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ANOMALIES OF DEVELOPMENT OF CHEST WALL IN CHILDREN

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RESUME.The work is based on the results of diagnosis and treatment of rare anomalies of chest wall in children. Features of surgical correction and its immediate and long-term results.

KEY WORDS: anomalies of development of chest wall and their surgical correction

RELEVANCE. Among the anomalies in the development of the chest in children, there are deformities in the form of congenital and acquired. The cause of acquired deformities of the chest can be lung diseases, rickets, trauma, as well as after surgical operations on the chest organs. The most common congenital deformity is funnel-shaped and keeled. With regard to the diagnosis and treatment of these types of deformities, the literature is relatively sufficient (1,2,3,4,5). At present, tactics are more relevant for various defects of the chest wall that occur with aplasia of the ribs, wide divergence of the ribs, synostoses of the ribs, an additional rib, underdevelopment of the pectoral muscles. There is a description in the literature of a case when a child was born with an open chest defect on the right, with a diaphragm defect (6). O.V. Dolnitsky 1978. Defects in fusion of the sternum in combination with other malformations were described by Forzano et al. (American Journal of Medical Genetics 135A, pp. 9-12, 2005) (7).
Currently, the most common classification of chest deformities is the Acatello classification modified by M.Torre (2012) (8).
Type 1. Deformities of the cartilaginous part of the rib (funnel-shaped, keeled deformity)
Type 2.Deformities of the bony part of the rib (aplasia, hypoplasia, etc.)
Type 3. Deformities of the cartilaginous and bone parts (Poland's syndrome)
Type 4. Deformities of the body of the sternum (sternum splitting)
Type 5. Deformities of the clavicle and scapula
The lack of sufficient information in the literature regarding the diagnosis and tactics of various anomalies in the development of the chest in children indicates the relevance of this problem.

Material and methods. In the period for 2007-2022, 85 children with various types of anomalies in the development of the chest, with the exception of funnel-shaped and keeled deformities, aged from 1 to 17 years, were examined and treated in the surgical department of the children's multidisciplinary medical center for examination and treatment. Of these, boys - 54, girls - 31. The type of chest deformity is presented in Table 1. Literature data and our observations indicate that 4-6 ribs are often missing.

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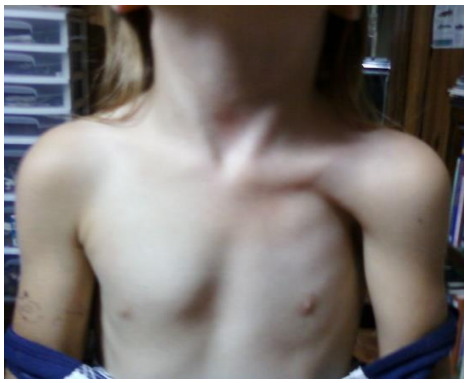
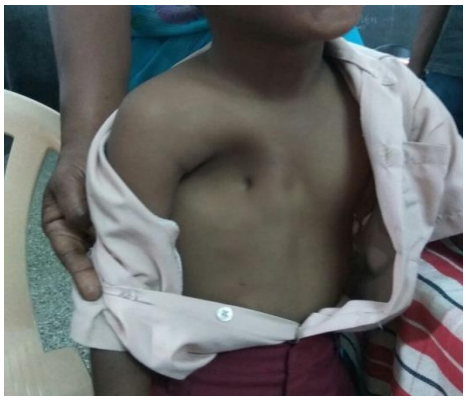
Table 1

Types of anomalies in the development of the chest	Numberofpatients
I. Exostoses of 3-4 ribs: 1) unilateral 2) bilateral	38 26 12
II. Retraction of individual ribs 1) unilateral 2) bilateral	23 14 9
III. Fusion of ribs together (synostosis)	9
IV. Lack of individual ribs	6
V. Underdevelopment of the ribs without articulation with the sternum	7
VI. Poland syndrome	2
Total	85



Pic.1. Poland syndrome

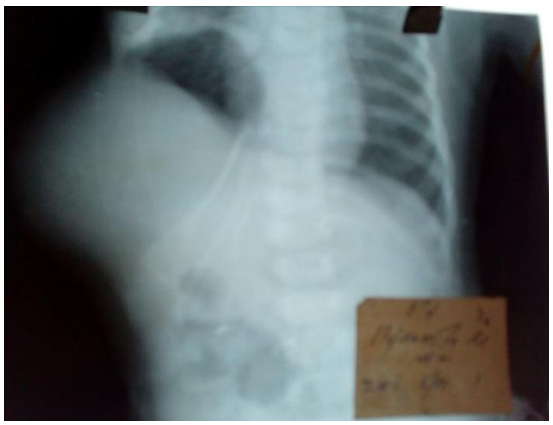


Pic. 2. Missing two ribs

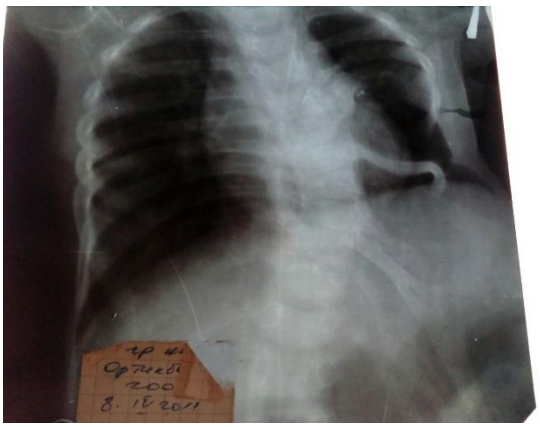
Complaints at admission are mainly cosmetic disorders. According to the anamnestic data, in all children, an anomaly in the development of the chest was noticed from birth. With age, the local manifestation became pronounced. All children underwent general clinical laboratory tests, chest X-ray examination. After preliminary preparation, isolated thoracoplasty was performed to eliminate these chest wall defects.

Example 1: patient P. at the age of 6 months was admitted with shortness of breath, rapid breathing. On local examination, the child has a mass formation measuring 10x10 cm in the right lateral chest wall, the skin is not changed, the mass is dense and motionless. On the x-ray (Pic. 3) in direct projection, the absence of III, IV, V ribs

was noted. The lower ribs are sharply displaced downwards. The palpable solid lesion turned out to be a liver that protruded through a defect in the chest wall. The chest muscles are underdeveloped, the right side of the diaphragm is stretched. Soft tissues are underdeveloped. Due to the severity of the pathology of anesthetic and surgical risk, after preliminary preparation, she was operated on at the age of one. The chest wall defect was repaired by partial displacement of the longitudinal splitting of the ribs and used as a graft. Plastic surgery of the diaphragm and chest muscles. The child was discharged in a satisfactory condition. Control examination after 3-6 months: cosmetic and functional disorders were not detected.



Pic. 3.



Pic. 4.

Example 2. Under our supervision were two children, of which the patient I., 3 years old, complained of rapid breathing and deformity of the chest. A local examination of the chest showed asymmetry: the left half was underdeveloped due to hypoplasia of the pectoralis major and minor muscles. Displacement of the left nipple down with hypoplasia. An X-ray examination (Fig. 4) in a direct projection showed underdevelopment, the absence of part IV-V of the costal cartilages, the VI rib in the form of a hook was displaced downward, the lower ribs were sharply directed downward. Based on the above data, the diagnosis of Poland's syndrome was made. In order to improve lung function, prevent the progression of respiratory failure, and protect the mediastinal organs, it is necessary to restore the chest frame.

TECHNIQUE. An oblique incision along the IV-V intercostal space with exposure of the sternocostal complex, longitudinal dissection of the III rib, downward displacement with fixation of the IV rib to it. Subsequently, the resulting graft was moved from the bone part of the underdeveloped 5th rib and fixed to the 6th rib. The chest wall defect was eliminated. The muscle defect was filled with a partial displacement of the latissimusdorsi muscle. When the skin is restored, it is displaced higher along with the nipple. The patient was discharged in a satisfactory condition. Control examination after 3-6 months. Cosmetic and functional disorders were not revealed. In the literature, Poland's syndrome is characterized as a rare congenital syndrome with partial or complete unilateral absence of the pectoralis major muscle with an anomaly in the development of the ribs in the form of aplasia or hypoplasia. N. Yiyit, on the results of a survey of 113 patients aged 6 to 38 years, revealed right-sided lesions in 55.7%, left-sided lesions in 37.1%, and bilateral lesions in 7% (9). In most patients, thinning of the subcutaneous fat on the affected side was observed (86.7%). The tactics of treating children with Poland's syndrome consists mainly in reconstructive intervention on the chest. The authors offer various options for eliminating a defect on the chest wall from rib transplantation to polymer prosthetics**.**

RESULT AND DISCUSSION. Congenital malformations of the chest are quite common as funnel-shaped and keeled deformities. Anomalies in the development of the ribs and sternum are less common. The result of the study were sick children with various variants of developmental disorders of the chest wall. The reasons for the formation of these defects have not been finally identified. Morphological studies of the connective tissue revealed violations of its structure such as dysplasia, aplasia of the cartilaginous or bone part of the chest. Surgical tactics depended on the type of developmental disorders of the ribs, sternum and muscles. The main goal of chest reconstruction is to eliminate the chest wall defect and restore the muscle structure. The immediate and long-term results of all operated children were recognized as good in terms of 3 months to 1 year. From the side of the cardiac and respiratory systems, there are no functional disorders.

CONCLUSION. Thus, in children, various types of developmental disorders of the sternum and ribs can occur. In some cases, they go unnoticed by parents and medical staff, because no functional impairment. And in most cases, a cosmetic defect on the chest is a great danger from the lungs and heart. In this regard, surgical correction is necessary to eliminate the defect at an early age.

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