

**APPROVED**

The First Pro-Rector for Scientific and Pedagogical Affairs  
Danylo Halytsky Lviv National Medical University

\_\_\_\_\_  
Assoc. Prof. Iryna SOLONYNKO

**APPROVED**

by the joint meeting of the Academic Councils of the Medical Faculties No. 1 and No. 2 and the Faculty of Foreign Students of Danylo Halytskyi Lviv National Medical University, Protocol No. 1/03-2024 of 13.03.2024.

Dean of Medical Faculty No 1 \_\_\_\_\_ Prof. Marta KOLISHETSKA  
Dean of Medical Faculty No 2 \_\_\_\_\_ Assoc. Prof. Oleh KAPUSTYNSKYI  
Dean of Foreign Students \_\_\_\_\_ Assoc. Prof. Eugene VARYVODA

**APPROVED**

At the meeting of the specialized methodical committee on pediatric disciplines Protocol No. 2 of "15" February 2024

The Chairman of the specialized  
methodical commission \_\_\_\_\_ Prof. Lesya BESH

**ALGORITHMS**

**of the examination station OSP(C)E**

**Clinical case scenario in pediatric medicine**

**Specialty 222 «Medicine»**

**discipline "Pediatric diseases with pediatric infectious diseases"**

### Clinical task

A 5-year-old child complains of a dry cough, body temperature elevation up to 38.5°C, and general weakness.

From the history, it is known that the child has been ill for 5 days. The illness started acutely with a fever, dry cough, and nasal congestion. Home remedies did not provide relief. The cough worsened, and the child's condition deteriorated. They sought medical help at the hospital.

On examination: the child's general condition is of moderate severity. Appetite is absent. The cough is frequent, and dry, with a respiratory rate of 38/min. The skin is pale, with cyanosis of the nasolabial triangle. Percussion reveals decreased lung sounds on the right in the lower lobes. During auscultation over the lungs, there is harsh breathing, and decreased breath sounds on the right in the lower lobes, with occasional fine crackles. Heart sounds are clear, rhythmic, and somewhat muffled. The abdomen is soft, non-tender on palpation. Bowel movements are once daily, normal. Urination is normal.

Laboratory findings: Complete blood count: hemoglobin - 122 g/L, RBC - 3.6 T/L, leukocytes - 11.2 G/L, neutrophils - 10%, lymphocytes - 65%, monocytes - 20%, eosinophils - 5%, ESR - 28 mm/h.

Chest X-ray: increased transparency of lung fields, focal shadow with indistinct borders in the lower lobe of the right lung.



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### Clinical task

A 4-year-old girl presents with complaints of a body temperature rise to 39.4°C, headache, muscle pain, diffuse abdominal pain, vomiting, pronounced intoxication syndrome, loss of appetite, general weakness, and constant drowsiness.

From the history, it is known that the child has been ill for 5 days. The illness started suddenly with a body temperature rise to 38°C, nasal congestion, and loss of appetite. The child received nasal drops and paracetamol. The child's condition gradually worsened, with abdominal pain, vomiting twice, headaches, and restlessness. She was transported by ambulance to the municipal children's hospital.

On examination, the child's condition is severe, crying upon examination. Respiratory rate - 45 breaths/min. Heart rate - 142 beats/min. There is a rash in the form of reddish papules, mainly on the face, trunk, and limbs, hyperemia of the lips and tongue, injection of scleral vessels in both eyes and swelling of the wrists and ankles. Heart sounds are muffled, with a systolic murmur heard at the apex of the heart. Auscultation of the lungs reveals symmetrical moist fine crackles in the basal lung fields. Abdominal palpation reveals significant tenderness throughout the abdomen. The child has not urinated since yesterday.

A surgeon examined the child - no evidence of surgical pathology was found.

Complete blood count: Hb - 102 g/L, Le - 31 G/L, Er - 3.0 T/L, Tr - 105 \*10<sup>9</sup>/L, eos - 1%, bas - 0%, neu - 9%, seg - 71%, lym - 11%, mon - 8%, ESR - 62 mm/h.

ECG: sinus tachycardia, deviation of the heart's electrical axis to the left, signs of left ventricular hypertrophy.

PCR test for SARS-CoV-2 from material taken from the nose and throat of the mother - positive.



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### Clinical task

A 5.5-year-old patient was admitted to the hospital with complaints of dyspnea, paroxysmal cough, wheezing, and chest tightness.

Medical history: The child's symptoms worsened 4 days ago, with a body temperature rise to 38.2°C, malaise, and persistent dry cough, leading to hospitalization.

The child was born at term, with normal pregnancy and delivery. Birth weight was 3450 g, length 52 cm. The child was formula-fed from 4 months of age. At 6 months, signs of atopic dermatitis appeared. From the age of 2, the child frequently suffered from acute respiratory viral infections (ARVI) with fever and persistent cough. Physical examination revealed auscultatory findings of dry and moist crackles in the lungs. Pneumonia was not confirmed on repeated X-rays. At 3.5 years old, the child experienced the first episode of nocturnal dyspnea (on the 4th day of ARVI), which was relieved by salbutamol inhalation. Subsequent attacks occurred approximately every 2 months, typically in the evening or at night, and were relieved by salbutamol inhalation. The home environment includes many carpets, soft toys, and infrequent wet cleaning.

Family history: Allergic rhinitis in the mother, bronchial asthma in the father and paternal grandfather.

Examination: The patient's condition is of moderate severity, afebrile, with a dry cough. Skin is somewhat dry and pale, with signs of excoriations and lichenification in the knee folds. Mucous membranes are calm, and somewhat loose. Wheezing respiration, prolonged expiration, dyspnea, and retractions of the chest wall are present. The respiratory rate is 36 per minute. The chest is expanded, with hyperresonant percussion note over the lungs, and auscultatory findings of dry wheezing in both lung fields. Heart sounds are muffled, heart rate is 100 bpm. The abdomen is soft, non-tender. The liver and spleen are not palpable. Adequate diuresis and well-formed stools are observed.

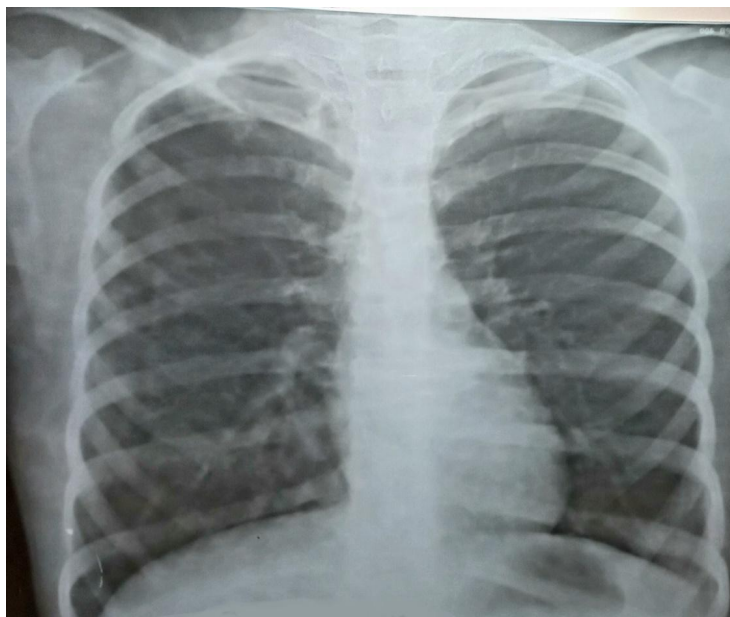
Investigations:

Blood analysis: Hb 130 g/L, Er.  $4.5 \times 10^{12}/L$ , Leuk.  $5.8 \times 10^9/L$ , neutrophils 50%, lymphocytes 27%, eosinophils 11%, monocytes 8%, ESR 9 mm/hour.

Pulse oximetry - 94%.

Chest X-ray: Increased lung transparency.

Strengthening of the bronchovascular pattern in the basal zones, no focal shadows. Enlargement of the shadow and blurring of the contours of the roots. Flattening and low position of the diaphragmatic domes. Horizontal rib arrangement. Widening of intercostal spaces.



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### Clinical task

A 7-year-old boy presented to the pediatric cardiology department with complaints of increased fatigue, dizziness, dyspnea with mild physical exertion, sweating, palpitations, and intermittent epigastric and periumbilical pain, as well as swelling in the lower extremities.

Upon objective examination: pale skin, moderate acrocyanosis. Auscultation reveals moist rales in the basal lung fields. Palpation shows diffuse cardiac impulse. Percussion reveals relative cardiac dullness with the right border 1.0 cm to the right of the right sternal line and the left border 1.5 cm to the left of the left midclavicular line, with the upper border at the upper edge of the third rib. Auscultation reveals tachycardia, irregular heart sounds, weakened first heart sound, accentuated second heart sound over the pulmonary artery, systolic murmur at the apex, and a non-intense systolic murmur near the base of the chest. Pulse is irregular, with pulse deficit. Blood pressure is 100/60 mmHg. Abdomen is soft, palpable in all quadrants, tender in the epigastric and periumbilical regions. Liver is palpable 2 cm below the costal margin.

Medical history: According to the mother, the child has experienced episodes of chest pain, temperature rise to subfebrile levels, palpitations, rapid fatigue, and dyspnea, which tended to progress. The onset of these symptoms is associated with a viral infection several weeks prior, characterized by a temperature rise to subfebrile levels, flushing of the face, and rash on the child's palms and soles after swimming in a pool.

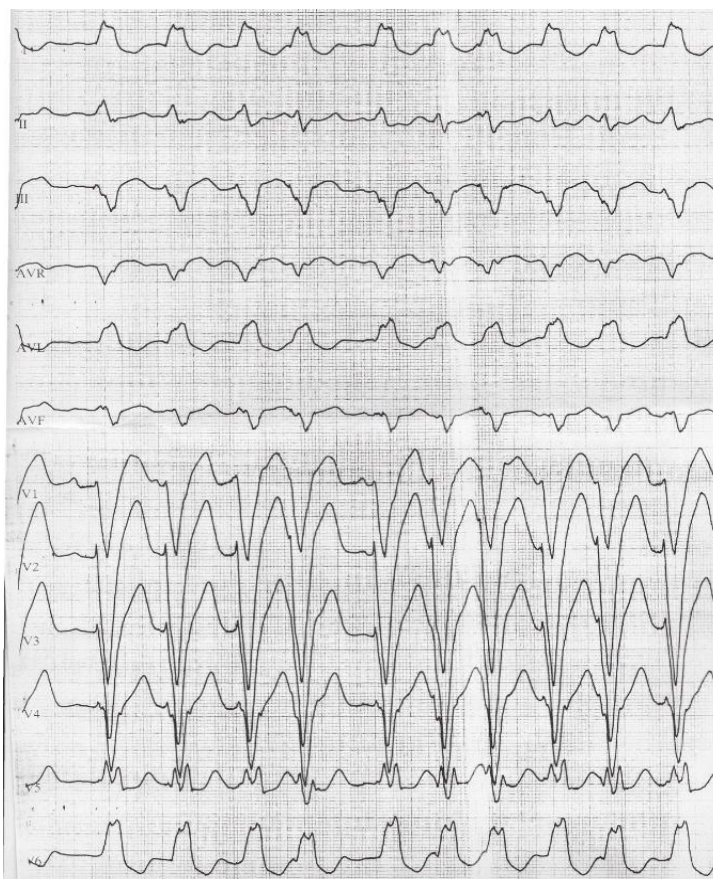
Laboratory findings:

Hemoglobin: 118 g/L, Erythrocytes:  $4.2 \times 10^{12}/L$ , Leukocytes:  $8 \times 10^9/L$ , Neutrophils: 0%, Bands: 4%, Segmented: 35%, Eosinophils 1%, Lymphocytes: 59%, Monocytes: 1%, ESR 20 mm/hour.

Biochemical blood analysis: Total protein: 65 g/L, AST: 48 U/L, LDH: 0.800 U/L (LDH-1 / LDH-2=2), CK-MB: 9.0 ng/mL, troponin I: 25 pg/mL, troponin T: 0.08 ng/mL, procalcitonin: 0.3 ng/mL, creatinine: 55  $\mu\text{mol}/L$ , urea: 6.7 mmol/L, CRP: 9 mg/L, ASO: 124 U/ml.

Echocardiogram: Dilation of heart chambers, predominantly ventricles, with left ventricular end-diastolic dimension (LVED)  $>6.5-7.0$  cm, end-diastolic volume (EDV)  $>158$  cm<sup>3</sup>/m<sup>2</sup>, end-systolic volume (ESV)  $>112$  cm<sup>3</sup>/m<sup>2</sup>, ejection fraction (EF) - 45%, signs of diffuse hypokinesia, valve apparatus - unchanged.

ECG:



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### Clinical task

Boy B, 4 years old, was admitted to the pediatric cardiology department with complaints reported by his parents of lethargy and rapid fatigue during walks and play, decreased appetite, pale skin, periodic chest pains, dyspnea, and perioral cyanosis with minor physical exertion, short episodes of temperature elevation to subfebrile levels, periodic epigastric and periumbilical pain that quickly resolves, and swelling in the lower extremities. Skin appears pale, periodically exhibiting perioral cyanosis. White spot symptom - 4c. Upon auscultation over the lungs, there are few symmetrical moist rales heard in the basal lung fields. Percussion reveals relative cardiac dullness: the right border is 1.5 cm to the right of the right sternal line, the left border is 2 cm to the left of the left midclavicular line, and the upper border is at the second intercostal space. Cardiac auscultation reveals weakened heart sounds, a triphasic rhythm, a systolic murmur radiating to the left axilla at the apex, and a non-intense systolic murmur near the base of the chest. Blood pressure is 108/66 mmHg. Abdomen is soft, palpable in all quadrants, tender in the epigastric and periumbilical regions. Liver is palpable 2 cm below the costal margin.

From the medical history, it is known that a month ago, the child exhibited signs of a respiratory infection (temperature elevation to subfebrile and febrile levels for 3 days, catarrhal symptoms). The child received saline nasal solutions, antipyretics, and topical anti-inflammatory therapy. The child's condition improved after 4 days, but a week later, the above-mentioned clinical manifestations appeared and began to progress, leading to hospitalization.

Laboratory findings:

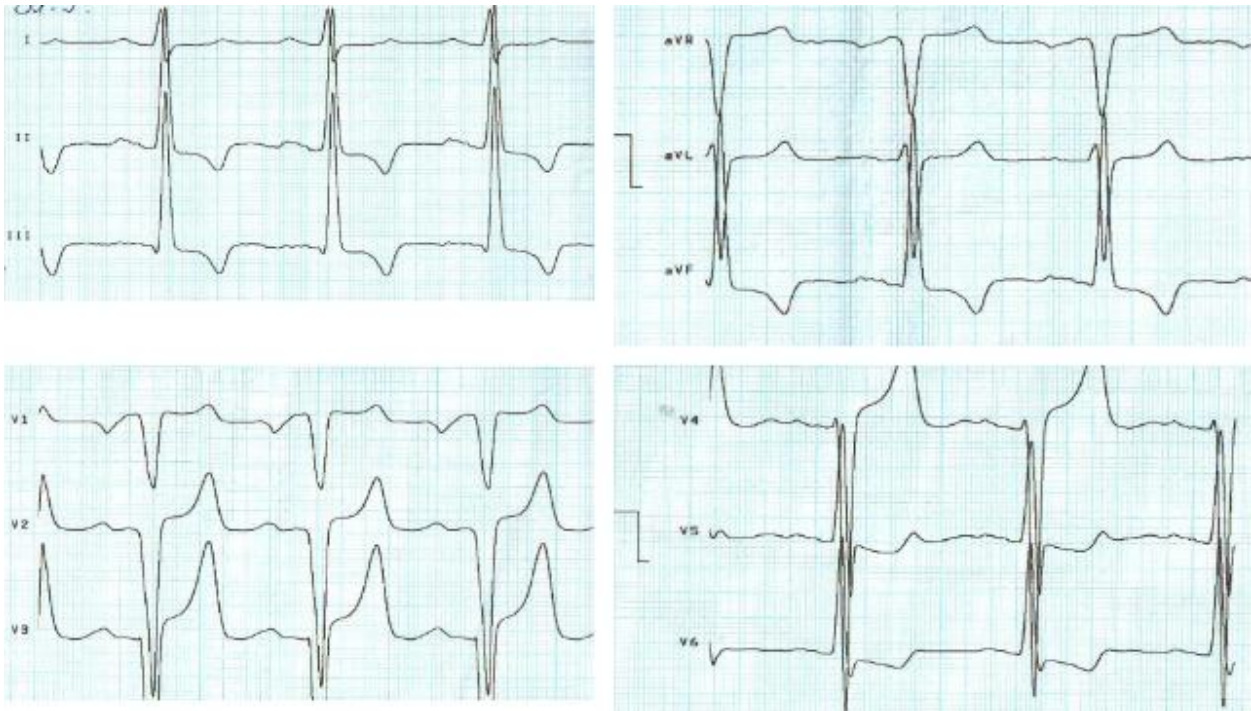
Hemoglobin: 116 g/L, Erythrocytes:  $4.0 \times 10^{12}/L$ , Leukocytes:  $7 \times 10^9/L$ , Neutrophils: 0%, Bands: 2%, Segmented: 33%, Eosinophils: 1%, Lymphocytes: 63%, Monocytes: 1%, ESR: 20 mm/hour.

Urinalysis: Specific gravity - 1015, Protein - absent, Leukocytes - 1-2 per field, Erythrocytes - absent.

Biochemical blood analysis: Total protein - 65 g/L, AST - 45 U/L, LDH - 0.720 U/L (LDH-1 / LDH-2=2), CK-MB - 8.5 ng/mL, troponin I - 22 pg/mL, troponin T - 0.06 ng/mL, procalcitonin - 0.3 ng/mL, creatinine - 50  $\mu\text{mol}/L$ , urea - 6.5 mmol/L, CRP - 9 mg/L, ASO - 130 U/ml.

Echocardiogram (Echo): Enlargement of the heart ventricles (predominantly left), diffuse hypokinesia of their walls, ejection fraction (EF) - 45%.

EKG



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### Clinical task

The family doctor was approached by a mother with her 10-year-old daughter complaining of a fever up to 37.5-38°C, weakness, rapid fatigue, shortness of breath with physical exertion, periodic joint pain (knees, shoulders, and elbows), and the appearance of rashes on the trunk. These symptoms have been bothering her for the past 3 weeks.

Two weeks before the onset of symptoms, according to the mother, the girl had a fever of 39-40°C and a sore throat for several days. They did not consult a doctor and self-treated using "Tantum Verde" spray and Nurofen syrup.



On examination: the condition is of moderate severity. Diffuse pale-pink erythematous rashes with diameters ranging from a few millimeters to 5-10 cm were found on the anterior surface of the chest, with a thin ring-like contour that blanches on pressure and does not raise above the skin level.

The right knee joint is swollen, warm to the touch, movable, painful; the elbow joints are painful but visually unchanged. Auscultation reveals vesicular breathing in the lungs. Cardiac tones are rhythmic, with a systolic murmur heard at the apex, radiating to the left axillary area. Heart rate - 90 beats/min. The



abdomen is soft, non-tender, and the liver is not palpable below the costal margin.

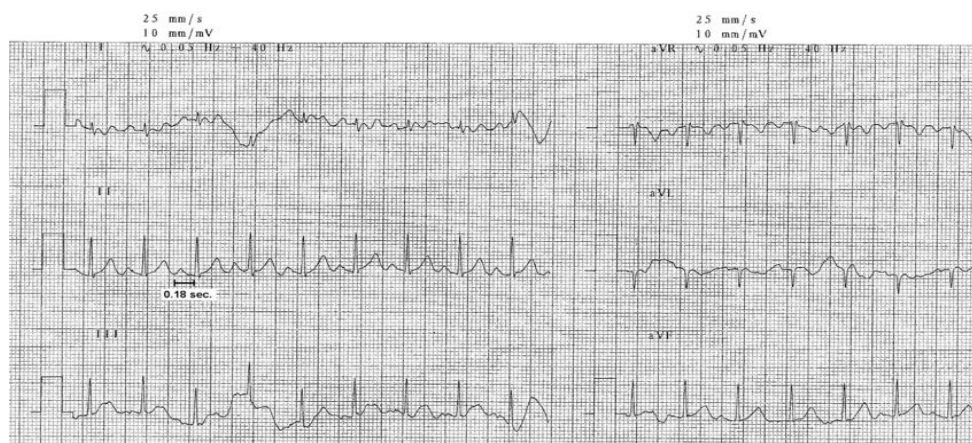
Additional examinations performed on the child:

Complete blood count: Hb - 124 g/L, Er -  $4.2 \times 10^{12}/L$ , Le -  $10 \times 10^9/L$ , Ne - 2%, Lym - 46%, Eo - 2%, Mo - 48%, Mon - 2%, ESR - 35 mm/hour.

Urinalysis: specific gravity - 1018, protein - absent, leukocytes - 2-3 per field of view, erythrocytes - absent.

Biochemical blood analysis: total protein - 70 g/L, glucose - 4.2 mmol/L, CRP - 52 mg/L, ASL-O titer - 620 MO/ml.

ECG:



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### Clinical task

The 4-year-old girl presents for the second time in a month to the pediatrician with complaints of fever (38.2-39.4°C) and swelling of the left knee. The mother notes that the child has been having frequent and prolonged fevers for the past 6 months. Sometimes the girl limps in the morning, but it disappears after some time. The mother denies any trauma. There is no family history of similar symptoms.

Additionally, the mother noticed that the child had lost about 3 kg in the past few weeks.

On examination – body temperature – 38.7°C. The skin – pale. Macular rash – mainly on the limbs and trunk. Non-painful mobile supraclavicular, axillary, and epitrochlear lymph nodes. Heart rate – 138 bpm. Heart sounds are faint, tachycardia, soft systolic murmur at the apex of the heart. Lungs – vesicular breath sounds. Respiratory rate – 36 breaths per minute. On palpation, the liver is palpable 4 cm below the costal margin, spleen – 2 cm below the costal margin.

Swelling of the left knee joint with decreased range of motion.

Complete blood count: Hb – 94 g/L, Le –  $21 \times 10^9/L$ , Er –  $3.0 \times 10^{12}/L$ , Plt –  $520 \times 10^9/L$ , MCV – 68 fL, MCH – 21 pg, MCHC - 300 g/L; Eos – 1%, Baso – 0%, Band – 1%, Segs – 68%, Lymphs – 22%, Monos – 8%, ESR – 48 mm/hour. CRP – 55 mg/L.

X-ray of the left knee joint – osteoporosis with enlargement of the distal epiphysis of the femur.



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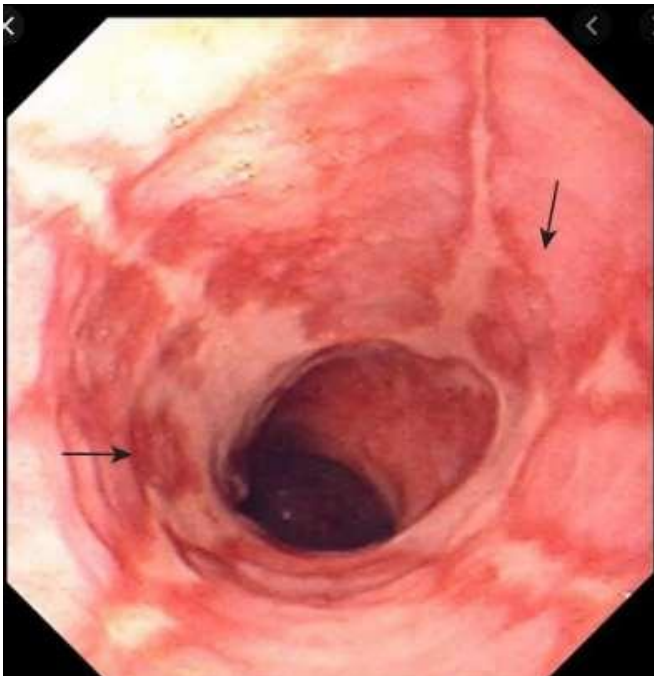
The 17-year-old girl, weighing 65 kg and measuring 175 cm, presented to the doctor complaining of abdominal pain and restless sleep for several weeks. The pain periodically occurs in the upper part of the abdomen, especially after eating or at night, accompanied by a feeling of hunger and heaviness in the stomach.

The pain (more often dull) is located around the umbilicus and in the epigastric region 0.5-1.5 hours after eating. Intermittently, she experiences intense heartburn, belching, nausea, and decreased appetite leading to food refusal.

Her parents note that the girl frequently complains of stomach pains and gastrointestinal disturbances, and the episodes have a recurrent course. They associate the complaints with dietary indiscretions (chips, crackers, spicy foods), as well as with a previous *Helicobacter pylori* infection detected 3 years ago when the child was hospitalized with a diagnosis of Chronic gastritis. After treatment, the child's condition improved, but abdominal pain recurred 6 months ago. The child's mother was diagnosed with peptic ulcer disease 2 years ago. Two days before admission, black stool was observed. The use of antacid medications did not lead to noticeable improvement in symptoms.

On physical examination – local tenderness on palpation in the epigastrium with radiation to the pyloroduodenal area, moderate tension of the abdominal wall in the epigastrium, emotionally labile child.

To confirm the diagnosis and exclude other gastrointestinal disorders, an esophagogastroduodenoscopy (EGD) was performed.



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### Clinical task

The 12-year-old boy presents with complaints of general weakness, subfebrile temperature, mild-intensity abdominal pain, predominantly in the lower abdomen, and loose stools. He has been unwell for two years, experiencing periodic abdominal pain accompanied by diarrhea and abdominal bloating with decreased appetite. Parents have observed slight traces of blood in the stool twice. The child has a history of recurrent episodes of aphthous stomatitis. Over the past 3 years, he has intermittently experienced anal itching, leading to three diagnostic scrapings for pinworms, all of which were negative. He has been treated twice for perianal fissure.

On examination, the child exhibits reduced appetite and moderate thirst. His temperature is 37.3°C. He has lost 5% of his body weight, and his height falls within the 1-2 centile range. The child appears lethargic but alert. His skin is dry, with a crack at the corner of the mouth, but there are no signs of dehydration. Oral mucosa is clean, with a tongue coated in whitish plaque. Peripheral lymph nodes are not enlarged. Pulmonary examination reveals vesicular breath sounds. Heart sounds are clear and rhythmic. Respiratory and heart rates are within normal limits.

Upon abdominal examination, there is slight distention, with mild tenderness on deep palpation along the ascending and transverse colon. There are no signs of peritoneal irritation. The child has 3-5 bowel movements per day, loose in consistency, with mucus but no visible blood.

Laboratory findings show a low hemoglobin level (Hb - 90 g/L), with leukocytes and erythrocytes within normal limits. Erythrocyte sedimentation rate (ESR) is elevated (36 mm/h). Biochemical analysis reveals a low serum protein level (42 g/L) and albumin (30 g/L). Potassium level is slightly low at 3.2 mmol/L. Vitamin B12 concentration is 180 pg/mL, and ferritin is 10.3 ng/mL. 25-hydroxyvitamin D (25-(OH)D) is 18 ng/mL.

Stool examination reveals significant mucus, leukocytes (8-10), occasional erythrocytes, abundant iodophilic flora, intracellular starch undigested fiber, and a fecal calprotectin concentration of 280 mg/kg.

Radiological examination of the colon using double-contrast technique shows segmental changes in the mucosal lining, including thickening of folds, altered arrangement, and the presence of the cobblestone sign, with reduced haustration.



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### Clinical task

The mother with her 4-year-old boy visited the outpatient nephrology clinic with complaints of recurrent fever and occasional abdominal pain in the child. Upon review of the outpatient medical records, it was noted that the child had experienced episodes of elevated body temperature to febrile levels over the past year without apparent catarrhal symptoms involving the upper respiratory tract and ENT organs.

During examination, the child's condition was of moderate severity. Body temperature was 37.3°C, heart rate was 110 beats per minute, and blood pressure was 100/60 mmHg. Skin and visible mucous membranes were clean, pink, and moist. Nasal breathing was unobstructed. Auscultation revealed vesicular breath sounds in the lungs. Heart sounds were clear and rhythmic. The abdomen was soft and non-tender upon palpation. The liver and spleen were not enlarged. Positive Pasternack's sign was noted on the right flank. Urination occurred 4-5 times a day with volumes of 150-200 ml each time, free-flowing, occasionally with discomfort. Stool was formed, with a tendency towards constipation (once every 1-3 days).

Laboratory findings: Red blood cells -  $3.4 \times 10^{12}$  / L, Hemoglobin - 120 g / L, Leukocytes -  $15.2 \times 10^9$  / L, eosinophils - 2%, segmented neutrophils - 66%, lymphocytes - 29%, monocytes - 3%, ESR - 30 mm / hour; Urinalysis: protein - 0.3 g / L, leukocytes - 170-180 per field of view, erythrocytes - 3-5 per field of view, alkaline reaction; according to the diagnostic test strip - bacteriuria ++.

Renal ultrasound: detected thickening of the walls of the renal pelvis, right-sided pyelectasis (9 mm when the bladder is full, 14 mm after micturition).

Micturition cystography:

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