

Methodical recommendations for foreign students in

Acute appendicitis

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Acute appendicitis is an inflammation of vermiform appendix caused by festering microflora. Most frequent causes of acute appendicitis are festering microbes: intestinal stick, streptococcus, staphylococcus. Moreover, microflora can be in cavity of appendix or get there by hematogenic way, and for women – by lymphogenic one. Factors which promote the origin of appendicitis, are the following: a) change of reactivity of organism; b) constipation and atony of intestine; c) twisting or bends of appendix; d) excrement stone in its cavity; e) thrombosis of vessels of appendix and gangrene of wall as a substance of inflammatory process (special cases). Simple (superficial) and destructive (phlegmonous, gangrenous primary and gangrenous secondary) appendicitises which are morphological expressions of phases of acute inflammation that is completed by necrosis can be distinguished. In simple appendicitis the changes are observed, mainly, in the distant part of appendix. There are stasis in capillaries and venule, edema and hemorrhages. Focus of festering inflammation of mucus membrane with the defect of the epithelium covering is formed in 1–2 hours (primary affect of Ashoff). This characterizes acute superficial appendicitis. The phlegmon of appendix develops to the end of the day. The organ increases, its serous tunic becomes dimmed, sanguineous, stratifications of fibrin appear on its surface, and there is pus in cavity. In gangrenous appendicitis the appendix is thickened, its serous tunic is covered by dimmed fibrinogenous tape, differentiating of the layer structure through destruction is not succeeded.

1. Appendiceal colic.
2. Simple superficial appendicitis.
3. Destructive appendicitis:
 - a) phlegmonous;
 - b) gangrenous;
 - c) perforated.
4. Complicated appendicitis:
 - a) appendicular infiltrate;
 - b) appendicular abscess;
 - c) diffuse purulent peritonitis.

Symptoms and clinical course

Four phases are distinguished in clinical course of acute appendicitis: 1) epigastric; 2)

local symptoms; 3) calming down; 4) complications.

The disease begins with a sudden pain in the abdomen. It is localized in a right iliac area, has moderate intensity, permanent character and not irradiate. With 70 % of patients the pain arises in a epigastric area - it is an epigastric phase of acute appendicitis. In 2–4 hours it moves to the place of appendix existence (the Kocher's symptom). At coughing patients mark strengthening of pain in a right iliac area – it is a positive cough symptom.

Together with it, nausea and vomiting that have reflex character can disturb a patient. Often there is a delay of gases. The temperature of body of most patients rises, but high temperature can occur rarely and, mainly, it is a low grade fever. The general condition of patients gets worse only in case of growth of destructive changes in appendix.

During the examination It is possible to mark, that the right half of abdomen falls behind in the act of breathing, and a patient wants to lie down on a right side with bound leg.

Painfulness is the basic and decisive signs of acute appendicitis during the examination by palpation in a right iliac area, tension of muscle of abdominal wall, positive symptoms of peritoneum irritation. About 100 pain symptoms characteristic of acute appendicitis are known, however only some of them have the real practical value.

The Blumberg's symptom. After gradual pressing by fingers on a front abdominal wall from the place of pain quickly, but not acutely, the hand is taken away. Strengthening of pain is considered as a positive symptom in that place. Obligatory here is tension of muscles of front abdominal wall.

The Voskresensky's symptom. By a left hand the shirt of patient is drawn downward and fixed on pubis. By the taps of 2-4 fingers of right hand epigastric area is pressed and during exhalation of patient quickly and evenly the hand slides in the direction of right iliac area, without taking the hand away. Thus there is an acute strengthening of pain.

The Bartomier's symptom is the increase of pain intensity during the palpation in right iliac area of patient in position on the left side. At such pose an omentum and loops of thin intestine is displaced to the left, and an appendix becomes accessible for palpation.

The Sitkovsky's symptom. A patient, that lies on left, feels the pain which arises or increases in a right iliac area. The mechanism of intensification of pain is explained by displacement of blind gut to the left, by drawing of mesentery of the inflamed appendix.

The Rovsing's symptom. By a left hand a sigmoid bowel is pressed to the back wall of stomach. By a right hand by ballotting palpation a descending bowel is pressed. Appearance of pain in a right iliac area is considered as a sign characteristic of appendicitis.

The Obrazcov's symptom. With the position of patient on the back by index and middle fingers the right iliac area of most painful place is pressed and the patient is asked to heave up the straightened right leg. At appendicitis pain increases acutely.

The Rozdolsky's symptom. At percussion there is painfulness in a right iliac area.

The general analysis of blood does not carry specific information, which would specify the presence of acute appendicitis. However, much leukocytosis and change of formula to the left in most cases can point to the present inflammatory process.

Acute appendicitis in children. With children of infancy acute appendicitis can be seen infrequently, but, quite often carries atypical character. All this is conditioned, mainly, by the features of anatomy of appendix, insufficient of plastic properties of the peritoneum, short omentum and high reactivity of child's organism. The inflammatory process in the appendix of children quickly makes progress and during the first half of days from the beginning of disease there can appear its destruction, even perforation. The child, more frequent than an adult, suffers vomiting. Its general condition gets worse quickly, and already the positive symptoms of irritation of peritoneum can show up during the first hours of a disease. The temperature reaction is also expressed considerably acuter. In the blood test there is high leukocytosis. It is necessary to remember, that during the examination of calmless children it is expedient to use a chloral hydrate enema.

Clinical course of acute appendicitis at the atypical location (not in a right iliac area) will differ from a classic course.

Appendicitis at retrocecal and retroperitoneal location of appendix can be with 8–20 % patients. Thus an appendix can be placed both in a free abdominal cavity and retroperitoneal. An atypical clinic arises, as a rule, at the retroperitoneal location. The patients complain at pain in lumbus or above the wing of right ileum. There they mark painfulness during palpation. Sometimes the pain irradiates to the pelvis and in the right thigh. The positive symptom of Rozanov — painfulness during palpation in the right Pti triangle is characteristic. In transition of inflammatory process on an ureter and kidney in the urines analysis red corpuscles can be found.

Appendicitis {at the pelvic location} of appendix can be met in 11–30 % cases. In such patients the pain is localized above the right Poupart's ligament and above pubis. At the very low placing of appendix at the beginning of disease the reaction of muscles of front abdominal wall on an inflammatory process can be absent. With transition of inflammation on an urinary bladder or rectum either the dysuric signs or diarrhea develops, mucus appears in an excrement. Distribution of process on internal genital organs provokes signs characteristic of their inflammation.

Appendicitis at the medial placing of appendix. The appendix in patients with such pathology is located between the loops of intestine, that is the large field of suction and irritation of peritoneum. At these anatomic features mesentery is pulled in the inflammatory process, acute dynamic of the intestinal obstruction develops in such patients. The pain in the abdomen is intensive, widespread, the expressed tension of muscles of abdominal wall develops, that together with symptoms of the irritation of peritoneum specify the substantial threat of peritonitis development.

For the subhepatic location of appendix the pain is characteristic in right hypochondrium. During palpation painfulness and tension of muscles can be marked.

Left-side appendicitis appears infrequently and, as a rule, in case of the reverse placing of all organs, however it can occur at a mobile blind gut. In this situation all signs which characterize acute appendicitis will be exposed not on the right, as usually, but on the left.

Among complications of acute appendicitis most value have appendiceal infiltrates and abscesses.

Appendiceal infiltrate is the conglomerate of organs and tissue not densely accrete round the inflamed vermiform appendix. It develops, certainly, on 3–5th day from the beginning of disease. Acute pain in the stomach calms down thus, the general condition of a patient gets better. Dense, not mobile, painful, with unclear contours, formation is palpated in the right iliac area. There are different sizes of infiltrate, sometimes it occupies all right iliac area. The stomach round infiltrate during palpation is soft and unpainful.

At reverse development of infiltrate (when resorption comes) the general condition of a patient gets better, sleep and appetite recommence, activity grows, the temperature of body and indexes of blood is normalized. Pain in the right iliac area calms down, infiltrate diminishes in size. In this phase of infiltrate physiotherapeutic procedure is appointed, warmth on the iliac area.

In two months after resorption of infiltrate appendectomy is conducted.

At abscessing of infiltrate the condition of a patient gets worse, the symptoms of acute appendicitis become more expressed, the temperature of body, which in most cases gains hectic character, rises, the fever appears. Next to that, pain in the right iliac area increases. Painful formation is felt there. In the blood test high leukocytosis is present with the acutely expressed change of leukocyte formula to the left.

Local abscesses of abdominal cavity, mainly, develops as a result of the atypical placing of appendix or suppuration. More frequent from other there are pelvic abscesses. Thus a patient is disturbed by pain beneath the umbilicus, there are dysuric disorders, diarrhea and tenesmus. The temperature of body rises to 38,0–39,0°C, and rectal — to considerably higher numbers. In the blood test leukocytosis, change of formula of blood is fixed to the left.

During the rectal examination the weakened sphincter of anus is found. The front wall of rectum at first is only painful, and then its overhanging is observed as dense painful infiltrate.

A subdiaphragmatic abscess develops at the high placing of appendix. The pain in the lower parts of thorax and in a upper quarter of umbilicus often to the right, that increases at deep inhalation is except for the signs of intoxication, is characteristic of it. A patient, generally, occupies semisitting position. Swelling in an epigastric area is observed in heavy cases, smoothing and painful intercostal intervals. The umbilicus often during palpation is soft, although tension in the area of right hypochondrium is possible. Painfulness at pressure on bottom (9–11) ribs is the early and permanent symptom of subdiaphragmatic abscess (the Krukov's symptom).

Roentgenologically the right half of diaphragm can fall behind from left one while breathing, and there is a present reactive exudate in the right pleura cavity. A gas bubble is considered the roentgenologic sign of subdiaphragmatic abscess with the horizontal level of liquid, which is placed under the diaphragm.

Interloop abscesses are not frequent complications of acute appendicitis. As well as all abscesses of abdominal cavity, they pass the period of infiltrate and abscess formation with the recreation of the proper clinic.

The poured festering peritonitis develops as a result of the timely unoperated appendicitis. Diagnostics of this pathology does not cause difficulties.

Pylephlebitis is a complication of both appendicitis and after-operative period of appendectomy.

The reason of this pathology is acute retrocecal appendicitis. At its development the thrombophlebitis process from the veins of appendix, passes to the veins of bowels mesentery, and then on to the portal vein. Patients complain at the expressed general weakness, pain in right hypochondrium, high hectic temperature of body, fever and strong sweating. Patients are adynamic, with expressed subicteritiousness of the scleras. During palpation painfulness is observed in the right half of abdomen and the symptoms of irritation of peritoneum are not acutely expressed.

In case with rapid passing of disease the icterus appears, the liver is increased, kidney-hepatic insufficiency makes progress, and patients die in 7-10 days from the beginning of disease. At gradual subacute development of pathology the liver and spleen is increased in size, and after the septic state of organism ascites arises.

Acute appendicitis is differentiated with the diseases which are accompanied by pain in the abdomen.

Food toxicoinfection. Complaints for pain in the epigastric area of the intermittent character, nausea, vomiting and liquid emptying are the first signs of disease. The state of patients progressively gets worse from the beginning. Next to that, it is succeeded to expose that a patient used meal of poor quality. However, here patients do not have phase passing, which is characteristic of acute appendicitis, and clear localization of pain. Defining the symptoms of irritation of peritoneum is not succeeded, the peristalsis of intestine is, as a rule, increased.

Acute pancreatitis. In anamnesis in patients with this pathology there is a gallstone disease, violation of diet and use of alcohol. Their condition from the beginning of a disease is heavy. Pain is considerably more intensive, than during appendicitis, and is concentrated in the upper half of abdomen. Vomiting is frequent and does not bring to the recovery of patients.

Perforative peptic and duodenum ulcer. Diagnostic difficulties during this pathology arise up only on occasion. They can be in patients with the covered perforation, when

portion of gastric juice flows out in an abdominal cavity and stays too long in the right iliac area, or in case of atypical perforations. Taking it into account, it is needed to remember, that the pain in the perforative ulcer is considerably more intensive in epigastric, instead of in the right iliac area. On the survey roentgenogram of organs of abdominal cavity under the right cupula of diaphragms free gases can be found.

The apoplexy of ovary more frequent is with young women and, as a rule, on 10-14 day after menstruation. Pain appears suddenly and irradiate in the thigh and perineum. At the beginning of disease there can be a collapse. However, the general condition of patients suffers insignificantly. When not enough blood was passed in the abdominal cavity, all signs of pathology of abdominal cavity organs calm down after some time. Signs, which are characteristic of acute anemia, appear at considerable hemorrhage. Abdomen more frequent is soft and painful down, (positive Kulenkampff's symptom: acute pain during palpation of stomach and absent tension of muscles of the front abdominal wall).

During paracentesis of back fornix the blood which does not convolve is got.

Acute cholecystitis. The high placing of vermiform appendix in the right half of abdomen during its inflammation can cause the clinic somewhat similar to acute cholecystitis. But unlike appendicitis, in patients with cholecystitis the pain is more intensive, has cramp-like character, is localized in right hypochondrium and irradiate in the right shoulder and shoulder-blade. Also the epigastric phase is absent. The attack of pain can arise after the reception of spicy food and, is accompanied by nausea and frequent vomiting by bile. In anamnesis patients often have information about a gallstone disease. During examination intensive painfulness is observed in right hypochondrium, increased gall-bladder and positive symptoms Murphy's and Ortner's.

Right-side kidney colic. For this disease tormina at the level of kidney and in lumbus is inherent, hematuria and dysuric signs which can take place at the irritation of ureter by the inflamed appendix. Intensity of pain in kidney colic is one of the basic differences from acute appendicitis. Pain at first appears in lumbus and irradiate downward after passing of ureter in genital organs and front surface of the thigh. In diagnostics urogram survey is important, and if necessary — chromocystoscopy. Absence of function of right kidney to some extent allows to eliminate the diagnosis of acute appendicitis.

As experience of surgeons of the whole world testifies, in acute appendicitis timely operation is the unique effective method of treatment.

Access for appendectomy must provide implementation of operation. {McBurney's incision} is typical.

When during operation the appendix without the special difficulties can be shown out {in a wound}, antegrade appendectomy is executed. On clamps its mesentery is cut off and ligated. Near the basis the appendix is {ligated and cut}. Stump is processed by solution of antiseptic and peritonized by a purse-string suture .

If only the basis of appendix is taken in a wound, and an apex is fixed in an abdominal cavity, more rationally retrograde appendectomy is performed. Thus the

appendix near basis is cut between two ligatures. Stump is processed by antiseptic and peritonized. According to it the appendix is removed in the direction from basis to the apex.

According to indication operation is concluded by draining of abdominal cavity (destructive appendicitis, exudate in an abdominal cavity, capillary hemorrhage from the bed). In recent years the laparoscopy methods of appendectomy are successfully performed.

In patients with appendiceal infiltrate it is necessary to perform conservative-temporizing tactic. Taking it into account, bed rest is appointed, protective diet, cold on the area of infiltrate, antibiotic therapy. According to resorption of infiltrate, in two months, planned appendectomy is executed.

Treatment of appendiceal abscess must be only operative. Opening and drainage of abscess, from {retroperitoneal access}, is performed. To delete here the appendix is not necessary, and because of danger of bleeding, peritonitis and intestinal fistula — even dangerously