MINISTRY OF HEALTH OF UKRAINE
"Ukrainian Medical Stomatological Academy"

«Approved»
on meeting the
department of Pediatric Surgery
Protocol № 1 of 28.08.2020

The Head of the department
O.V. Pelypenko

METHODICAL INSTRUCTIONS

FOR STUDENTS` SELF-WORK

WHILE PREPARING FOR PRACTICAL LESSONS

Educational discipline	Pediatric Surgery
module №3	Urgent Pediatric Surgery
Theme of the lesson	Inflammatory diseases of abdominal cavity organs: acute appendicitis in children, necrotizing enterocolitis.
Course	V
Faculty	foreign students preparation

POLTAVA 2020

1. The topic basis: the topic "The Inflammatory diseases of abdominal cavity organs" is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt.

2. The aims of the training course:

1.To master the basic list of surgical diseases at children caused by the inflammatory diseases of abdominal cavity organs.

2.To recognize basic clinical manifestation and local symptoms of inflammation of abdominal cavity organs.

3. To differentiate symptoms of inflammatory diseases of abdominal cavity organs, which need surgical intervention.

4. To interpret the auxiliary methods of research (CT, USD, X-ray, thermometric, rectal examination), laboratory and biochemical analyses, diagnostic laparoscopy.

3. Basic knowledge, skills, habits necessary for studying the subject (interdisciplinary integration).

Names of previous disciplines	Obtained skills
1. Anatomy, topographic anatomy.	Conducting palpation of different parts of the intestine, knowledge of the features of the anatomy of the abdominal cavity in different age periods.
2. Pathological physiology.	Clinical interpretation of laboratory studies.
3. Pathological anatomy.	Compare the morphological changes inherent in different types of acute appendicitis, peritonitis.
4. Microbiology.	Own the technique of sampling material for research. Interpret the results of the microbiological study.
5. Propaedeutics of childhood diseases	Collect complaints, anamnesis of the disease, conduct an examination of the child and additional methods of examination for diseases of the abdominal cavity.
6. Topographic anatomy and surgical surgery.	Own the methodology (diagrams) of operational access and methods of surgical interventions on the organs of the abdominal cavity in children of different age groups.
7. General surgery.	Demonstrate the methods of preparing a patient for therapeutic and diagnostic interventions and surgical interventions.
8. Hospital surgery.	To conduct differential diagnostics and substantiate the methods of diagnosis, treatment of acute appendicitis and abdominal cavity diseases in children.

9. Clinical pharmacology.	Classify the drugs necessary for the treatment of acute surgical diseases, taking into account the pharmacokinetics and methods of action of drugs in children of different age groups.

Thereotical questions for the lesson:

1. Give the basic list of surgical diseases at children caused by the inflammatory diseases of abdominal cavity organs.
2. What are the basic clinical manifestations and local symptoms of inflammatory diseases of abdominal cavity organs?
3. What are the basic clinical manifestations and local symptoms of the inflammatory diseases of abdominal cavity organs in new-born ones?
4. Peculiarities of clinic of acute appendicitis at children of early age (under 3).
5. What clinical symptoms and auxiliary methods of diagnostics are characteristic of the destructive forms of cholecystitis?
6. Give general principles of treatment of cholecystitis and define indications for surgical methods of treatment.
7. What are the main reasons of origin of acute pancreatitis?
8. Formulate indications for conservative and operative treatment of acute pancreatitis

4. Maintenance of the subject:

APPENDICITIS

Appendicitis, rare in the first year of life, has been noted in early infancy. The incidence increases after the first year of life; most cases occur in the first three decades. Males are slightly more prone to appendicitis than females. The mortality of this disease has progressively declined; on the other hand, the percentage of children hospitalized with a ruptured appendix and localized or generalized peritonitis has not changed significantly. Further reduction in the morbidity from appendicitis can be accomplished only by earlier recognition and treatment of the disease, before the inflamed appendix ruptures.

ETIOLOGY. Obstruction is the primary factor in the pathogenesis of appendicitis. The obstruction may be secondary to inflammatory changes from blood-borne or enteric infections or may be mechanical, as by pinworms, a fecalith, other foreign body, stenosis or kinking. Soft fecal material is commonly found in the lumen of the appendix, but has doubtful pathologic significance. In some instances appendicitis appears to be related to an infection of the upper respiratory tract, but a significant correlation is not established. Such systemic infections as rheumatic fever, measles, scarlet fever and other exanthems are infrequently responsible for appendicitis.

Peritonitis or appendiceal abscess eventually occurs from perforation of the inflamed appendix. Coliform organisms predominate in cultures, but a mixed flora is usually responsible for the infection. Recent improvements in microbiologic techniques have identified anaerobic organisms as major contributors to appendiceal infections.

PATHOLOGY. Inflammation begins in the mucosa, which may ulcerate; the wall is edematous and infiltrated with neutrophils; the lumen is distended, often enough to impair the blood supply and produce gangrene and perforation. In milder types there may be mucosal ulceration without obstruction. Bacteria may escape through a perforation or the intact gangrenous wall to produce diffuse peritonitis or an abscess confined by adherence of adjacent omentum and intestines.

CLINICAL MANIFESTATIONS. Epigastric pain shifting to the right lower quadrant and accompanied or followed by nausea, vomiting and low-grade fever is the classic pattern of acute appendicitis. It is the one observed commonly in older children, but relatively infrequently in infants and young children. About 70 per cent of children 5 years of age or younger who have acute appendicitis have a perforation of the appendix and peritonitis when first seen medically.

The prodromal manifestations are usually not appreciated in the very young; perforation of the appendix takes place relatively quickly in the thin-walled appendix, and the omentum is not sufficiently developed to afford adequate protection against diffuse peritoneal spread.

Most children 4 years of age and under have difficulty in localizing pain; a finger pointed at the umbilicus or the mother's description of the positions of preference taken by the child, such as knees drawn up or reluctance to move the legs, is as much aid in localization as one may get. When perforation of the appendix has occurred in the very young child, he appears acutely ill with grunting respirations, a rigid abdomen, flaring of the alae nasi, an ashen color and an anxious expression. Extreme prostration may be preceded by an unaccustomed period of inactivity. Fever prior to rupture of the appendix may be absent or of low grade. After development of peritonitis the temperature is usually elevated to 39.5° C or more (103 to 105° F). Subnormal temperature in a prostrated child has serious implications. Active peristalsis may persist for some time with generalized peritonitis.

The initial symptom in the older child is pain, usually persistent rather than intermittent, which increases progressively in severity. With localized ileus, secondary to appendiceal inflammation, the pain may be intermittent or crampy. The amount of vomiting appears to be somewhat related to the position of the appendix; if the organ is retrocecal or deep in the pelvis, no vomiting may occur. Peritoneal irritation and pain may also be masked by the position of the appendix. Constipation is more common than diarrhea, though a pelvic appendix irritating the bowel in the cul-de-sac may produce mucus and diarrhea. Frequency of urination may be produced by an inflamed appendix adjacent to the bladder.

DIAGNOSIS. Persistent pain in the abdomen, insidious or abrupt in onset, accompanied by *persistent* localized tenderness in the right lower quadrant, involuntary muscular spasm and rigidity are evidence of localized intraperitoneal irritation. Nausea and vomiting are frequently present, and low-grade fever is more characteristic than chills and high fever at the onset of the disease. The distinction between voluntary and involuntary muscle spasm or guarding is important. When the frightened young child tenses his abdominal muscles at the sight of a white coat or the touch of a large, cold hand, the abdominal examination becomes unreliable. A gentle, unhurried approach gains the confidence of the child, and involves time well spent. In some cases, sedation with a short-acting barbiturate will allay apprehension and eliminate voluntary muscle guarding. Narcotic analgesics should not be given since they may mask signs of intraperitoneal inflammation.

Other signs of peritoneal irritation such as cough and rebound tenderness are helpful when elicited. An inflamed retrocecal appendix, however, may have deep tenderness as the only physical finding, and, when the appendix is in the pelvic area, there may be no abdominal findings. The rectal examination should be the final step in the physical examination, but must never be omitted, since it may provide valuable information.

Peristalsis is generally decreased or absent in the presence of intraperitoneal infection, but it may be hyperactive during the early stages. A positive psoas sign, or the tendency of the patient in bed to draw his legs up, is also suggestive of a right lower quadrant inflammatory lesion.

There is usually a mild leukocytosis of 14,000 to 16,000 cells per mm^3 with a preponderance of immature polymorphonuclear cells. Excessively high total leukocyte counts are suggestive of an abscess or peritonitis. Leukopenia associated with prostration and a shocklike state may indicate overwhelming sepsis.

Differential Diagnosis. A history of antecedent or concomitant respiratory or enteric disease, poorly localized pain, fever out of proportion to the abdominal findings or variations in the intensity of pain may suggest *mesenteric adenitis*, but an exact differential diagnosis can be made only by laparotomy.

Prolonged, severe *constipation* may also simulate an acute surgical condition of the abdomen. When feces are easily palpated, and one has reason to suspect fecal obstruction of the bowel, a saline enema of moderate amount may be given. In contrast to the valid objections to catharsis under such a situation, an enema judiciously given may be valuable diagnostically.

Infection of the urinary tract may mimic appendicitis. Urinalysis is indispensable in evaluation of abdominal pain. The urinalysis may be within normal limits, however, in the presence of completely obstructed hydronephrosis. On occasion an intravenous pyelogram may be required for differential diagnosis.

Pneumonia, especially of the right lower lobe, may simulate appendicitis. Abdominal tenderness and muscular tightness are apt to be somewhat higher with the pulmonary infection than with appendicitis. A roentgenogram of the chest will usually clarify the diagnostic situation.

The abdominal pain of *acute gastroenteritis* may on occasion suggest the possibility of appendicitis. Persistent *diarrhea* is rare as a symptom of appendicitis, though several loose stools may herald the onset of disease. If diarrhea persists after an acute abdominal episode, the possibility of a *pelvic abscess* should be considered. The differential diagnosis depends mainly on the physical findings. The two conditions may occur concomitantly.

Meckel's diverticulitis may simulate appendicitis. Blood, with or without mucus, in the stool favors diverticulitis. *Intussusception* must be considered, particularly in children under 5 years of age. Intermittent sharp pain, the presence of an abdominal mass and blood by rectum are the differential features. A barium enema, which is con-traindicated in appendicitis, may be useful in confirming and localizing the intussusception.

Ovarian lesions, such as cysts, ruptured follicles or a twisted pedicle, must be considered in girls, especially in the older ones.

Acute rheumatic fever, diabetes mellitus, regional enteritis, abdominal epilepsy, sickle cell crisis, infectious mononucleosis and nonicteric infectious hepatitis must also be considered diagnostic possibilities; these are described in their respective sections.

When one is confronted with evident peritonitis, the possibility of a primary infection as well as one secondary to a ruptured appendix must be considered. The former lesion is now encountered so infrequently, however, even in patients with nephrosis, and the consequences of continued drainage from a ruptured appendix are so serious that the differential diagnosis should be established by laparotomy.

COMPLICATIONS. Whether localized abscess formation and diffuse secondary peritonitis (see below) are to be considered complications or part of the natural course of acute appendicitis may be debatable, but they are the only common sequels. Perforation occurs earlier and more frequently in children than in adults, and there is less tendency for the infection to become localized. This failure to localize has been attributed to the relatively small size of the omentum in young children. A pelvic abscess occasionally occurs, but subphrenic abscess is rare. Less common complications are paralytic ileus and thrombophlebitis.

Postoperative complications of acute appendicitis include abscess of the operative wound, multiple intra-abdominal abscesses, intra-abdominal adhesions and intestinal obstruction.

PROGNOSIS. There is great danger in postponing operation for appendicitis, since local or diffuse peritonitis consistently follows perforation, and almost negligible risk attends operation before perforation. Even when perforation has occurred, the mortality rate may be less than 1 per cent. This low rate is probably due to several factors, including improvements in preoperative preparation, operative technique, anesthesia, parenteral fluid therapy and antibacterial therapy.

TREATMENT. Appendectomy, with adequate external drainage in cases of abscess formation, is the only appropriate treatment of acute appendicitis. High fever, dehydration, overwhelming sepsis and a shocklike state are reasons for delay until appropriate preoperative correction can be attained. Convulsions during anesthesia are common in children with high fever. Induced hypothermia, hydration and antibiotic therapy are indicated. The temperature should be below 39° C (102° F) and the pulse below 120 before anesthesia is initiated.

Reasonably early ambulation after removal of an unperforated appendix and dismissal from the hospital within a few days are usually possible.

Meckel's diverticulitis may simulate appendicitis. Blood, with or without mucus, in the stool, pain in abdomen favors diverticulitis. Its structure contains atipical cells (from pancreas,

stomach, gall bladder and others). And therefore it may be the different clinic manifestations in this case.

NECROTIZING ENTEROCOLITIS

Necrotizing enterocolitis is a serious idiopathic disease of the newborn which occurs primarily in premature infants. It is characterized by gastric retention, abdominal distention, vomiting of bile, and blood-streaked and occasionally diarrheal stools. Earlier reports of "functional ileus," perforation of the ileum and colon, and colitis in the newborn infant probably represented forms of this condition.

The ileum and the colon are the most common sites of involvement; the duodenum is the least common. The condition is a complication of exchange transfusion or severe infections such as pneumonia, meningitis or omphalitis. *Pathologically* the intestine is dilated, necrotic and friable, with superficial ulcerations and submucosal hemorrhage. Perforation is common. Pneumatosis (intramural gas) of the intestinal wall may be present and often is a premonitory sign of perforation. The *roentgenographs findings* are (1) multiple dilated loops of small intestine with air-fluid levels in the erect position and separation of loops suggesting mural edema or peritoneal fluid, (2) intramural gas, (3) free air in the peritoneum, and (4) gas in the portal vein. Therapy is mainly supportive; intravenous alimentation and hydration are usually necessary. Gastric suction, blood transfusions and antibiotic therapy are always indicated. Surgical treatment is required for intestinal perforation.

5. Additional materials for the self-control

A. Clinical cases

Case 1. A 5 year-old boy was woken up from abdominal pain at night; there was vomiting by food. By the morning the boy was pale, refused to eat, complained about pain in the right part of abdomen. There was no emptying for 2 days.

What diagnosis have you made?

What tactics have you developed?

Case 2. A 9 year-old boy entered the admitting office of the hospital complaining about permanent pains in the right part of abdomen. The pains appeared 12 hours ago, accompanied by frequent urination, vomiting. State of the child is of moderate severity, the child is uneasy, the skin is pale. The body temperature is 37,2°C, the pulse is 98 beats per minute. The tongue is moist; the abdomen is symmetrically distended, there is sharp pain in the right part of abdomen during palpation. Shchotkin-Blumberg symptom is positive.

Your previous diagnosis and tactics?

Case 3. The mother with a 14-month child applied to the admitting office of the hospital. The boy is uneasy, capricious, and during the change of the position of the body to the other side, he starts screaming louder. The body temperature is 38,3°C. The pulse is 112 beats per minute. There was vomiting three times. The boy hasn't slept for 6 hours, he is moaning.

What diagnosis have you made?

What tactics have you developed?

B. Tests

4. LITERATURE FOR STUDENTS

1. Coran AG: Vascular Access and Infusion Therapy. Seminars in Pediatric Surgery 1(3): 173-241, 1992
2. Welch KJ, Randolph JG, Ravitch MM, O'Neill JA, Rowe MI. Pediatric Surgery. 4th edition. Chicago. Year Book Medical Publishers. 1986
3. Ashcraft KW, Holder TM. Pediatric Surgery. 2nd edition. Philadelphia. W.B. Saunders Co. 1993

4. Grosfeld JL. Common Problems in Pediatric Surgery. 1st edition. St Louis. Mosby Year Book. 1991
5. Seeds JW, Azizkhan RG. Congenital Malformations: Antenatal Diagnosis, Perinatal Management and Counseling. 1st edition. Maryland. Aspen Publishers, Inc. 1990
6. Kenneth S. Azarow, Robert A. Cusick. Pediatric Surgery. 2012
7. Lewis Spitz, Arnold G. Coran - Operative Pediatric Surgery, 7th Edition, 2013
8. Peter Mattei-Fundamentals of Pediatric Surgery, 2011

http://studmedic.narod.ru/
http://www.med-edu.ru/
http://www.med.siteedit.ru/
http://medvuz.info/
http://www.pharm-med.ru/page.php?view=31
http://ambarsum.chat.ru/
http://www.ty-doctor.ru/
http://studentmedic.ru/
http://6years.net/
http://vk.com/student_unite
http://nmu-s.net/
http://www.amnu.gov.ua/
http://medsoft.ucoz.ua/

http://www.medvedi.ru/
http://www.rmj.ru/
http://www.medwind.ru/
http://www.allmedbook.ru/
http://www.arhivknig.com/
http://www.formedik.narod.ru/
http://www.medobook.ru/
http://www.freebookspot.in/
http://www.booksmed.com/
http://www.medprizvanic.org/
http://www.medkniga.ukoz.net/
http://www.mednik.com.ua/
http://www.libriz.net/