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Clinical Features and Laboratory and Instrumental Changes of Chronic Akalkulous Cholecystitis in Children

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Abstract: Biliary tract diseases in children remain one of the most urgent problems of pediatrics as of 2026. In recent years, the incidence of biliary tract pathologies, in particular, cholelithiasis, has increased sharply among children and adolescents. Currently, this disease ranks third in prevalence among children after cardiovascular diseases and diabetes mellitus. Early diagnosis and prevention of biliary tract diseases in children is one of the priorities of the healthcare system in 2026, as these diseases, if left untreated, can lead to cirrhosis of the liver and other chronic complications.

Keywords: Biliary tract, dyskinesia, cholangitis, acalculous cholecystitis, biliary sludge, dysfunction, cholelithiasis, anomaly.

Introduction: Pathology of the gall bladder and biliary tract occupies one of the leading positions in gastroenterological diseases. Hepatobiliary pathology is diagnosed in the majority of school-aged children, and girls are sick 2-3 times more often than boys, accounting for 80% of diseases of the gastrointestinal system. Biliary tract diseases in children are much milder than in adults, and the main type of damage is biliary tract dysfunction.

Dyskinesias of the biliary tract are diseases of a functional nature in which the motility of the biliary tract is disturbed (development of biliary sphincter spasm and temporary disturbance of bile) and visceral sensitivity, that is, increased sensitivity of the walls of the biliary tract. Dyskinesia of the gallbladder and dyskinesia of the sphincter of Oddi are distinguished. Functional disorders of the biliary tract (dyskinesias) are currently considered a premorbid condition that can lead to the development of chronic biliary tract diseases - cholecystitis, cholecystocholangitis, cholelithiasis.

Inflammatory diseases of the gallbladder and bile ducts in childhood have non-infectious etiological factors in the composition of digestive tract diseases. Biliary dyskinesia is characterized by functional disorders of the gallbladder and bile ducts. Dyskinesias are divided into primary and secondary. The group of primary biliary dyskinesias includes conditions based on functional disorders of the bile ducts as a result of impaired regulatory function of the central nervous system.

Purpose of the study. To identify and analyze the clinical features and laboratory and instrumental changes of chronic acalculous cholecystitis in children.

METHOD

During the study; Chronic cholecystitis was diagnosed in 71 children treated at the city children's clinical hospital, and medical examination and observations were carried out. Children were divided into 2 groups: group 1 consisted of 39 (55%) chronic cholecystitis with cholecystitis and group 11 consisted of 32 (45%) chronic cholecystitis without cholecystitis.

RESULTS

Chronic cholecystitis was characterized by a long duration and monotonous, periodic course. The leading clinical signs are pain, dyspeptic and general intoxication syndrome.

Painful attacks occur after physical exertion, neuropsychiatric stressful situations, errors in nutrition (fatty, fried, very sweet foods, eggs, cold and carbonated drinks, etc.). During the period of relapse, it can be accompanied by an exacerbation of concomitant diseases (tonsillitis, pneumonia, etc.), and in some cases, it can be without any reason. Most often, the pain is observed under the right rib, rarely in the epigastric region, often radiating (radiating) to the right scapula, the clavicle, the shoulder joint and shoulder, less often under the left rib. The pain is dull in nature, lasting for many hours, days, and even weeks. Sometimes these pains are accompanied by acute, short-term paroxysmal pains. As a result of the studies, pain syndrome was characterized in children with biliary dyskinesia (with bile deposition) and biliary dyskinesia (without bile deposition). In this case, children with bile deposition (69.3%, p<0.05) had pain in the epigastric region, 51.3% (p<0.05) around the navel, 74.3% (p<0.005) in the right costal arch with pain radiating to the back and right shoulder 69.3% (p 0.05) and paroxysmal and constant evening pain in the right upper quadrant 30.5% (p<0.05). children with cholestasis had more clinical symptoms than children without cholestasis.

When examining abdominal pain syndrome in children, 14 (35.8%) complained of pain in the right rib cage, 15 (38.5%; R<0.05), 9 (23.08%; R<0.05), long-lasting (23.08%; R<0.05), 8 (23.1%, R<0.05) pains. In addition, squeezing, throbbing, stabbing pains were also studied. In our study, the time of onset of pain syndrome in children was analyzed. 18 (46.1%, R<0.005) on an empty stomach, 22 (56.4%, R<0.05) during a meal, 23 (58.3%, R<0.05) after a meal, after a fatty meal. 28 (71.3%, R<0.05), 19 (54.2%, R<0.05) evening pains, 15 (38.1% R<0.05) early pains were detected. The pain syndrome studied in children is defined by its characteristics. Pain syndrome indicators in the examined children

Dyspeptic symptoms are usually characterized by symptoms such as nausea, a feeling of heaviness under the right rib cage or in the epigastric region, especially after eating, belching, a feeling of bitterness in the mouth, and they are often associated with a violation of the diet. In some cases, vomiting occurs with bitter whey, which still does not bring a feeling of relief. During the period of relapse, appetite decreases, sometimes stool disorders are observed: constipation, diarrhea, their alternation, as well as flatulence, etc.

The symptoms of dyspeptic syndrome in the examined children were studied and analyzed. The highest dyspeptic symptoms were observed in children with gallstones compared to children without gallstones: belching (29 cases, 74.4%, P<0.005), constipation (27 cases, 69.2%, P<0.01), loss of appetite (28 cases, 71.7%, P<0.005), bitter taste in the mouth (22 cases, 56.4%, P<0.005), and heaviness in the right costal arch (15 cases, 38.4%, P<0.005). Gallbladder symptoms were determined by Orter, Murphy, Kerr, and Lepeine. Dyspeptic symptoms were observed more frequently in children with biliary dyskinesia than in the control group. The dyspeptic symptoms in the examined children are presented in Table 1.

Table 1.

Clinical characteristics of dyspeptic syndrome in children in groups of chronic cholecystitis (with cholestasis) and chronic cholecystitis (without cholestasis).

Symptom CC Swelling	**CC (without bilesediment) (n=32)**		**CC (withbilesediment) (n=39)**	
	n	**%**	**n**	**%**
-Bitter taste in the mouth	22	56.4	8	25
-Vomiting	11	28.2	2	6.25
Vomiting with food mass	5	12.8	1	3.23
Vomiting of bile	7	17.9	1	3.23
Vomiting that does not bring relief	5	12.8	1	3.23
Appetite disturbance	28	71.7	11	34.4

Nausea	20	51.3	9	28.1
Feeling of heaviness under the right rib cage	15	38.4	3	9.4
-Floating	14	35.8	11	34.4
-Gastrointestinal reflux	19	40	5	15.6
-Beructation	29	74.4	13	40.2*
-Constipation	27	69.2	13	40.2
-Restlessness	11	34.3	5	15.6
Gallbladder symptoms				
-Murphy-	6	15.3	1	3.2
-Kera -	5	12.8	2	6.25
-Lepene-	3	7.6	-	-
-Ortner-	1	-	-	-

Note: * — $p < 0.005$ — reliability compared to a group of healthy children

The development of dyspeptic phenomena is associated with impaired bile secretion and changes in the biochemical composition of bile. During the period of digestion (when food is not consumed), bile secretion can flow into the stomach, causing nausea and a bitter taste in the mouth, that is, heartburn. A decrease in the amount of bile acids in bile leads to a violation of the digestive system, especially affecting the hydrolysis and absorption of fats.

The clinical picture of chronic cholecystitis is similar to the symptoms of other diseases of the digestive system, therefore, when examining the patient, the presence of pain under the right rib, positive symptoms of Murphy, Ortner, Kerr, Hausman, Vasilenko, Mussi were taken into account.

Signs of chronic intoxication are also manifested: headache, increased fatigue, sleep disturbance, emotional lability, decreased cognitive performance, subfebrile fever. This symptomatology was observed in 57 (80%) children.

In atypical forms of chronic cholecystitis (14 children - 20%), the main symptoms of the disease - pain and dyspeptic syndromes - were poorly expressed or completely absent. In 10 children (14%), there was a pronounced emotional lability, paroxysmal headaches, insomnia, sometimes tremor of the hands and involuntary movements of the facial muscles. In 6 cases (6%), the leading clinical symptoms were persistent subfebrile fever and polyarthralgia or palpitations, pain and discomfort in the heart, shortness of breath and constant anxiety.

As a result of our studies, 20 (28%) children had rare and short-term relapses of clinical symptoms within 2-3 days, which were caused by errors in nutrition, and with the correction of nutrition, their condition improved and clinical symptoms disappeared.

According to the results of other observations, in 51 children (80%) there was a change in the periods of relapse and remission of chronic cholecystitis of moderate severity. Relapses lasted 2-3 weeks, pain and dyspeptic syndromes, positive signs of the gallbladder were detected. During the period of exacerbation or relapse of the disease, mainly associated with errors in nutrition, intoxication, pain and dyspeptic syndromes, and changes in blood biochemical parameters were observed.

In the peripheral blood analysis, inflammatory changes may be observed during the period of exacerbation of SAH: slight leukocytosis with a shift in the number of leukocytes to the left, an increase in ESR. In such cases, it is necessary to exclude other causes of inflammatory changes, especially a mild course or atypical form of the disease.

As a result of biochemical tests, dysproteinemia (increased levels of α-1, α-2, γ globulins), an increase in the thymol test, CRP (C-reactive protein), in some cases an increase in enzymes and signs of cholestasis were detected.

The biochemical parameters of the blood in the examined children are presented in Table 2.

Table 2. Biochemical blood parameters in children with chronic acalculous cholecystitis

Biochemical parameters	Healthy children (n=36)	CAC (without bilesediment) (n=32)	CAC (withbilesediment) (n=39)	p
Total protein, g/l	68,92 ± 0,59	64,09 ± 1,42	64,35 ± 1,36	p>0,05
Total bilirubin, µmol/l	15,7 ± 0,29	21,07 ± 0,47*	25,05 ± 0,5	p<0,05
Direct bilirubin, µmol/l	4,71 ± 0,11	4,74 ± 0,13	5,5 ± 0,08*	p<0,05
Indirect bilirubin, µmol/l	11,07 ±0,17	16,33 ± 0,35*	19,55 ± 0,35*	p<0,01
Cholesterol, mmol/l	4,126 ±0,1	4,45 ± 0,16	6,08 ± 0,029*	p<0.05
ALT, IU/l	23,18 ±0,68	31,93 ± 0,34*	41,95 ± 1,1*	p>0,05
AST, IU/l	21,76 ± 0,125	34,5 ± 0,76*	35,625 ± 0,8*	p<0,05
ALP, IU/l	282,36 ± 5,3	380,16± 2,3*	617,2 ± 18,6*	p<0,05
GGT, IU/l	32,81 ± 0,62	38,7 ± 0,65*	61,9 ± 0,46*	p<0,01
LAP, IU/l	32,81 ± 0,95	38,48 ±0,61*	59,65 ± 0,59*	p<0,05

Note: * — p < 0.005 — reliability compared to a group of healthy children

In children with CAC without signs of biliary sludge, biochemical blood tests showed an increase in total bilirubin by 21.07 ± 0.47*, direct bilirubin by 4.74 ± 0.13, which was within the upper limit of the norm. There was a slight increase in alkaline phosphatase activity by 380.16 ± 12.3*, and transaminase activity by 38.7 ± 0.65*, which was within the upper limit of the norm.

In children with signs of biliary sludge on the background of CAC, an increase in total bilirubin by 25.05 ± 0.5 was observed. This was mainly due to the increase in indirect bilirubin fractions 19.55 ± 0.35 and direct bilirubin 5.5 ± 0.08* above the norm, an increase in cholesterol 6.08 ± 0.029 and a slight increase in ALT activity 41.95 ± 1.1*. Increased enzyme activity (ALP, GGT, LAP) indicated impaired bile secretion and the development of cholestasis.

CONCLUSION

The study showed that the incidence and diagnosis of chronic acalculous cholecystitis in children increased after 7 years of age, and the frequency of occurrence increased at school age. Many factors affecting the development of cholecystitis at different stages of life, such as intestinal infections, helminthiasis, parasitic diseases, nutritional disorders, simultaneous functional disorders of the bile ducts, and other cases of cholelithiasis play an important role.

Many factors contribute to the development of chronic cholecystitis, including functional disorders of the bile ducts. Secondary functional disorders develop against the background of chronic cholecystitis. Against the background of chronic acalculous cholecystitis, bile secretion is disturbed and bile deposits appear. Treatment that helps to eliminate the inflammatory process and restore functional disorders prevents the development of gallstone diseases. The study results demonstrated that children with chronic acalculous cholecystitis (CAC), particularly those with bile sediment, exhibit significant changes in the functional state of the liver and biliary tract. Markers of cholestasis (increased levels of bilirubin, cholesterol, ALP, GGT, and LAP) were significantly higher in the group with bile sediment compared to both healthy children and those without sediment (p<0.01 and p<0.05). These findings indicate a more severe disease progression and profound bile stasis in patients with biliary sludge.

Thus, in many cases, functional disorders of the

gallbladder and the inflammatory process contribute to mutual formation, which requires attention in the treatment of patients.

Therefore, timely treatment and preventive measures for recurrences of SAH, as well as correction of concomitant dyskinesias, help restore the function of the biliary system and prevent the formation or development of gallstones, while preventing cholelithiasis.

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