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CHARGE SYNDROME IN CHILDREN

The article presents a clinical case of CHARGE syndrome in a 4-year-old child. Literature data and a description of the clinical observation of CHARGE syndrome are given. CHARGE syndrome (Hall–Hittner syndrome; ICD-10:Q87.8) is a rare hereditary disease. The name of the syndrome is made up of the first letters of the main malformations characteristic of the disease. CHARGE: Coloboma (coloboma — a defect of the membranes of the eye), Heart disease (heart disease), choanal Atresia (hoan atresia — overgrowth of the posterior parts of the nasal cavity), growth and mental Retardation (delay in physical and mental development), Genital anomalies (anomalies of the genitourinary system).

Keywords: CHARGE syndrome, children, coloboma, hoan atresia, congenital heart disease, developmental abnormalities, clinical case.

Introduction. The syndrome was first described in 1979 by the authors of Hitter and Hall, who independently revealed phenotypic features in this syndrome [1,3,7]. In 1981, it was proposed to combine the main signs of the manifestation of the disease into an abbreviation. In 2004, Vessers L.E. and co-authors identified pathological changes in the gene in patients with CHARGE syndrome, thereby determining the genetic cause of the disease [5,7,8]. CHARGE syndrome is a genetic disorder caused by a mutation of the CHD7 gene, inherited in an autosomal dominant manner. In children, it occurs with a frequency of 1:12,000 to 1:15,000 among newborns around the world [1,2,10]. When a child has signs that cause suspicion of a given syndrome, a genetic study is carried out to confirm the diagnosis. Due to the wide range of outcomes in children, CHARGE syndrome is difficult to establish. To do this, the main symptoms and less specific symptoms to confirm the diagnosis are identified (Tab. 1).

The diagnosis is made if the child has 4 or 3 basic and 3 less specific signs. If there are less than 3 or 2 signs, it is believed that CHARGE syndrome is possible [1,8,10]. However, making this diagnosis has great difficulties, since a genetic test is not always available and not all patients with CHARGE syndrome will confirm the mutation of the CHD7 gene.

Treatment is required from the early neonatal period, as it is associated with serious health problems – complicated breathing, heart defects, other birth defects, nutrition problems, etc. Subsequently, it is necessary to pay attention to the hearing, vision and general development of the child [6,10]. Speech therapy and psychotherapy are recommended, as well as lifelong immunocontrol [4,10,11].

In the literature, russian and foreign, this syndrome is not so often described, due to a rare occurrence.

Purpose of the study: description of the clinical case and features of the diagnosis of CHARGE syndrome.

Material and methods. A retrospective analysis of the case histories of a patient who was on inpatient treatment in the pathology of newborns was carried out, and subsequently in the psycho – neurological department – 1 (PND – 1) and the psych- - neurological department – 2 (PND – 2) of the Pediatric Center of the Republican Hospital №1 – National Center of Medicine named after M.E. Nicolaev.

Clinical example. Patient A., child from 5 pregnancies, 5 births. Pregnancy occurred in 1 half – without features, in 2 half – against the background of anemia. During pregnancy, ultrasound examination of the fetus revealed multiple malformations from the cardiovascular and nervous system – arachnoid cyst of the brain with ventriculodilation, pyeloectasia on the right, tricuspid valve regurgitation, pericardial fluid. Mother refused to terminate the pregnancy. Childbirth at term. Birth weight – 3700g, height – 52cm. The condition at birth is satisfactory, the Apgar score is 7 – 8 points. On the 2nd day after birth – difficulty breathing and swallowing. Child transferred to intensive care unit with increasing shortness of breath. She was in the department of pathology of newborns diagnosed with perinatal damage to the central nervous system. Hearing impairment. Open arterial duct. Up to 4 month – probe nutrition, due to severe bulbar syndrome. The child developed with a gross delay in physical and neuropsychiatric development, recurrent diseases of the bronchopulmonary system.

She was repeatedly admitted for examination and treatment at PND – 1 with a diagnosis of perinatal brain damage, severe, gross delay in static – motor and psycho – speech development. Grade 2 hypotrophy. Developmental microanomalia. Genetic disease is not excluded. Microdeletion (microduplication) syndrome. Complication: Heart failure in a newborn, pulmonary hypertension grade 2.

At the age of 2, she was admitted to inpatient treatment at the PND – 2, where the diagnosis was established: Perinatal lesion of the central nervous system. Gross defeat. On examination: height – 76cm, weight – 7,7kg, BMI – 13,33, HP – 84, BP – 90/40 mm hg.

Saturation 99%. The childs condition is closer to satisfactory. Mucous membranes are clean, of ordinary color. Peripheral lymph nodes are not enlaged. The skin is clean, usually colored. Breathing is carried out in all fields, there are no wheezing. The tones of the heart are clear, rhythmic, there are no noises. The abdomen during palpation is soft, painless. Urination is free, painless. The chair is decorated, regular.

Gastroscopy: Superficial gastritis.

Ultrasound of the heart: open ductus arteriosus – 0,24 – 0,25cm. open oval window – 0,25cm. Mitral valve insufficiency 1st degree. Sealing of the walls of the atrioventricular valve with minimal regurgitation. Regurgitation on the tricuspid valve is minimal – 1degree. Right atrial dilation – 2,7cm and pulmonary artery trunk – 1,43 – 1,46cm. Slight expansion of the root of the aortic valve – 1,6 – 1,7cm, the right ventricle – 1,4cm. Ejection fraction – 69,3%.

Based on the results of the examination and in order to exclude genetic dis-

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eases, a DNA study was carried out by genetic sequencing. As a result, a mutation was detected in the CHD7 gene (locus 8q12.2), which encodes the DNA – binding protein 7 of chromodomain helicase DNA binding protein 7.

Ophtalmologists consultation: Retinal angiopathy.

Consultation with a cardiologist: Congenital heart disease. Open arterial duct. Mitral valve insufficiency grade 1. Chronic heart failure grade 2.

Surgical treatment for congenital heart disease is recommended.

In August 2021 in the Federal Center for Cardiovascular Surgery (Khabarovsk), an operation was performed – Spiral Embolization of the open arterial duct.

One year after the operation on the control ultrasound of the heart: condition after the operation: embolization of the open arterial duct. No additional ducts were identified in the aircraft trunk. Open oval window – 0,25cm. Arterial valve insufficiency 1st degree. Tricuspid valve regurgitation grade 1. Expansion of cavities of right atrium (RA), right ventricle (RV), left ventricle (LV), aortic root. Additional trabecules in the LV cavity. Ejection fraction – 70%.

At the age of 4, she was hospitalized in a PND – 2 with complaints of weakness in the muscles – does not sit, does not stand. Upon admission, the condition was assessed as conditionally satisfactory. Crying, inspection is difficult. Height – 83,5cm, weight – 9,3kg. Breathing rate – 28 per minute, heart rate – 120 per minute. Saturation – 98%. The physique is asthenic. The skin is pink, there is no cyanosis. Peripheral lymph nodes are not enlarged. Pharynx without features. Puerile breathing in the lungs, no wheezing. The cardiac area was not changed. There is no shaking. The boundaries of the percussion are not expanded. Heart tones are clear, rhythmic, systolic noise on the 4 intercostal areas on the left. The abdomen is soft, painless. Liver, spleen not enlarged. There are no edema. The head is tilted forward. Head turns in full. “short neck”. The spine line is curved in the pectoralis. Doesn’t sit. Walks with support. The foot support is complete. Lower limb length D=S. Movements in the joints in full, painless during flexion. Muscle tone is reduced uniformly.

CBC (HGB) – 86 g/l (115 - 145 g/l); RBC - 4,37x10^{12}/l (3,7-4,9x10^{12}/l); PLT - 350 10^9/l (150 – 400x10^9/l); WBC -11,8x10^9/l (5,5 – 14.5x10^9/l); LYMF – 29.1% (19-37%); monocytes - 0,4x10^9/l (0,05 - 0,4x10^9/l); rod – nucleated neutrophils - 2% (1-6%); segmented neutrophils - 69%, (32 - 55 %); eosinophils – 0% (0-5%); determination of ESR by Panchenkov – 11mm/h (1 – 15mm/h). Conclusion: hypohemoglobinemia, lymphocytosis.

Immunogram results: immunoglobulin A – 4,2g/l (0,7 – 3,0g/l); Immunoglobulin M – 3,2 mg/ml (0,6 – 2,00 mg/ml); immunoglobulin G – 17,2 mg/ml (8,00 – 16,26mg/ml); immunoglobulin E – 122U/ml (0 – 100U/ml). Conclusion: increase in all indicators.

Blood chemistry: AlAt – 10,3U/l (00 – 29,00U/l), AsAt – 29,4U/l (00 – 36U/l), albumin – 35,5g/l (38,00 – 54,00g/l), total bilirubin – 9,00mmol/l (3,4 – 7,1mmol/l), ferritin – 9,77mcg/l (7,00 – 140,00mcg/l), phosphorus – 1,67mmol/l (1,46 – 1,78mmol/l), total protein – 68,9g/l (60,00 – 80,00g/l), urea – 5,8mmol/l (1,8 – 6,4mmol/l), glucose – 3,08mmol/l (3,3 – 5,6mmol/l), ferrum – 3,7mmol/l (8,95 – 21,48mmol/l), total calcium – 2,4mmol/l (2,2 – 2,7mmol/l). Conclusion: decreased serum blood ferrum and albumin.

Radiography of the spine: enhanced kyphosis of the thoracic spine, smoothed lordosis of the lumbar spine.

The child was examined by a cardiologist: Condition after surgery: embolization of the open arterial duct. Open oval window 0,25 see degree 1 circulatory insufficiency. Cardiomyopathy in the background of the underlying disease.

Examination of traumatologist – orthopedist: congenital malformation of the cervical spine. Crank. Grade 1 C-shaped thoracolumbar scoliosis. Osteoporosis. Cerebral palsy. Atonic – astatic form. Gross delay in development. Myotonic syndrome. Flat – valgus feet of the 2nd degree.

Ophthalmologists examination: Hypermetropia of mild OU grade. OU retinal angiopathy.

Examination by an otolaryngologist: Severe bilateral sensorineural hearing loss. Tubootite. Congenital laryngomalacia.

Clinical diagnosis: CHARGE syndrome. Severe perinatal brain damage, gross delay of static-motor and psycho-speech development. Grade 2 hypotrophy. Developmental microanomaly. Congenital heart disease. Open arterial duct. Mitral valve insufficiency grade 1. Chronic heart failure grade 2. Complication: Heart failure in a newborn, pulmonary hypertension grade 2.

Diagnostic criteria for CHARGE syndrome in children

Basic	Less specific
Coloboma (defect of one or more eye structures); Heart defect; Atresia of the choanae; Discreased or no breathing; Facial paralysis (unilaterial or bilaterial); Ear anomalies	Cleft lip; Esophageal atresia; Kidney abnormalities; Low growth; Altered facial features (square face, broad forehead and bridge of nose); Delayed puberty; Foot hand abnormality

Thus, a comprehensive examination revealed in this patient 3 main and 3 less specific signs characteristic of CHARGE syndrome from the central nervous system, cardiovascular, respiratory systems, musculoskeletal system, hearing and vision organs.

Discussion. The manifestations of CHARGE syndrome are most dangerous in the neonatal period, since hoan atresia causes respiratory distress syndrome, which we observe in this clinical case. According to literature, impaired swallowing and aspiration in CHARGE syndrome occur due to abnormalities of IX-X cranial nerve pairs [3,4,9].

Among all the described cases of children with CHARGE syndrome, congenital heart defects were a common sign. 70-80% of children with this pathology are found [1,5]. Coloboma is diagnosed with the same frequency, in this case, the absence of this sign was a feature of the manifestation of the syndrome.

Hearing loss, auricle abnormalities, facial nerve paresis are also characteristic of the disease [1,4].

Half of patients with CHARGE syndrome have endocrine pathology, most often hypogonadotropic hypogonadism. In boys, micropenis and cryptorchism are noted at birth, in girls it manifests itself only during puberty [2,7].

Approximately 30% of patients have abnormalities of the hands and feet in the form of polydactyly, forking of the phalanges of the fingers on the hands and feet, extra vertebrae, scoliosis. In the described case, the child was diagnosed with chest kyphosis and lordosis of the lumbar spine.

Treatment of children with CHARGE syndrome is symptomatic, with an emphasis on hormone replacement and surgical methods [2,4,6].

Conclusion. CHARGE syndrome is a

rare disease difficult to diagnose. Patients with this syndrome need lifelong medical and psychological support. Timely diagnosis and treatment, as well as effective care will help improve their quality of life.

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A CLINICAL CASE OF ELIMINATION OF OBSTRUCTIVE JAUNDICE CAUSED BY *ASCARIS LUMBRICOIDES*

The article presents a clinical case of elimination of obstructive jaundice caused by Ascaris lumbricoides. The patient was admitted with a clinic of obstructive jaundice, presumably caused by choledocholithiasis against the background of a long history of cholelithiasis, chronic calculous cholecystitis. After two attempts of lithoextraction in the lumen of the common bile duct, a round parasite was detected, which extracted and sent for laboratory was testing, where the diagnosis of ascariasis was confirmed. The clinic of obstructive jaundice was dropped out.

Keywords: ascariasis, obstructive jaundice.

Introduction. Ascariasis is one of the most common helminthiases, according to WHO, more than 1.4 billion people are infected with ascariasis in the world. Every year, up to 100 thousand people die from ascariasis and its complications [1]. At the same time, ascariasis rarely gives surgical complications. We applied the principles of writing a systematic review of PRISMA to evaluate the statistics of surgical complications of ascariasis. In the Pubmed database over the past 10 years, 33 publications were found for the keywords "ascariasis", "Ascaris lumbricoides" and "surgical complications", while only one publication is a meta-analysis, the rest were clinical observations of various rare complications. 3 meta-analyses and 336 studies since 1998 were found in the Cochrane database for the keywords "ascariasis", "Ascaris lumbricoides", and "surgical complications". At the same time, less than ten studies are devoted to the systematic study of surgical complications and there is not a single meta-analysis on this issue, and the existing studies are devoted to intestinal obstruction, as the most common complication, the rest of the complications are described in the form of clinical cases. Most surgical complications are caused by a large number of nematodes in the intestinal lumen, which is the fate of third world countries, where there are poor social and living conditions, a high risk of massive contamination by the fecal-oral route [1]. The most common surgical complication of ascariasis is intestinal obstruction [1, 2]. Other complications are published in the literature as clinical cases due to their rarity, such as acute appendicitis due to obstruction of the lumen of the appendix by a parasite [3], perforation of the small intestine [4], as well as complications from the hepatopancreatobiliary system, such as acute pancreatitis, obstructive jaundice and hepaticolithiasis [5, 6].

We considered it necessary to present a clinical example of the treatment of a rare complication of ascariasis, obstructive jaundice, in an adult patient who denies a typical history of STH infection.

A 67-year-old patient was hospitalized in the Department of Surgery of the City Hospital No. 5, Barnaul, with complaints of heaviness and periodic pain in the right hypochondrium and epigastrium for two days. Social and living conditions are satisfactory, he lives in an apartment building with a central sewerage system. Contact with unwashed food from the ground, water not from the sewer denies. In histo-

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