MINISTRY OF HEALTH OF THE REPUBLIC OF UZBEKISTAN TASHKENT PEDIATRIC MEDICAL INSTITUTE

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ACUTE PNEUMONIA IN CHILDREN OF EARLY AGE WITH COMPLEX CONGENITAL HEART DISEASES

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ANNOTATION

A decrease in mortality and an improved prognosis of the lives of infants with congenital heart and vascular defects are largely determined by the timeliness of cardiac surgery for children. Reducing the number of delayed operations due to intercurrent morbidity, mainly pneumonia, increasing the risk of death (Forrester MB, 2004; Kim A.I. et al., 2003; Ilyin V.N. et al., 2005; Bokeria L.A. et al., 2014) requires solving a number of issues related to the features of the clinic and the course of pneumonia in complex CHD, as well as the development of new therapeutic approaches. Acute pneumonia in congenital heart diseases (CHD) with enrichment of the pulmonary circulation, in the structure of bronchopulmonary pathology in children, is 53%, and has been studied quite well. (Belozerov Yu.M., 2012). However, acute pneumonia in complex CHD, such as transposition of the main vessels (TGA), general atrioventricular communication (AVC), and Tetralogy of Fallot (TOF), in young children is 47% and remain poorly understood and relevant.

Аннотация

Снижение летальности и улучшения прогноза жизни младенцев с врождёнными пороками сердца и сосудов во многом определяются своевременностью кардиохирургического лечения детей. Уменьшение количества отсрочек операций, обусловленных интеркуррентной заболеваемостью, преимущественно пневмонией, повышающих риск летального исхода (Forrester M.B., 2004; Ким А.И. с соавт., 2003; Ильин В.Н. с соавт., 2005; Бокерия Л.А. с соавт., 2014) требует решения ряда вопросов, связанных с особенностями клиники и течения пневмоний при сложных ВПС, а также разработки новых терапевтических подходов. Острые пневмонии при врожденных пороках сердца (ВПС) с обогащением малого круга кровообращения, в структуре бронхолегочной патологии у детей, составляют 53%, и изучены достаточно хорошо. (Белозеров Ю.М., 2012). Но, острые пневмонии при сложных ВПС, таких как транспозиция магистральных сосудов (ТМС), общая атриовентрикулярная коммуникация (АВК) и Тетрада Фалло (ТФ), у детей раннего возраста составляют 47% и остаются недостаточно изученными и актуальными.

Annotatsiya

Tug'ma yurak va qon tomir nuqsonlari bo'lgan chaqaloqlar o'limining pasayishi va prognozining yaxshilanishi asosan bolalar uchun kardiojarrohlik muolajalarining o'z vaqtida bajarilishi bilan belgilanadi. Vaqtinchalik kasalliklar, asosan pnevmoniya, o'lim xavfini oshirishi sababli kechiktirilgan operatsiyalar sonini kamaytirish (Forrester MB, 2004; Kim A.I. va boshqalar, 2003; Ilyin V.N. va boshqalar, 2005; Bokeria L.A.) va boshq., 2014) klinik jihatdan o'ziga xos xususiyatlar va murakkab yurak nuqsonlaridagi pnevmoniyaning kechishi bilan bog'liq bir qator masalalarni hal qilishni, shuningdek, yangi terapevtik yondashuvlarni ishlab chiqishni talab qiladi. O'pka qon aylanishini boyitgan tug'ma yurak kasalliklarida (TYuN) o'tkir pnevmoniya, bolalardagi bronxopulmonar patologiya 53% tashkil etadi va juda yaxshi o'rganilgan. (Belozerov Yu.M., 2012). Ammo murakkab bolalarda o'tkir pnevmoniya, masalan, asosiy tomirlarning transpozitsiyasi (ATT), umumiy atrioventrikulyar aloqa (AVA) va keng tarqalgan Fallo tetradasi (TF), yosh bolalarda 47% ni tashkil etadi va kam tushunarli va dolzarb bo'lib qolmoqda.

CONTENT

LIST OF ABBREVIATIONS

ABP – antibacterial preparates

ABT – antibiotic therapy

ASD-atrial septal defect

AVC-atrioventricular communication

CAP – community-acquired pneumonia

CDI – cardiothoracic index

CHD – congenital heart defects

CO - cardiac output

CPB – cardiopulmonary bypass

ECG - electrocardiogram

ECHO-CG – echocardiogram

EDV-end diastolic volume

EF – ejection fraction

HF – Heart failure

IG – immunoglobulin

LV-left ventricle

LA-left atrium

PA-pulmonary artery

PDA-patent ductus arteriosus

PEM- protein-energy malnutrition

PFO-patent foramen ovale

PH- pulmonary hypertension

PS-pulmonary stenosis

RA-right atrium

SARS – ОРВИ

SPRV-systolic pressure of right ventricle

TGA- transposition of great arteries

TOF-Tetralogy of Fallot

VSD-ventricular septal defect

INTRODUCTION

It is known that frequent respiratory infections in patients with CHD often lead to the development of pneumonia against the background of chronic pulmonary congestion (with malformations with increased pulmonary blood flow) or chronic hypoxia (with malformations with decreased pulmonary blood flow). Most often, pneumonia with defects with increased pulmonary blood flow occurs in the first year of life, is characterized by a protracted course, and is difficult to treat. Therefore, in this situation, a timely assessment of the condition of the sick child and the implementation of high-quality therapy, taking into account hemodynamic disorders and the morphological form of pneumonia, are required [54, 58-60].

Congenital heart defects (CHD) – abnormalities third-place development after malformations development of the central nervous system and defects development of the musculoskeletal system. Is known more than 350 variants of congenital malformations, while many heart defects are so complex in anatomical combination that children die from their complications at very early stages of life, often even in the period of the newborn. Clinical manifestations depend on the type and severity of heart disease. Symptoms often manifest in the early stages of life, but some CHD may go unnoticed throughout life. Some children have no symptoms, while others may experience shortness of breath, cyanosis, fainting, heart murmur, underdevelopment of limbs and muscles, poor appetite or short stature, frequent respiratory infections.

Mortality reduction and improved prognosis of life of infants with CHD and blood vessels are largely determined by the timeliness of cardiac surgery [55-57, 61]. Advances in Pediatric Cardiac Surgery decades allowed primary radical correction of CHD in the neonatal period and in early infancy due to improved cardiopulmonary bypass (CPB), perfusion, surgical techniques, minimally invasive and endovascular methods, improving prenatal and early postnatal diagnosis [57, 80, 61]. But operations are delayed due to frequent intercurrent pathology due to secondary immunosuppression, documented for this category of patients [54, 58,

60]. The main forms of intercurrent pathology are viral, bacterial or mixed lower respiratory tract infections, mainly pneumonia, present in infants. It is known that frequent respiratory infections in patients with CHD often lead to to the development of pneumonia against the background of chronic pulmonary congestion (with malformations with increased pulmonary blood flow) or chronic hypoxia (with defects with decreased pulmonary blood flow). Most often pneumonia with defects with increased pulmonary blood flow occur in the first year of life, differ protracted course, difficult to treat. Therefore, in this situation, a timely assessment is required the condition of a sick child and the conduct of quality therapy taking into account hemodynamic disturbances and morphological forms of pneumonia [54, 58-61].

Purpose of the study:

To study the clinical features, course and therapeutic approaches in acute pneumonia in young children with complex congenital heart defects (CHD).

Research Objectives:

1. To study the features of the clinical manifestations and course of acute pneumonia in young children with complex CHD.

2. To identify the features of the bacterial spectrum of acute pneumonia in young children with complex CHD

3. To develop a rational, etiotropic therapy of acute pneumonia in children with complex CHD.

Scientific novelty:

For the first time, data will be presented on the features of the etiology and clinical course of acute pneumonia in young children with complex CHD, and more rational diagnostic, therapeutic and preventive approaches to acute pneumonia in young children with complex CHD will be developed.

Publication of research results.

On the topic of the master's thesis, 1 journal article and 3 theses were published.

The structure and scope of the master's dissertation. The master's dissertation consists of an introduction, a review of the literature, chapters, materials and methods of research, the results of our own studies and their discussions, conclusions, practical recommendations and a list of references. The dissertation is presented on 63 pages of computer text, illustrated with tables and diagrams, clinical cases are given, the bibliographic source contains 81 sources, including foreign ones.

Testing the master's dissertation. The materials of the dissertation were reported and discussed at the department approbation with the participation of staff and students of the 1, 2, 3 courses of the Department of Hospital Pediatrics No. 2 with Alternative Treatment Methods (April 14, 2020), the meeting of the Problem Commission of TashPMI and the scientific seminar at the Specialized Council 14.00.09 – Pediatrics.

CHAPTER I. LITERARY REVIEW

1.1. ABOUT INTEGRATED MEASURES TO IMPROVE THE HEALTH SYSTEM OF THE REPUBLIC OF UZBEKISTAN

— Reforming the healthcare sector is one of the important directions of state policy, said Shavkat Mirziyoyev. - In our country, special attention is paid to further improving the health care system, stimulating the work of medical workers, widespread adoption of modern technologies and treatment methods.

Over the past period, the system of primary health care has been improved through the organization of rural medical centers, urban and rural family clinics, and its accessibility to the population has been increased. A single centralized system of emergency medical care has been created, and a network of republican specialized scientific and practical medical centers that provide high-tech medical services to citizens, including in the field, is being improved.

A number of targeted national programs have been implemented to strengthen the reproductive health of the population and protect the health of mothers and children. Republican and regional screening centers have been organized to ensure the prevention of the birth of children with hereditary and congenital diseases [1].

Particular attention is paid to respect for the representatives of this profession, worthy of stimulating their dedicated work. The Decree of the First President of our country “On the State Program for Reforming the Health Care System of the Republic of Uzbekistan”, adopted on November 10, 1998, served as an important factor in creating relevant modern requirements and ensuring the provision of qualified medical assistance to the population in all regions of the country, in particular, a unified system for protecting mothers and children. According to this document, the country has created a modern system of medical services for the

provision of first aid, which covered rural medical centers and city family polyclinics.

Currently, high-quality medical services are provided in specialized scientific and practical medical centers in the areas of cardiology, surgery, eye microsurgery, urology, therapy and medical rehabilitation, endocrinology, pulmonology and phthisiology, obstetrics and gynecology, dermatology and venereology, pediatrics and others. Each year, about 50 thousand high-tech complex surgeries are performed in these medical institutions, outpatient services are provided to more than 600 thousand patients. As a result of relevant scientific research in more than twenty areas of medicine, more than 1000 medical diagnostic standards have been developed.

The announcement of 2017 in our country as the Year of dialogue with the people and human interests has a deep meaning. After all, a person’s interests include the issues of his health and the possibility of full access to modern medical services.

But life is constantly changing, people's demands are growing. The medical culture of the people has increased, the demand for medical services by the latest methods has increased. Gone are the days when people were content only with what was available. This, along with all areas, is also directly related to medicine, said the President of our country. Therefore, workers in the field must master the most advanced, modern achievements of world medicine, treatment methods. Being satisfied with what has been achieved is a serious obstacle to further development.

Shavkat Mirziyoyev at his election meetings especially emphasized the need to conduct a direct dialogue with people, to know about problems that concern citizens, to listen to their opinions and suggestions. The actual problems of the population in this direction are also confirmed by the fact that more than 7 thousand of the appeals received by the Prime Minister’s virtual reception area concerned the field of medicine.

The President of our country dwelt in detail on the forthcoming work in this area, waiting for their solution to the problems. Attention was focused on issues related to the activities of rural medical centers. Currently, rural medical centers are sufficiently equipped with laboratory analysis tools, diagnostic devices for conducting an initial medical examination.

A number of measures have been taken to increase the level of emergency medical assistance to the population. But we cannot say that today our people are satisfied with the quality of this service. It is necessary to organize separate clinics for girls and women, said the head of our state. After all, the birth of a healthy generation - the owners of our tomorrow - largely depends on the health of women.

When it comes to healthcare, we must remember one truth: healthcare providers are the guardians of our health. The people should trust them, and they should win the trust of the people, emphasized Shavkat Mirziyoyev [2].

1.2. FEATURES OF THE COURSE OF ACUTE PNEUMONIA ON THE BACKGROUND OF THE CHD. BASIC FACTS.

Pneumonia causes the death of 15% of children under 5 years of age worldwide. 808 694 children under 5 years old died of pneumonia in 2017.

Viruses, bacteria, and fungi can cause pneumonia.

Pneumonia can be prevented by immunization, adequate nutrition and the elimination of environmental factors.

Bacterial pneumonia can be treated with antibiotics, but only one third of children with pneumonia receive the antibiotics they need.

Pneumonia is the single most important infectious cause of death in children worldwide. In 2017, 808,694 children under the age of 5 years died from pneumonia, which accounts for 15% of all deaths of children under the age of 5 years worldwide. Pneumonia is ubiquitous, but children and families are the most affected by the disease in South Asia and sub-Saharan Africa. Pneumonia can be prevented with simple measures; it can be treated with simple, inexpensive drugs with proper care [3].

Along with these facts, pneumonia can be considered as the most frequent intercurrent pathology in children with congenital heart defects in the preoperative period and the reason for the forced delay of cardiac surgery. The study proved the possibility of predicting a variant of the course of pneumonia in infants with heart defects in order to select the optimal diagnostic and treatment algorithm to reduce the preoperative period [4].

Modern foreign works devoted to pneumonia in CHD, performed in developing countries, such as China, Thailand, Turkey, are fully consistent with the work of the period of the 80s of the XX century and are descriptive of clinical observations without analyzing the flow patterns in different forms of CHD and without determining the significance specific risk factors for adverse outcome [5].

In the works, an increase in the frequency of CHD pneumonia with hypervolemia of the pulmonary circulation, a protracted course, the absence of pronounced inflammatory changes in the hemogram, and the need for long-term therapy from 1 to 6 months are noted. Studies on the problem of pneumonia in children with CHD performed in Europe and America are practically absent, which is largely due to the perfection of prenatal diagnosis of CHD and early cardiac surgery in the neonatal period.

Experts of the European Respiratory Society consider pneumonia among the main causes of death in children even in economically developed countries, where the mortality rate is 13.1 per 100,000 children, mainly due to young children and children with reduced immunological reactivity [6].

Previously established secondary immunological deficiency with phagocytosis dysfunction, decreased levels of immunoglobulins (Ig) of all classes and, especially, IgG, decreased functional activity of T-lymphocytes, immunoregulatory imbalance of T-helpers and cytokines in CHD [7], can be regarded as a factor in increasing the severity of pneumonia, along with hemodynamic disturbances.

Currently, there is no work in our country with a comprehensive analysis of the severity and risk of death in infants with CHD, depending on adverse anamnestic factors, anatomical and morphological characteristics of defects, on the degree of myocardial dysfunction, pulmonary hypertension and arterial hypoxemia, the presence of myocardial damage, type of infiltrative (alveolar or interstitial) changes in the lungs, the severity of the systemic inflammatory reaction. Although the need for such an analysis to optimize the tactics of examination and treatment in order to reduce the time of preoperative preparation is obvious [8].

In the Russian Federation, congenital heart defects account for at least 30% of all malformations [9] and cause 11% of infant deaths and up to 50% of all deaths associated with malformations [10]. The prognosis of infants with congenital heart defects is largely determined by the timeliness of cardiac surgery [11-14].

Deferred operations are often caused by intercurrent morbidity, mainly pneumonia, which has a complicated course and a high risk of death in babies with heart defects [15, 16]. Previously, anamnestic risk factors for the adverse course of pneumonia in infants, such as a burdened obstetric history of the mother, prematurity, and severe condition of the child at birth, history of mechanical ventilation, intrauterine infection, antibiotic therapy for 3 months prior to hospitalization later (more than 3 days after disease) admission to the hospital, and a number of concomitant diseases. Congenital heart defects are recognized as the most significant modifying factor for the adverse course and outcome of pneumonia [16].

The outcomes of pneumonia are determined not only by the quality of diagnosis and the adequacy of therapy, but also by the presence of factors modifying and

aggravating its course, among which CHD, of course, is one of the most important [17].

1.3. THE CAUSATIVE AGENTS OF ACUTE PNEUMONIA IN CHILDREN OF EARLY AGE

The etiology of CAP (community-acquired pneumonia) depends on the conditions in which the infection occurred, the age of the child, previous antibiotic therapy, the presence of concomitant diseases, such as immunodeficiency or aspiration syndrome, as well as vaccination against pneumococcal infection, hemophilic infection, pertussis, influenza [18, 19, 20-22]. The data presented in the scientific literature on the etiology of community-acquired pneumonia in children vary greatly, which can be explained by the different epidemic conditions in which the study was conducted, as well as its methodology (in particular, the criteria for diagnosing pneumonia may vary).

The causative agents of community-acquired pneumonia in children can be various bacteria and viruses, and in some cases, fungi and parasites. In the table. 1 shows the role of various bacteria in the etiology of community-acquired pneumonia according to the ERS publication [23].

Table 1

The main bacteria that cause community-acquired pneumonia in children at different ages [23]

Bacteries	Age groups			
	Newborns	1–3m	4m—4y	5–18y
Streptococcuspneumoniae	+	+++	++++	+++
Haemophilusinfluenzae	+	+	+	±
Streptococcuspyogenes	—	+	+	+
Staphylococcusaureus	++	++	+	+
Streptococcusagalactiae	+++	+	—	—

Escherichiacoli	++	+	—	—
Mycoplasmapneumoniae	—	+	++	++++
Clamydophylapneumoniae	—	+	+	++
Legionellapneumophila	+	+	+	+
Chlamydiatrachomatis	+	++	—	—
Bordetellapertussis	±	++	+	+

++++ very often, +++ often, ++ relatively infrequently, + rarely, ± very rarely, — no.

Viruses are important in the etiology of community-acquired pneumonia in young children, can act as a direct pathogen or play the role of a co-pathogen in community-acquired pneumonia of bacterial etiology. In 2009–2013 13 large-scale studies were conducted in different countries of the world (more than 7000 children), in which the etiological role of viruses in CAP was evaluated. In general, viruses were detected in 41.3% of patients (from 17.9 to 73.5% in various studies) [24]. In separate studies, it was shown that up to 80% of cases of community-acquired pneumonia in children under 2 years old are associated with viruses [23, 25]. The role of various viruses in the etiology of community-acquired pneumonia in children is presented in Table 2.

Table 2.

The role of viruses in community-acquired pneumonia in children [24]

Virus	Identification of community-acquired pneumonia in children
Respiratory syncytial	According to most studies, the most common viral pathogen of CAP in children. Identified in 2.4–39.4% of cases
Human Rhinovirus	3–100% of children with CAP, often in association with other viruses (enteroviruses, etc.)

Influenza (A and B)	2–14,1%
Parainfluenza	0–17%
Adenovirus	0–18%
Metopneumovirus	0,2–14,5%
Human Bocavirus	0–18,4%
Human Coronavirus	0,8–6,6%

Studies in which qualitative verification of pathogens has been widely carried out show that in 23–33% of cases, CAP is a mixed viral-bacterial infection [25]. With a mixed viral-bacterial infection, the virus, obviously, acts as a factor contributing to the infection of the lower respiratory tract by the bacterial flora.

S. pneumoniae is the most common pathogen of CAP in children [23, 25, 26]. According to a multicenter study in 18 cities of the Russian Federation, among serotypes of pneumococcus (analysis of 223 strains), most often CAP in children under 5 years of age causes serotype 19 (in 33.6% of cases). Serotypes 6 (15.8%), 23 (8.9%) and 14 (7.2%) are also important. The remaining serotypes of pneumococcus were isolated in less than 5% of cases or were not allocated [27].

There are significant age-related features of the etiology of CAP. In newborns, the main pathogens are S. agalactiae (β-hemolytic group B streptococcus), E. coli, S. aureus. Also, the causative agent of pneumonia in the neonatal period may be L.monocytogenes. CAP caused by S. pneumoniae and H. inuenzae is rare in infants. In the etiological structure of CAP in children 1-3 months, the main role is played by viruses. At this age, S. aureus, S. agalactiae (β-hemolytic group B streptococcus), E. coli retain their significance, and the role of S. pneumoniae increases. In the first months of life, bacterial pneumonia most often develops in children with habitual food aspiration (with reflux and / or dysphagia), as well as the first manifestation of cystic fibrosis and immunodeficiency [26]. Also at this age, CAP caused by C.trachomatis may occur (infection of the baby occurs during childbirth). The etiological role of other atypical bacteria, the infection of which

can also occur during childbirth (M.hominis and U.urealyticum), is controversial [18, 23, 25].

In children 3 months - 5 years old, most often, CAP causes S. pneumoniae (according to some studies, their share is 70–88% of cases). Of typical bacteria, H.influenzae type b also plays a role (up to 10% of cases, mainly in children under 2 years old).

These bacteria account for most cases of pneumonia complicated by pulmonary destruction and pleurisy. Pneumonia caused by atypical bacteria at this age is infrequent: M. pneumoniae accounts for 9–22%, C. pneumoniae - 4–6% [18, 23, 25].

Rare pathogens of CAP include B.pertussis, L. pneumophila, M. calcarhalis, K. pneumoniae, S. pyogenes. An unusual etiology of CAP (Candidaspp., Aspergillusspp., P.jiroveci) can be observed in patients receiving immunosuppressive therapy or HIV-infected. In patients with cystic fibrosis, CAP can cause P.aeruginosa [18]. Against the background of chicken pox, the risk of pneumonia caused by S.pyogenes increases against the background of influenza A, S.aureus [28].

And so, in the first half of life, E. coli, K. pneumoniae, S. aureus and respiratory viruses are more significant in the etiology, while the role of pneumococcus and hemophilic bacillus is insignificant, since children have passive transplacental immunity. Another group of pneumonia in this age period is pneumonia caused by atypical flora, mainly C.trachomatis and M.hominis, as a rule, infection occurs intranatally from the mother [31].

From the second half of life and in the preschool years, pneumonia is mainly caused by pneumococcus, and capsuleless hemophilic bacillus is often also sown and, in 7-10% of cases, H. influenzae type b, which is usually associated with a severe and complicated course. In recent years, a number of publications have appeared on RC infection in young children and its role in the development of acute severe pathology of the respiratory tract. So, in children under 5 years old, the RC virus is

the most common pathogen of the respiratory tract and is verified in 62% of cases, with 10-30% being viral pneumonias. It should be emphasized that the danger of this pathogen is due to the fact that RC infection transferred by children under 1 year of age can subsequently lead to the formation of stable bronchial hyper reactivity with transformation into bronchial asthma. Practitioners should pay special attention to the following groups of patients in whom this infection can take a severe, complicated and even life-threatening course:

• premature, especially less than 35 weeks of gestation;

• age less than 3 months. at the time of infection;

• weight less than 5 kg;

• chronic lung diseases (broncho-pulmonary dysplasia, cystic fibrosis);

• hemodynamically significant congenital heart disease;

• congenital immunodeficiency;

• severe neuromuscular diseases;

• intoxication at the time of infection;

• hereditary predisposition to bronchial asthma [32-34].

To date, significant results have been achieved in the study of the pathogenesis of the infectious process in the lungs, which have determined the main directions for the diagnosis and treatment of community-acquired pneumonia in children. It is proved that the inflammation that occurs in the lung parenchyma depends on the number and virulence of pathogens, the state of the protective mechanisms of the respiratory tract and the body of the child as a whole. Among the main mechanisms of the development of pneumonia, the first place in young children is aspiration of the infected secretion of the nasopharynx, which usually occurs in a dream, as infection of S. pneumoniae, H. influenzae, gram-negative bacteria, anaerobes occurs. An inhalation of an aerosol with microorganisms is an equally significant

route of infection - this is most relevant for M. pneumoniae, C. pneumoniae, L. pneumophila, C. psittaci and respiratory viruses. Much less common in children is the hematogenous (as well as lymphogenous) spread of the microorganism from outside the pulmonary infection site (Staphylococcusaureus) [35]. The risk of developing and the course of community-acquired pneumonia in young children is largely due to the premorbid background, which must be taken into account by the pediatrician in determining treatment tactics and indications for hospitalization. The modifying risk factors for pneumonia are severe encephalopathies, prematurity, morphofunctional immaturity and / or intrauterine infection in children 1 year of age, intrauterine growth retardation and postnatal hypotrophy of the 2nd to 3rd degree, congenital malformations, chronic lung diseases (including bronchopulmonary dysplasia, bronchial asthma), cardiovascular system, kidney, hematologic diseases, immunocompromised patients. Of the social factors, the most significant are the impossibility of adequate care and the implementation of all medical prescriptions at home due to asocial behavior of family members or a low economic level [36, 37].

In general, regardless of the severity of the disease, S. pneumoniae dominates in the etiology of CAP in children, however, as the severity increases, the proportion of S.aureus, H.in fl uenzae, bacteria of the Enterobacteriaceae family and L. pneumophilae increases, and the values of M. pneumoniae and C. pneumoniae decrease [24]. According to a global study (data from 192 countries), the majority of deaths from CAP in children are associated with S. pneumoniae and H.inuenzae [29, 30].

1.4. THERAPY OF ACUTE PNEUMONIA

Pneumonia is an infectious disease, and therefore the main thing in the treatment of the patient is the appointment of antibiotics [38].

A preferred antibiotic is amoxicillin in dispersible tablets. They are usually prescribed at a medical center or hospital, but in the vast majority of cases,

pneumonia in children can be effectively treated at home with inexpensive oral antibiotics. Hospitalization is recommended only in very severe cases [3].

The basic principles of antibacterial pneumonia are as follows:

• antibiotics are prescribed immediately when the diagnosis is established or in a serious condition of the patient, if the diagnosis is doubtful in a mild patient, the decision is made after radiography;

• the initial choice of an antibiotic is carried out empirically, focusing on the signs of the disease, but, taking into account the etiological structure of “home” pneumonia, if there are even minimal signs of bacterial toxicosis, it is advisable to start therapy with “protected” betalactams - amoxiclav, augmentin, etc. or second generation cephalosporins , and with "atypical" pneumonia - from modern macrolides (sumamed, macropen, clarithromycin, etc.);

• macrolide antibiotics should not be prescribed as first-line drugs for conventional - not “atypical” pneumonia;

• indications for switching to alternative drugs are the lack of clinical effect of the first-choice drug for 36–48 hours for mild and 72 hours for severe pneumonia; the development of undesirable side effects (primarily intolerance - primarily allergic reactions) from the drug of first choice;

• pneumococci are resistant to gentamicin and other aminoglycosides, therefore, treatment of community-acquired pneumonia with antibiotics of this group is unacceptable;

• for uncomplicated mild pneumonia, preference should be given to the administration of drugs orally, switching to parenteral administration with an aggravation of the course of the disease; if therapy was started parenterally, after lowering the temperature and improving the patient's condition, one should switch to an oral antibiotic;

• after a course of antibiotic therapy, it is advisable to prescribe biological products [38].

In the vast majority of cases (about 80%), children with CAP can be effectively treated at home [40], that is, in the conditions of a medical organization of the 1st level, when primary health care is provided on an outpatient basis and in a day hospital with a pediatrician district or general practitioner (family doctor). If the patient has indications, they are referred to a pulmonologist for primary medical care [41].

Patient regimen with CAP - bed rest with expansion after normalization of body temperature. With a quick treatment effect, transfer to the general regimen is permissible already on the 6-10th day of the disease [39].

If it is impossible to provide medical care in the framework of primary health care and the availability of medical indications, children with CAP are sent to a medical organization of the 2nd level of medical care - a hospital that provides specialized medical care in the field of "pulmonology" or "pediatrics".

Indications for hospitalizing a child in a hospital are [39, 40, 42]:

• Age up to 6 months of life;

• Severe pneumonia;

• the presence of severe background diseases - congenital heart disease, chronic lung diseases accompanied by infection (bronchopulmonary dysplasia, cystic fibrosis, bronchiectatic disease, etc.), immunodeficiency, diabetes mellitus;

• conducting immunosuppressive therapy for the child;

• lack of conditions for treatment at home or lack of guarantees for the implementation of the recommendations of the pediatrician - a socially disadvantaged family, poor social conditions (hostel, orphanage, temporary accommodation, etc.);

• lack of response to starting antibiotic therapy taken by a child at home for 48 hours (maintaining high fever, increasing respiratory failure, the appearance of agitation or depression of consciousness) [43].

Hospitalized children with CAP that do not require intensive care are preferably isolated [40]. In a hospital, the treatment of children with CAP is carried out by a pediatrician and / or pulmonologist and in the ICU as an anesthesiologist and resuscitator, if necessary, an examination by a phthisiatrist, thoracic surgeon, physiotherapist, and physiotherapist. All children with severe CAP (if the pediatrician carries out the treatment) should be consulted by a pulmonologist [44]. With uncomplicated CAP and the conditions for treatment at home, early discharge from the hospital is advisable - immediately after the clinical effect is achieved (on 3-4 days of hospitalization), which reduces the risk of nosocomial infections. Preservation of individual symptoms of the disease, changes in the blood test and on the radiograph are not an obstacle to early discharge [39].

Carrying out antibacterial therapy is a cardinal method of treating bacterial and viral-bacterial pneumonia at all ages and in all countries of the world. Moreover, the earlier antibiotic therapy is started and the more sensitive it is to antibiotics for pathogens, the sooner the patient will recover. The first 8 hours from the onset of the disease are considered the optimal start of antibiotic therapy [43]. Starting therapy is always empirical; the increase in its effectiveness is associated with the early diagnosis of the etiological factor of pneumonia. The generally accepted methods for etiological decoding of pneumonia are microbiological examination of sputum (the sensitivity of the method does not exceed 50%), as well as a blood test for bacteremia (sensitivity - 30%). An intermediate place is occupied by the method of bacterioscopy; Gram stain of sputum allows the doctor to navigate the choice of empirical ABT. It should be noted that in Russia the introduction of the method of bacterioscopy is associated with the name S.P. Botkin. In recent years, the method of polymerase chain reaction and the study of pneumococcal antigen in the urine have been actively introduced; immunochromatographic determination of pneumococcus polysaccharide C. The time taken to complete the Binax test does

not exceed 15 minutes, which is comparable with bacterioscopy, that is, it can be considered as an express method [45].

Children who have undergone moderate CAP are subject to follow-up for 6 months, and those who have had severe and complicated CAP for 12 months in level I medical facilities by a local pediatrician or general practitioner (family doctor) at the place of residence, as indicated by a pulmonologist [46]. Children who have had CAP can be sent for rehabilitation to a specialized local sanatorium. It is optimal to transfer the child to a sanatorium on the 10–11th day of inpatient treatment. In this case, the average length of stay in rehabilitation treatment should be at least 14 days, during which physiotherapy, physiotherapy, reflexology, manual therapy, psychotherapy are carried out, taking into account the prospect of restoration of functions (rehabilitation potential) confirmed by the results of the examination [47]. Routine vaccination is carried out after recovery. The resumption of hardening is possible in 2-3 weeks after the normalization of temperature, exercise is permissible in 6-12 weeks after recovery (depending on the severity of pneumonia) [39].

Antibiotic therapy

ABT has a decisive influence on the prognosis of pneumonia, therefore, with a reliable diagnosis or in a patient in serious condition with a probable diagnosis, it should be started immediately [39, 48].

The choice of ABT in each case of CAP is carried out individually, taking into account the natural activity of the drugs in relation to the pathogen and their possible acquired resistance, severity and course of the disease, the patient's contraindications to the use of certain antibiotics.

However, in real clinical practice, especially on an outpatient basis, empirical ABT is more often performed.

Principles of empirical therapy: early prescription of ABP, taking into account the most probable pathogen and its sensitivity in the region, patient age, background diseases, toxicity and tolerance of ABP for a particular patient.

Conducted evidence-based studies have shown that the use of amoxicillin orally, even in severe uncomplicated CAP in children aged 3 months to 5 years, is not inferior in effectiveness to benzylpenicillin or ampicillin administered intravenously [50, 52]. In this regard, in all children with CAP who do not have indications for hospitalization, as well as in hospitalized children with moderate CAP, it is advisable to use oral ABT. In severe community-acquired pneumonia, ABP is prescribed parenterally or in the form of stepwise therapy (in two stages, parenteral administration for 2-3 days, followed by the transition to oral administration of ABP).

In children over the age of 3 months, the main ABP for the treatment of CAP is amoxicillin (in a standard dose - 45-50 mg / kg per day), since this antibiotic has a high stable activity against the most common and dangerous pathogen - S. pneumoniae, as well as in most cases, active against H.influenzae [49, 50–51, 39].

When choosing a dosage form, it should be borne in mind that a dispersible tablet (Solutab technology) has better bioavailability compared to amoxicillin in the form of tablets and capsules (93% and 70–80%, respectively), which helps to increase the efficiency and reduce the risk of intestinal adverse events [53].

Amoxicillin / clavulanate or CS-2 is prescribed for patients with background diseases or who have taken ABP in the previous 3 months [49.50–51, 39]. In regions with a high level of resistance of S. pneumoniae to penicillin and in children with a risk that the disease is caused by a resistant strain (first of all, being in day care centers with a round-the-clock stay), it is recommended to use a dose of amoxicillin 2 times higher - 80–90 mg / kg per day. If the child is at the same time at a high risk that the infection may be caused by a β-lactamase-producing H. influenzae strain, the best choice is to use amoxicillin / clavulanate with a high content of amoxicillin (drugs with a ratio of amoxicillin and clavulanate 14:1 with 3

months to 12 years and 16:1 after 12 years), which makes it possible to use a dose of amoxicillin 90 mg / kg / day, without increasing the dose of clavulanate.

Other treatments

• Bed rest is indicated for the entire febrile period. Nutrition must be age appropriate and must be complete.

• The volume of fluid per day for children up to a year, taking into account breast milk or infant formula

• 140-150 ml / kg of mass. It is advisable to give 1/3 of the daily volume of fluid in the form of glucose-salt solutions (rehydron, oralit) or fruit, vegetable decoctions. Dietary restrictions (chemically, mechanically and thermally sparing food) are determined depending on the appetite and the nature of the stool.

• In the room where the child is, there should be cool (18 - 19 ° C), humidified air, which helps to reduce and deepen breathing, and also reduces water loss.

• The use of antiviral drugs is indicated in cases of viral etiology of viral etiology (primarily influenza), as well as in cases of viral infections developed against the background of the current SARS. The choice of antiviral therapy in children has age restrictions.

• Antipyretic drugs are not systematically prescribed, as this can make it difficult to evaluate the effectiveness of antibiotic therapy. The exception is children who have premorbid indications for lowering the temperature [38].

Conclusion to chapter I

Currently, there is no work in our country with a comprehensive analysis of the severity and risk of death in infants with CHD, depending on adverse anamnestic factors, anatomical and morphological characteristics of defects, on the degree of myocardial dysfunction, pulmonary hypertension and arterial hypoxemia, the presence of myocardial damage, type of infiltrative (alveolar or interstitial) changes in the lungs, the severity of the systemic inflammatory reaction. [8].

In general, regardless of the severity of the disease, S. pneumoniae dominates in the etiology of CAP in children, however, as the severity increases, the proportion of S.aureus, H.influenzae, bacteria of the Enterobacteriaceae family and L. pneumophilae increases, and the value of M. pneumoniae and C. pneumoniae decreases [14]. According to a global study (data from 192 countries), the majority of deaths from CAP in children are associated with S. pneumoniae and H.influenzae.

ABT has a decisive influence on the prognosis of pneumonia, therefore, with a reliable diagnosis or in a patient in serious condition with a probable diagnosis, it should be started immediately [39, 48]. The use of antiviral drugs is indicated for viral etiology (primarily influenza), as well as for developed against the background of the current SARS.

Thus, taking into account the data of foreign and domestic authors, we came to the conclusion that data on the etiology, clinical course, therapy and outcomes of pneumonia in children with complex and combined congenital heart defects are extremely insufficient, therefore we consider this problem relevant, especially for our region.

CHAPTER II

MATERIALS AND RESEARCH METHODS

To solve the tasks, during 2017-2020, studies were conducted on the basis of the Department of Hospital Pediatrics №2 of Tashkent Pediatric Medical Institute. We examined 37 children in early age with acute pneumonia occurring on the background of complex, combined and simple CHD, as well as PH. All children underwent inpatient treatment in the departments of pathology of young children, cardiac rheumatology and cardiac surgery departments of the TashPMI clinic.

2.1. General characteristics of the examined patients

To achieve this goal, 37 children were examined who were hospitalized in the cardiac rheumatology, infants and cardiac surgery departments of the TashPMI clinic.

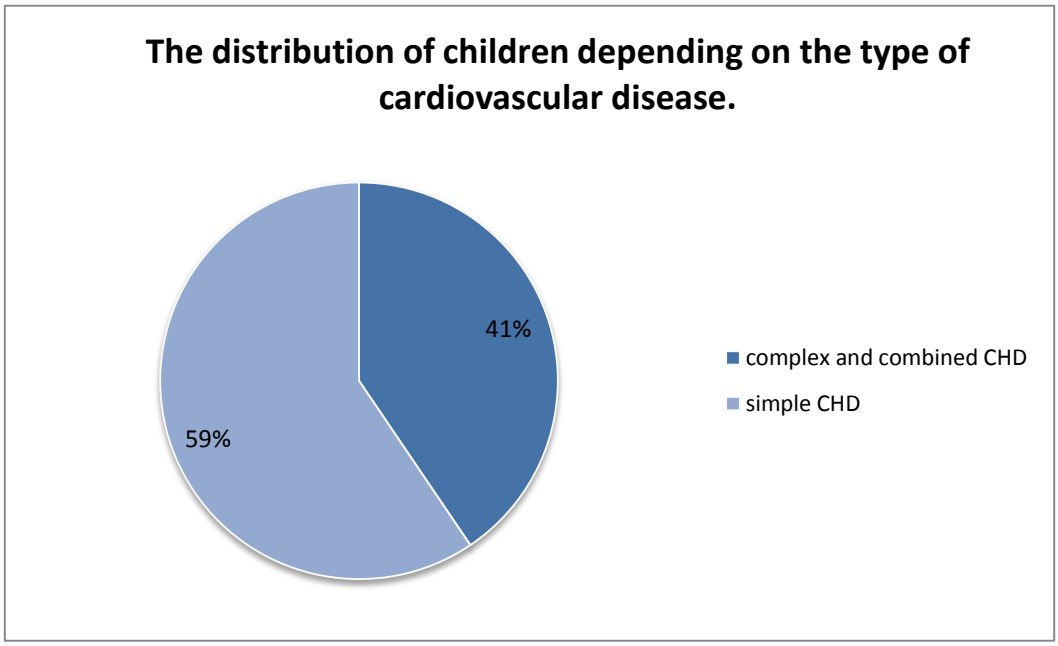
The control group consisted of 22 children with pneumonia on the background of simple CHD. The age of the examined children ranged from 0 to 3 years and averaged 1.5 ± 0.1 years. Children, depending on the type of CHD, were divided into 2 groups:

Group 1 - 15 children (41%), with pneumonia on the background of complex and combined CHD;

Group 2 - 22 children (59%), with pneumonia on a background of simple CHD:

The distribution of children depending on nosology is presented in (Fig. 2.1.1).

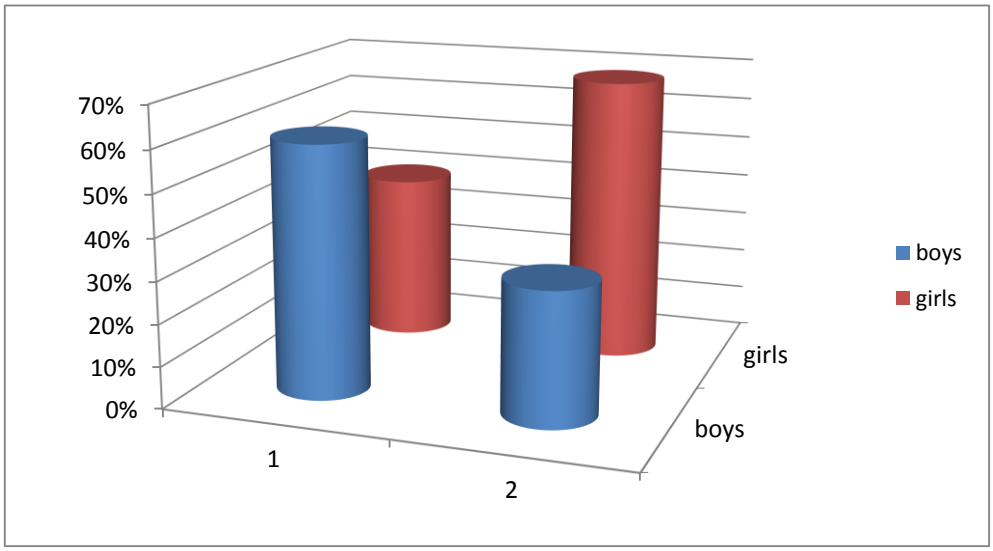
(Fig. 2.1.1)



As can be seen from Figure 2.1.1, the majority of the examined patients were children with pneumonia on the background of simple CHD (59%), in a smaller percentage of cases pneumonia was diagnosed on the background of complex and combined CHD (41%).

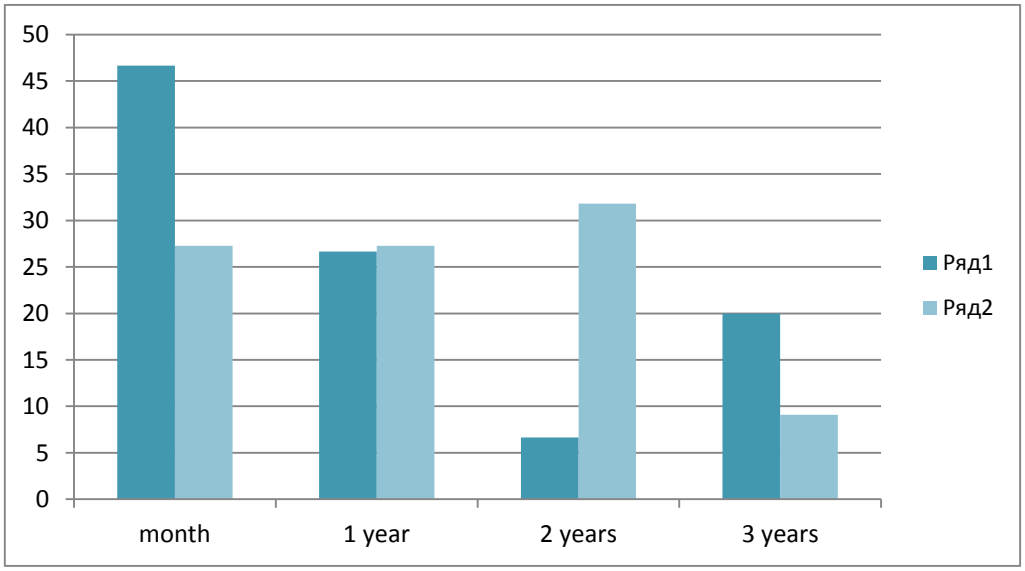
Children from two groups were divided by gender in Figure 2.1.2

(Fig. 2.1.2) Distribution of children by gender.



As can be seen from Figure 2.1.2., boys prevailed among children with pneumonia on the background of complex and combined CHD (60%), while among children with pneumonia on the background of simple CHD there were more female children (68,18%).

Distribution of children by age (Fig. 2.1.3)



The age distribution of children showed (Fig. 2.1.3) that among children with pneumonia on the background of complex and combined CHD, the majority were children under one year old (46,66%), the lowest among these children was among

2-year-old children (6,66%), while among children with pneumonia on the background of simple CHD, the highest rate was found in children of 2 years old (31,81%), and children of 3 years old made up the smaller part of this group (9,09%)

2.2. Research methods:

1. An objective study of children with acute pneumonia on the background of complex and combined CHD.
2. Laboratory research methods:
- general clinical tests: blood, urine, feces;
- bacteriological: bacterial culture from the throat and nose.
3. Instrumental research methods:
- pulse oximetry
- chest x-ray
- ECG, echocardiography.

The condition of the cardiovascular system in sick children was evaluated at admission and in the dynamics of the disease using the following research methods:

- Collection of complaints from mothers. In this case, special attention was paid to the presence of complaints typical to the CAP. The first signs were the onset of general complaints (lethargy, pallor, excessive sweating, and fatigue during physical exertion (for example, when breastfeeding), lag in physical development, as well as changes in the central nervous system: sudden anxiety attacks with increased shortness of breath and bluish staining of the skin (mainly the nasolabial triangle). According to the mothers, the disease was associated with a viral or bacterial infection during pregnancy. The main complaints in this group of children were abstinence, fatigue, and shortness of breath, cyanosis, fever, cough and respiratory failure.

- Objective examination and identification of clinical symptoms in patients with HF included:

- Assessment of the general condition
- Inspection

- percussion to determine the boundaries of the relative and absolute dullness of the heart
- heart auscultation
- the study of the frequency and nature of the pulse
- determination of the location and nature of the apical impulse
- Measurement of blood pressure (BP).

The control was provided by the norms of the pulse rate per minute by A.F.Tur data, by the norms of blood pressure indicators in children - generally recognized data by F.N.Serkov with co-authors, 1989.

In the course of research, we used the following instrumental research methods:

ECG diagnosis in standard, enhanced precardial and thoracic leads to obtain information on the functions of the conduction, arousal and automatism of the heart. An ECG study was performed upon admission of the child to the department, before discharge of sick children from the hospital, and 6 months after the treatment. For indicators of a normal ECG in children, the data were taken by N.A. Belokon and M.B. Kuberger and M.K. Oskolkov.

The study was conducted after 10-15 minutes of rest and not earlier than 2 hours after eating. The patient should be stripped to the waist, shins should also be released from clothing. ECG recording is usually carried out in the position of the patient lying on his back, which allows for maximum muscle relaxation. To improve the quality of the ECG and reduce the number of induced currents, good contact of the electrodes with the skin should be ensured. To do this, you must: first rub the skin with alcohol in places where the electrodes are applied; under the electrodes put gauze pads moistened with 5 - 10% sodium chloride solution, or cover the electrodes with a layer of special conductive paste, which allows minimizing the interelectrode resistance. Currently, many researchers are refusing to use gauze pads, which dry quickly during the study, which sharply increases the electrical resistance of the skin, and prefer to use electrode paste or, at least, moisten the skin abundantly with electrode solution of sodium chloride.

First, ECG was recorded in standard leads (I, II, III), then in reinforced limb leads (aVR, aVL and aVF) and chest leads (V1 - V6). At least 4 PQRST cardiac cycles are recorded in each lead. ECG is recorded, as a rule, at a paper speed of 50 mm/s. A lower speed (25 mm/s) is used if necessary, longer ECG recordings, for example, for the diagnosis of rhythm disturbances.

Immediately after the end of the study, the patient's last name, first name and patronymic, his age, date and time of the study, the number of the medical history were recorded on a paper tape. The tape with the ECG should be cut along the leads and glued to a special form in the same sequence that was recommended for shooting the ECG.

Echocardiography was performed for all patients in M-modal and two-dimensional modes according to the standard methodology of the American Association of Echocardiography (Sahn D.J. et al., 1978; Feigenbaum H., 1999). By the generally accepted methodology, the general myocardial contractility, the state of the valve apparatus were evaluated, the sizes of the walls and cavities of the left ventricle (LV) were measured by the standard method in two-dimensional and one-dimensional modes, as well as in pulsed and continuous-wave echocardiography. From the parasternal position along the long axis of the LV in the M-mode, the following parameters of the left heart were determined: Ao — size of the lumen of the aortic root at the valve level, mm; LA - the diameter of the cavity of the left atrium, mm; ESS - end-systolic cavity size of the left ventricle, mm; EDS – end-diastolic size of the cavity of the left ventricle, mm; FSV - the final systolic volume of the left ventricle, ml; FDV - final diastolic ventricle, ml; FDV - the final diastolic volume of the left ventricle, ml; TIS - thickness of the interventricular septum, mm; TPW - thickness of the posterior wall of the left ventricle, mm; as well as the right heart: pancreas - the size of the cavity of the right ventricle, mm; APRV - the average pressure in the cavity of the right ventricle, mm Hg. The stroke volume (SV, ml), ejection fraction (EF, %) of the left ventricle were calculated. The degree of pulmonary hypertension was quantified by measuring the diameter of the main trunk of the pulmonary artery, the blood flow velocity V in the

pulmonary artery, and the maximum systolic pressure gradient SGPmax in the pulmonary artery.

The conclusion is issued on a special form indicating the results of standard measurements and a description of the study. With hardware capabilities, it makes sense to record the study on a regular computer disk. This will allow, if necessary, to get a second opinion on the study, pictures and prints are not enough for this, because the heart structure is dynamic, and it is important to evaluate its work in video mode.

Chest x-ray was carried out in direct projection, the type and morphology of pneumonic infiltration were evaluated; uneven pneumatization; the presence of interstitial changes; atelectasis and cardiomegaly by the value of the cardiothoracic index according to the gradation proposed by Yu. N. Konstantinov (1963). As a rule, it is necessary to get two pictures of the chest organs: in a direct and lateral projection. The patient at this time is located opposite the holder of the photographic plate. For the second picture, the patient is placed sideways, arms raised up.

If the patient is not able to stand, then he is placed on a special table. At the same time, maximum immobility should be maintained, and during the picture itself, hold your breath for several seconds, which reduces the likelihood of blurry images. Radiography of the heart was carried out in direct and, according to indications, in lateral projection, the type and morphology of pneumonic infiltration were evaluated; uneven pneumatization; the presence of interstitial changes; atelectasis and cardiomegaly by the value of the cardiothoracic index according to the gradation proposed by Yu.N. Konstantinov (1963). The cardiothoracic index (CTI) is calculated by the formula:

CTI = ((MR + Ml) · 100%) / Basal chest diameter

where Mr + Ml is the transverse diameter of the heart, equal to the sum of the perpendiculars dropped to the midline from the most distant points of the right and left contours of the heart, i.e., CTI is the ratio of the transverse diameter of the heart to the basal diameter of the chest in percent. Yu. N. Konstantinov (1963) identifies 3 degrees of increase in CTI: the normal value does not exceed 50%, an increase in

I degree - 50 - 55%, II degree - 56 - 60%, III degree - more than 60%. Determination of CTI is a simple and convenient method for assessing the size of the heart in dynamics. It should be remembered that in newborns and children with obesity, due to the lying position of the heart, the CTI can normally be up to 53 - 55%.

Laboratory research methods included the determination of:

- general clinical tests: blood, urine, feces.

- bacteriological: bac.seeding from the pharynx and nose

Statistical methods. For statistical calculations we used standard (MS Excel 2010, Statistica 8.0) and specially developed programs.

Conclusion to chapter II.

Thus, the study was conducted during 2017-2020. at the Department of Hospital Pediatrics № 2 of Tashkent Pediatric Medical Institute. The material for the study was 37 cases of acute pneumonia in young children on the background of complex, combined, simple CHD and PH, which are in-patient treatment at the TashPMI clinic.

All patients were observed by:

1. Objective research methods: assessment of the general condition, examination, percussion to determine the boundaries of the relative and absolute dullness of the heart, auscultation of the heart, the study of the frequency and nature of the pulse,

determining the location and nature of the apical impulse, measuring blood pressure (BP).

2. Laboratory research methods - general clinical: blood, urine, feces, and bacteriological: inoculation from the throat and nose.

3. Instrumental methods of research: pulse oximetry, chest x-ray, ECG, echocardiography.

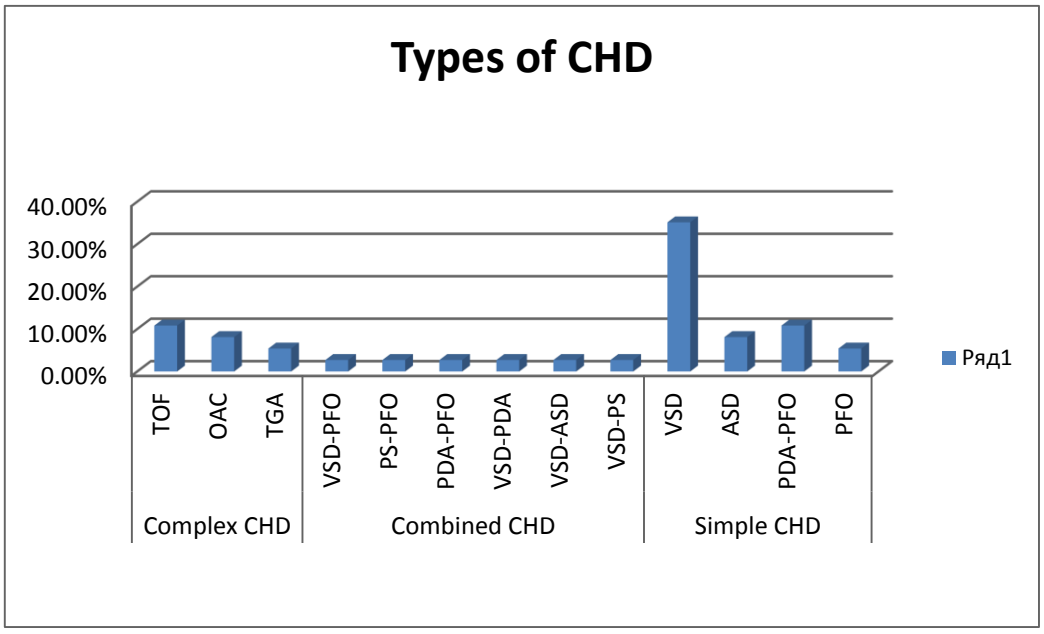
CHAPTER III

RESULTS OF OWN RESEARCHES AND THEIR DISCUSSION.

3.1. Study the features of the clinical manifestations and course of acute pneumonia in young children with complex CHD

With a thorough retrospective analysis of case histories, clinical examination data, laboratory and instrumental studies, it was found that acute pneumonia was found in 37 young children with acute pneumonia on the background of complex, combined and simple CHD. The types of CHD that we investigated are shown in the figure below (Fig 3.1.1)

(Fig 3.1.1)

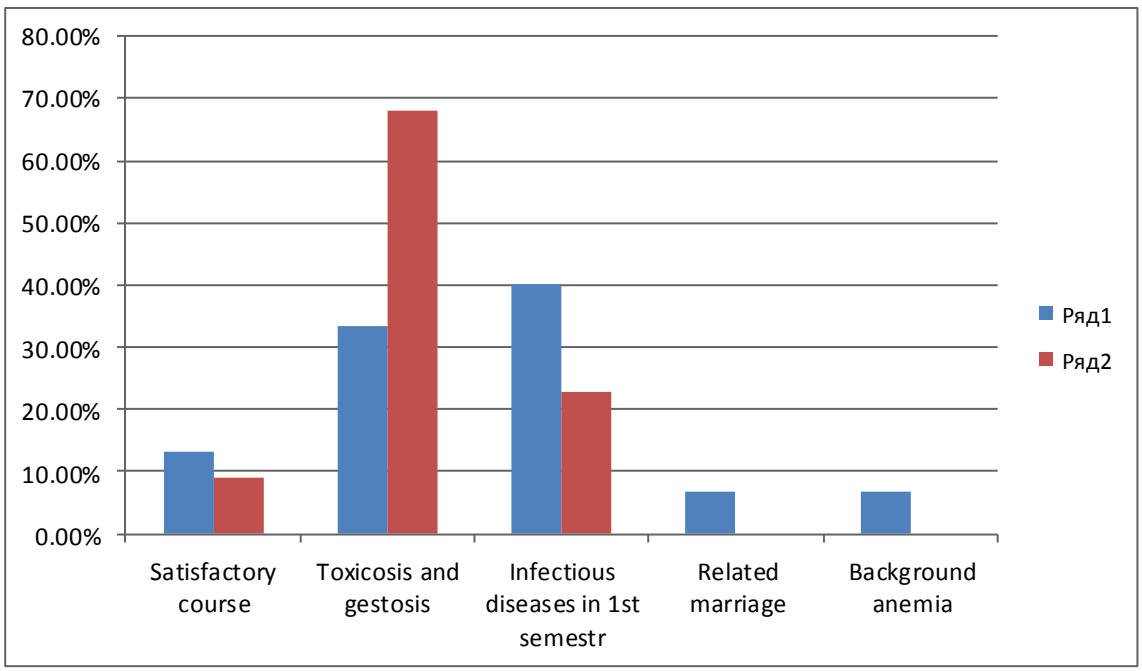


The figure illustrates the types of CHD that were selected for our research. Complicated CHD represented by young children with acute pneumonia on a background of Tetralogy of Fallot (TOF) 4 (10.81%), Open Atrioventricular Communication (OAC) 3 (8.10%) and Transposition of the Great Arteries (TGA) 2

(5.40%). Combined CHD is represented by young children with pneumonia on a background of Ventricular septal defect – Patent foramen ovale (VSD-PFO) 1 (2.70%), Pulmonary stenosis - Patent foramen ovale (PS-PFO) 1 (2.70%), Patent ductus arteriosus - Patent foramen ovale (PDA-PFO) 1 (2.70%), Ventricular septal defect - Patent ductus arteriosus (VSD-PDA) 1 (2.70%), Ventricular septal defect - Atrial septal defect (VSD-ASD) 1 (2.70%) and Ventricular septal defect - Pulmonary stenosis (VSD-PS) 1 (2.70%). We combined all complex and combined CHD into 1 group (experimental group). The second group (control group) is represented by young children with acute pneumonia on the background of VSD-13 (35.13%), ASD-3 (8.10%), PDA-4 (10.81%), and PFO-2 (5.40%)

According to the objectives, to determine the determinants of health that contribute to the development of cardiovascular diseases in children, we studied the anamnestic factors that contribute to the development of CHD in young children (Fig 3.1.1)

(Fig 3.1.1) Pregnancy period



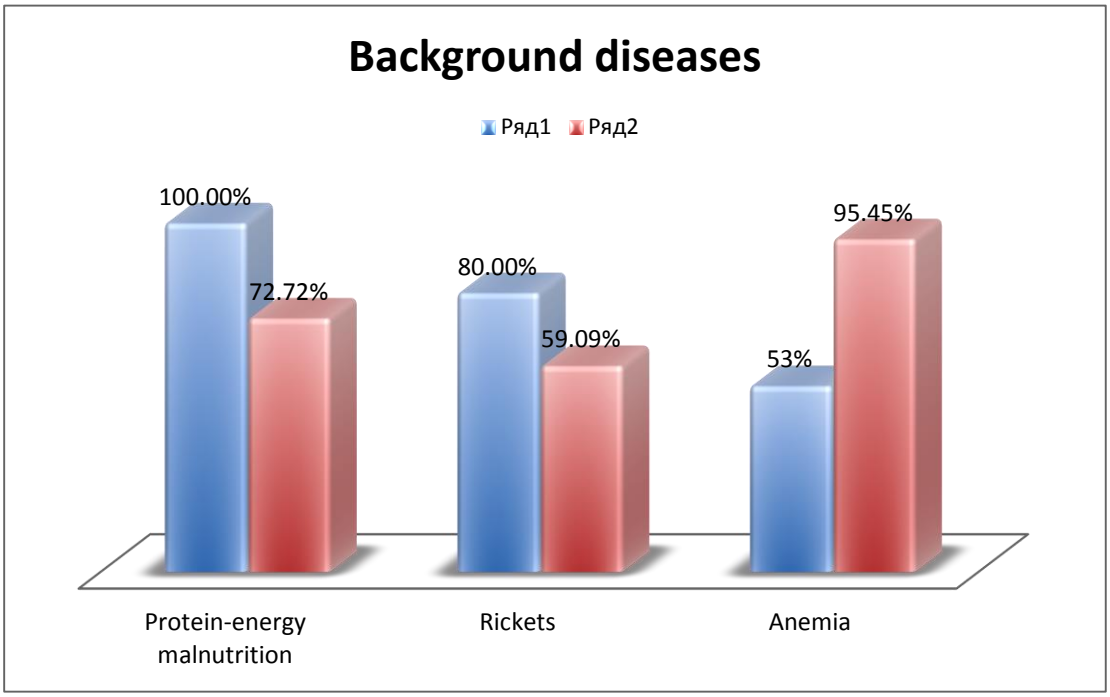
The diagram (Fig 3.1.1) shows that in the first group, the most influential in the development of CHD is the frequent infectious diseases of the mother in the 1st trimester (40%), toxicosis and gestosis take the second place, making up (33.33%),

the lowest indicator in this group, related marriages and anemia of pregnant woman during pregnancy are reported, making up the same figures (6.66%). The second group is dominated by toxicosis and gestosis of the mother during pregnancy, accounting for (68.18%), unlike the first group, related marriages and anemia of pregnant women were not registered.

During the examination of children, in addition to the period of mother's pregnancy, attention was paid to the premorbid background of the child, complaints, clinical data, laboratory data, treatment and the course of the preoperative period.

Premorbid diseases in children with complex congenital heart defects (CHD) are still relevant, as they complicate their course [55]. According to a number of researchers, mainly young children die from complications of premorbid pathology (11.3 per 100 thousand children born alive) [56]. To assess the background diseases, we took the most common diseases in the figure (Fig 3.1.2).

(Fig 3.1.2)

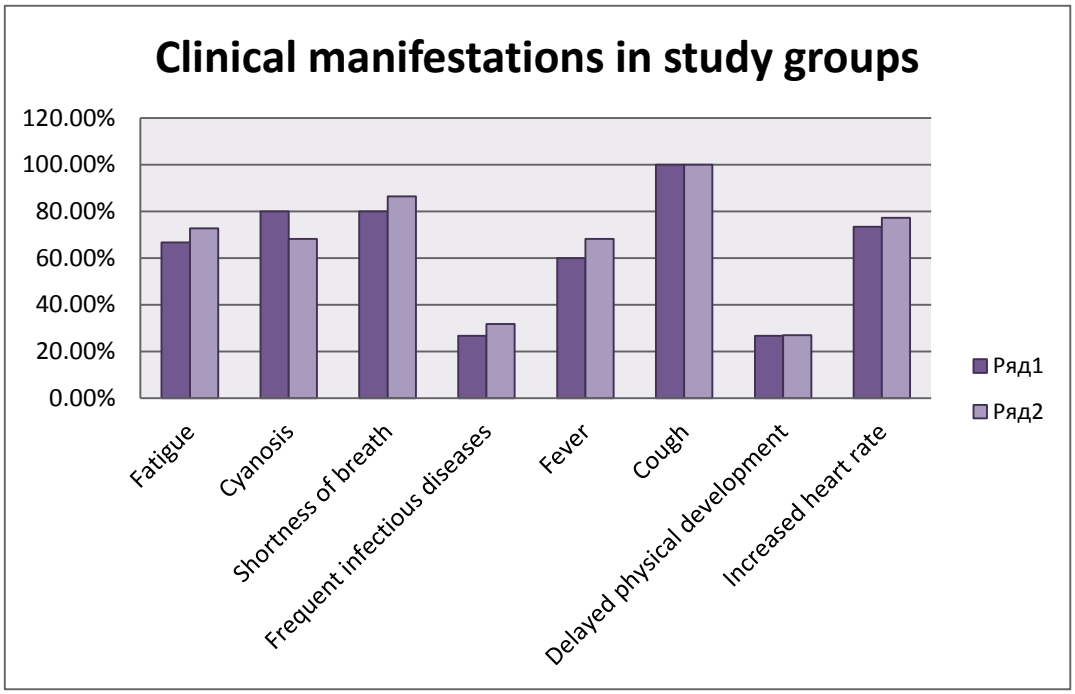


As the graph shows, in the complex and combined CHD group, protein-energy malnutrition (PEM) was found to varying degrees in all 15 (100%) children of this group. Rickets in varying degrees occurred in 12 (80%) children, when anemia was

registered in 8 (53.33%) children showing the lowest numbers. In the second group, anemia of varying degrees occurred in 21 (95.45%) children, showing the highest numbers in this group. PEM in this group was found in 16 (72.72%) children, and rickets in different degrees, as a background disease showed the lowest numbers, occurring in 13 (59.13%) children.

Parental complaints and clinical symptoms were similar in 2 groups. Most often, patients' parents complained of coughing. This complaint in our two groups was the same for all children (100%). After this complaint, shortness of breath was in the next place. In the first group, 12 (80%) children, and in the second group, 19 (83.36%) children. Cyanosis in the first group was in 12 (80%) children; in the second group, children with such symptoms were 15 (68.18%). The increased heart rate in the first group was recorded in 11 (73.33%) children, while in the second group; increased heart rate was observed in 17 (77.27%) children. Fever in the experimental group was observed in 9 (60%) children; in the control group, the number of such children was 15 (68.18%). Parents in the first group in 4 (26.66%) patients noted a child with a delay in physical development when, as in the second group, the number of such children was 6 (27.27%). Complaints of frequent respiratory diseases were observed in 49 (81.7%) patients. The distribution of complaints in patients with acute pneumonia on the background of complex and simple CHD is presented in graph. 3.1.3.

(Graph. 3.1.3).



As can be seen in the graph 3.1.3. the predominant complaint was cough, when, as a delay in physical development, it showed the lowest figures among all complaints of the patients' parents.

In all patients with acute pneumonia, on the background of CHD, the following clinical data were noted: the skin was pale, the osteoarticular system: the occiput was oblique, the rickets were clearly visible, and the Harrison groove was. The muscular system strength and tone are normal. Shortness of breath mixed with a predominance of inspiratory breathing. Percussion in the lungs revealed shortening of pulmonary sound. Auscultation in the basal zones on the background of weakened breathing dry buzzing wheezing. Palpation of apical impulse is spilled. Borders of relative cardiac dullness: right - 1 cm outwards from the parasternal line, left - 1 cm outwards from l. mamillaris, upper II rib. Auscultatory: heart sounds are muffled, rhythmic. When listening along the left edge of the sternum in the III-IV intercostal space, with a punctum maximum III intercostal space, systolic, systole-diastolic (PDA) noise is heard, the noise of the Accent II tone over arteriapulmonalis was heard (Table 3.1.4). The liver is enlarged, the edge is rounded, the texture is soft, and the surface is smooth.

(Table 3.1.4).

Objective inspection		1 group n=15		2 group n=22	
		n	%	n	%
Ausculation of lungs	weakened breathing and wheezing	1	6.66%	2	9.09%
	wheezing in the background hard breathing	14	93.33%	20	90.90%
Percussion of lungs	clear pulmonary sound	1	6.66%	3	13.63%
	blunting	13	86.66%	17	77.27%
	box sound	1	6.66%	2	9.09%
Auscultation of heart	systolic noise	15	100%	19	77.27%
	systoladiastolic noise	-	-	3	13.63%
Percussion of heart	borders are increased	11	73.31%	8	36.36%
	borders are not increased	4	26.66%	14	63.63%

As Table 3.1.4 shows, during an objective examination of children from two groups, we determined that, during auscultation of children of the experimental group, 1 (6.66%) child had different-sized dry and wheezing on the background of

weakened breathing, when, in other children from this group 14 (93.33%) identified dry and wheezing of various sizes against the backdrop of hard breathing. In children of the control group, dry and wheezing of various sizes with weakened breathing were recorded in 2 (9.09%) children, and in the remaining 20 (90.90%) of children from this group, dry and wheezing with different sizes were observed against the background of hard breathing.

In children from the 1st group, in 13 (86.66%) children, a pronounced pulmonary and box sound is determined by low, equal percentages of 1 (6.66%). In all other groups, in 17 (77.27%) children with an attractive sound of light sound, and in children (13.63%) and in 2 (9.09%) children, respectively.

It was found that in children of the first group, systolic noise at all points is determined in 15 (100%) children, in the second group this indicator was found in 19 (86.36%) children, and in the remaining 3 (13.63%) children systole-diastolic murmur was recorded.

Percussion of the borders of the heart in the first group in 11 (73.31%) children was increased, and in the second group in 8 (36.36%) children an increase in all the borders of heart dullness was revealed.

In addition to these indicators, we determined the respiratory rate and heart rate in children of two groups. The average number of respiratory rates in the first group was $M = 44.8 \pm 0.5$ per minute, and in children of the second group, on average, $M = 37.3 \pm 0.3$ per minute.

Heart rate, SpO2, and blood pressure were also determined. (Table 3.1.5)

Table 3.1.5

Indicators of oxygen saturation and blood pressure in children in the study groups.

Indicators	1 research group	2 research group
SaO2, %	80±6 (65-95)	91±0.1 (87-96)
SBP, mm Hg.	90 (85-95)	85 (80-90)
DBP, mm Hg.	60 (55-61)	59 (50-61)
Data are presented as mean (M) ± standard error of the mean (SD). In parentheses are the minimum and maximum values in each group		

3.2 Laboratory and instrumental methods of research in children with acute pneumonia on the background of CHD

According to the objectives, the study of peripheral blood indices depending on the pathology of children shows that in children with complex CHD anemia can occur to varying degrees in isolated cases, when, as in children with simple defects, anemia is more common. And also the number of segmented cells in both groups of children showed low rates from the norm. You also need to pay attention to the increase in the number of lymphocytes in the studied groups in the form of lymphocytosis. (table 3.2.1).

(Table 3.2.1).

Indicators of peripheral blood in the study groups.

Indicators	1 research group	2 research group
Hemoglobin g / l	120±1,5	92,8±2,4
Red blood cells, 10^9	4,23±0,4	3,79±0,3
Platelets	213±0,3	210±0,2
White blood cells	7,83±0,8	8,91±0,9
Stab	3,4±0,2	2,33±0,1
Segmented	39,2±0,4	40,68±0,38
Eosinophils	2,66±0,25	2,0±0,18
Lymphocytes	55,33±0,54	52,8±0,48
Mononocytes	3,93±0,4	4,59±0,4
ESR, mm/s	6,2±0,6	6,4±0,59

Modern laboratory diagnostics allows you to establish an etiological diagnosis in no more than 20-50% of cases, while the features of the clinical and radiological picture cannot be considered "adequately reflecting the etiology of the disease" [15]. In our study, bacteriological examination data allowed us to establish the probable etiology of pneumonia in patients with acute pneumonia against CHD in the main and control groups (Table 3.2.1).

Table 3.2.2. Results of bacteriological culture of the pharynx and nose

	Bacteries	1 group n=15		2 group n=22	
		n	**%**	**N**	**%**
1.	Streptococcus pneumoniae	10	66.66%	8	36.36%
2.	Staphylococcus aureus	3	20%	5	22.72%
3.	Streptococcus agalactiae	1	6.66%	3	13.63%
4.	H.influenzae	1	6.66%	4	18.18%

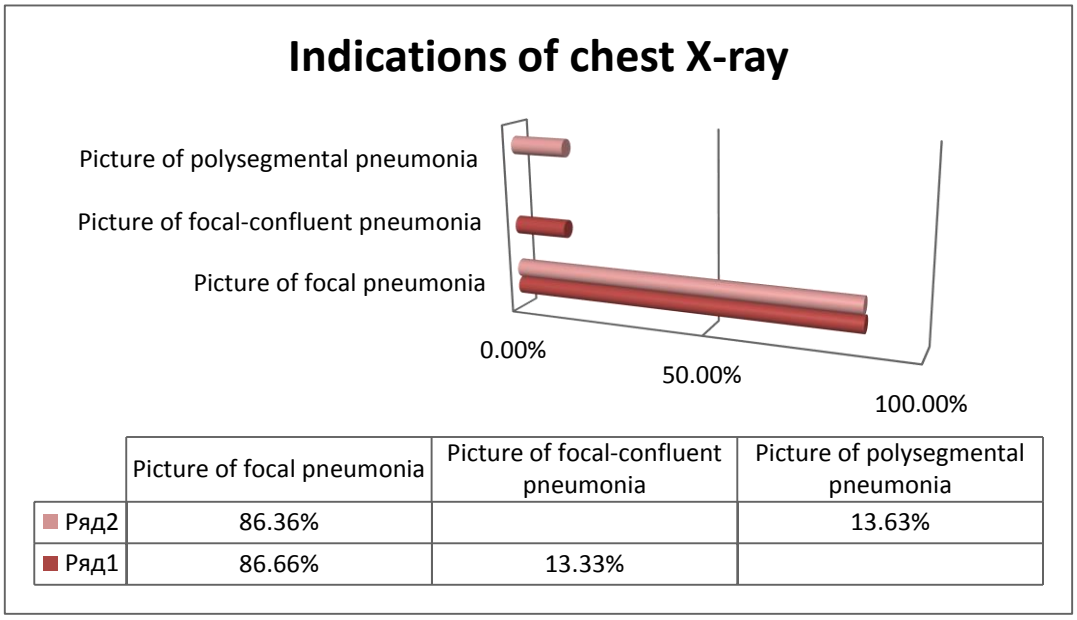
5.	Chlamydia trachomatis	-		2	9.09%

Bacteriological examination of the oropharynx and nose, carried out according to indications in patients of the experimental group, revealed that among the causative agents of acute pneumonia, causative agents from the group Streptococcus pneumoniae prevailed, as they were found in 10 (66.66%); among the children of the control group, bacteria from the Streptococcus pneumoniae group also prevailed, and were registered in 8 (36.36%) children. The rarest causative agents of acute pneumonia in the first group were Streptococcus agalactiae 1 (6.66%) and H. influenzae 1 (6.66%). And in the second group, they turned out to be bacteria from the Chlamydia trachomatis group, which were found in 2 (9.09%) children.

An X-ray examination revealed an increase in heart size mainly due to the RV (67.4%) in children in the initial stage of the disease and an increase in all parts of the heart 43.6% of the examined. In connection with the marked increase in both ventricles, the heart shadow had a spherical shape. Cardiomegaly was characterized by a significant increase in the cardiothoracic index (CTI) and exceeded 55% and reached 70-85%. 45.8% showed signs of venous congestion in the lungs. In lateral and oblique projections, an increase in all cavities of the heart was detected with predominant hypertrophy of the right ventricle and atrium.

X-ray changes from the lungs are shown in (tab. 3.2.3)

Table 3.2.3



Thus, radiological changes in the lungs showed that focal and focal-confluent pneumonia occurred in children of the first group, when, in the second group, along with focal changes in the lungs, polysegmental changes were also detected.

We also studied the ECG signs of all CHD in the study groups (table. 3.2.4)

Table 3.2.4 ECG indication of children with pneumonia on the background of CHD

Indications		n	1-research group n=15	n	2-research group n=22
Electric axis of the heart	rejected to the right	12	80%	20	90.90%
	rejected to the left	3	20%	-	-
Hypertrophy of the heart chambers	right ventricular hypertrophy	1	6.66%	-	-
	left ventricular hypertrophy	-		4	18.18%
	hypertrophy of the right departments	5	33.33%	13	59.09%

	hypertrophy of the left atrium and both ventricles	1	6.66%	1	4.54%
	hypertrophy of both ventricles	1	6.66%	2	9.09%
	hypertrophy of the right and left atrium	3	20%	1	4.54%
	hypertrophy of all departments	3	20%	1	4.54%
Blockade	incomplete blockade of the right leg bundles of His	10	66.66%	13	59.09%
	Blockade of AV conductivity	2	13.33%	-	
	intraventricular conduction retardation	3	20%	3	13.63%
Violation of the repolarization	violation of the repolarization of both ventricles	1	6.66%	-	
	early repolarization syndrome	1	6.66%	-	

The most highly informative non-invasive method for examining patients with CHD is echocardiography [35,40]. The main advantage of echocardiography is that it is not invasive in real time that you can evaluate the size and movement of the heart structures, obtain a characteristic of intracardiac hemodynamics, determine the pressure in the chambers of the heart and LA. However, the comparability of

the results of echocardiography with the data obtained by cardiac catheterization remains controversial.

Any pathological changes in the cardiovascular system, and even more so, a change in the pre and post-load characteristics of the heart, developing with congenital heart defects, lead to remodeling of the heart and blood vessels (Pfeffer M.A., 1990; Sokolov A.A., 2009). (Table 3.2.5).

Table 3.2.5 Echocardiographic heart indicators in children study groups

Indication	Norm	Pneumonia+complex and combined CHD	Pneumonia+simple CHD
		1 group	2 group
SPRV, mm Hg.	22,8±0,1	27,3± 2,3*	25,2±2,1
EDV LV,%	98,7±13,3	90,7±2,6*	95,4±11,6
PA,%	100,2±9,1	120,9±11,3*	112,9±12,9*
LA,%	96,5±11,9	94,3±14,8	93,8±8,0
RA,%	115,3±18,9	212,0±31,7*	129,7±18,5*
EF, %	58,5±2,2	34,5±1,23*	52,7±1,0*

*** – statistically significant differences with the comparison group (p <0.05).**

During echocardiography, dilations of the left and right parts of the heart, hypertrophy of the right parts, and relative insufficiency of the mitral and tricuspid valves were found. High pulmonary hypertension in the first group was found in children with TOF, AVC and VSD + ASD (26.66%). In the second group, PH was registered only in children with VSD (22.72%). This suggests that acute pneumonia can occur not only with high hypertension in children with CHD.Также СН в первой группе была обнаружена у 10 (66.66%) детей.

I st. - in 2 (20%), IIa st. - in (50%), IIb st. - in (30%) children.

And in the second group, HF was registered in 11 (50%) children, of which 6 (54.54%) had I st., 5 (45.45%) IIa st., IIb st. - was not found.

3.3. Rational etiotropic treatment in children with acute pneumonia on the background of CHD

ABT has a decisive influence on the prognosis of pneumonia, therefore, with a reliable diagnosis or in a patient in serious condition with a probable diagnosis, it should be started immediately.

The duration of ABT determines the severity and course of the disease, as well as the presence of background diseases. With CAP caused by typical bacteria, the duration of therapy is usually 7–10 days, and atypical bacteria 10–14 days [3, 13, 15, 16]. ABT can be completed 3-4 days after persistent normalization of body temperature [3].

Recent studies have shown the possibility of reducing the duration of ABT in children with CAP by 1.5–2 times (from 9–11 to 5–6 days) under the control of blood levels. This makes it possible to reduce the consumption of ABP without

reducing efficiency, shorten hospitalization, reduce the number of undesirable drug events, and also help to restrain the growth of bacterial resistance.

Infectious agents that cause acute pneumonia in young children and antibiotic therapy are shown below in table 3.3.5.

Table 3.3.5

Infection agents	**%**	**Antibiotics**	**Alternatives**
Streptococcus pneumoniae	66.66%	Amoxicillin/clavulanate, ampicillin/sulbactam	cefazolin,cefuroxime, ceftriaxone,cefotaxime, lincomycin,carbapenems
Staphylococcus aureus	20%	Oxacillin, cefazolin	Vancomycin, linezolid
Streptocossus agalacticae	6.66%	Ampicillin, benzylpenicillin, amoxicillin	IZAP, Cephalosporins-2 row
H. influenzae	6.66%	Amoxicillin,ampicillin	IZAP, azitromycin, claritromycin

The features of the bacterial spectrum of acute pneumonia in young children with complex CHD consisted in the fact that Streptococcus pneumoniae was 2 times

more likely to become the causative agent of the disease and amounted to 67%, in 20% of cases the causative agent was Staphylococcus aureus.

Conclusion to chapter III

ABT has a decisive influence on the prognosis of pneumonia, therefore, with a reliable diagnosis or in a patient in serious condition with a probable diagnosis, it should be started immediately.

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The features of the bacterial spectrum of acute pneumonia in young children with complex CHD consisted in the fact that Streptococcus pneumoniae was 2 times more likely to become the causative agent of the disease and amounted to 67%, in 20% of cases the causative agent was Staphylococcus aureus.

Conclusions

1. It was revealed that in acute pneumonia in young children with complex CHD there was an acute onset, a greater number of small foci in both lungs, with a predominant location in the lower sections. A more varied auscultatory picture was also noted (wet small-bubbling rales, crepitus for up to 3 days, short-lived dry wheezing rales) without a pronounced tendency to a protracted course.
2. The features of the bacterial spectrum of acute pneumonia in young children with complex CHD consisted in the fact that Streptococcus pneumoniae was 2 times more likely to become the causative agent of the disease and amounted to 67%, in 20% of cases the causative agent was Staphylococcus aureus.
3. The most rational antibiotic therapy scheme for acute pneumonia for children with complex CHD has been developed. The scheme includes the use of ceftriaxone in a dose of 50 mg / kg from 7 to 9 days in combination with gentamicin in a dose of 1-2 mg / kg for 5 days, starting from the first day of illness, which reduced the stay in a bed to 2 days (in comparison with standard treatment).

LIST OF PUBLICATIONS ON THE THEME OF THE DISSERTATION

Based on the results of the research, scientific publications were prepared in the form of thesises and articles

1	Akromova (Mamadjanova) N.A.	«Some types of background diseases in complex congenital heart defects in children»	Scientific and practical journal for students and young scientists "Forcipe". Saint-Petersburg -2019.	Thesis
2.	Akromova (Mamadjanova) N.A.	«Analysis of medical diagnostic bronchoscopies in children in TashPMI clinics»	International scientific journal №1.1 (108) 2019 collection of scientific papers of 73rd Scientific-practical conference of medical students and young scientists with international participation. Actual problems of modern medicine. Samarkand-2019.	Thesis
3	Akromova (Mamadjanova) N.A.	«English language as irreplaceable tool to deepen and widen specialty knowledge in medicine»	Annual collection of the Student Science conference at Tashkent Pediatric Medical Institute "Young scientific achievements in the field of pediatrics". Tashkent-2018.	Thesis
4	Akromova (Mamadjanova) N.A.	«NT-proBNP marker of cardiac dysfunction in secondary pulmonary hypertension in children»	Journal "Medical sciences mathematics and physics" Colloquium-journal No. 6 (58), 2020 Część 3 Warsaw, Poland-2020	Article

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