is somewhat different. In this localization chemoradiotherapy is used (telegammatherapy, 5-fluorouracil, fltorafur) which
can also cause an immediate effect as a reduction in tumor mass, and sometimes its visual disappearance.

**Prognosis.** The prognosis of colon cancer depends on the stage of cancer. In the initial stages of the disease 5-year survival rate after radical surgery can reach 90% of all cases.

**Cancer of the anal canal.**

**Definition.** Cancer of the anal canal are neoplasms arising in the region, the proximal boundary of which is the upper edge of the anorectal ring and the distal is junction with perianal skin covered with hairs. Neoplasms arising from the distal edge of the anus to the point of transition in the hairy skin of the buttocks are classified as tumors of the perianal skin.

**Pathological anatomy.** The presence of the stratified squamous and transitional epithelium, on the one hand, is a source of epidermoid tumors; on the other hand, the cylindrical epithelium of the rectum and glandular epithelium of the anal glands can be a source of adenogenic cancer. Finally, combination of features of glandular and epidermoid cancer, the so-called glandular-squamous cell carcinoma is possible too. An interesting fact is that mucoepidermoid cancer could metastasize, having the structure of both adenocarcinoma and squamous cell carcinoma.

**Types of anal canal cancer.** Squamous (epidermoid) carcinoma of anal canal and perianal skin is the most common form of malignant neoplasms of anal canal and perianal skin. It is more prevalent among people older than 50 years. Women are affected by squamous cancer of the anal canal more often.

**Clinical picture and diagnosis.** Even in the early stages of cancer, anal canal and perianal skin are not asymptomatic. Such complaints as pain, blood in the stool, foreign body sensation in the anus or around it, anal itching almost always accompany the disease. This is due to the localization of tumors in the anal canal, which has good innervations. Pain syndrome tends to increase, due to a further growth of the tumor. Invasion of the tumor in the sphincter leads to its destruction and the development of anal incontinence. Invasion of the posterior wall of vagina may lead to formation of rectovaginal fistula, and in men - invasion of prostate gland and urethra leads to dysuria.

Symptoms of cancer of the anal canal are nonspecific and are often regarded as manifestation of benign diseases of the anal canal. However, despite the availability of digital rectal examination (in cases of perianal cancer - skin is inspected too) in 30-70% of correct diagnosis is not established at the first visit to the doctor. This leads not only to delay of necessary treatment, but often the "treatment" which is contraindicated in cancer of the anal canal (warm baths, physiotherapy).
In all doubtful cases digital rectal examination and sigmoidoscopy must be done with biopsy of lesion. Inguinal regions should be carefully palpated and the presence of enlarged lymph nodes indicates needle biopsy (or puncture) followed by cytological examination.

The important investigations that should be carried out are: colonoscopy to exclude synchronous formations in the colon, ultrasound or CT of the liver and para-aortic lymph nodes and chest radiography to exclude distant metastases. One of the most informative and modern methods of investigation is transrectal ultrasonography. This method allows us to estimate the depth of invasion of primary tumor, to accurately determine the dimensions of tumor and to identify the presence of enlarged para-aortic lymph nodes.

**Treatment**. The development of radiology, the creation of modern megavolt beam tools, the opening of antitumor chemical preparations revolutionized the treatment of squamous cell carcinoma of the anal canal and perianal skin. The relatively high radiosensitivity of this form of cancer makes possible, on the one hand, to achieve sanitation of the anal canal using ionizing radiation, on the other hand, in most cases to preserve the obturator apparatus function of the rectum. The use of chemotherapy increased the anti cancer effect of radiation therapy, as well as the impact on metastasis of the tumor in regional lymph nodes. All this makes the radiation and chemotherapy an attractive alternative to abdominoperineal excision of the rectum with the formation of permanent colostomy.

As the methods of radiation therapy the following are used: teletherapy with anteroposterior fields, as well as perineal field. Recommended doses are 55-65 Gray in 4-6 weeks, the split rate.

As chemotherapy in combined treatment the following are applied: mitomycin C and 5-fluorouracil. Also platinum drugs (platidiam, cisplatin) and bleomycin are used.

**Prognosis**. In cases when radiotherapy can not support adequate sanitization of the anal canal or perianal skin, surgery is used. The indications for surgery are also recurrence of tumor after irradiation. Standard operation is abdominoperineal extirpation of the rectum. Local excision is possible only for small tumors. In cases when metastases in inguinal lymph nodes are identified, surgery should be supplemented with inguinal lymphadenectomy.