ANNOTATION

of dissertation work of Kemelbekov Kanatzhan Saukhanbekovich on the topic of «Surgical care improvements in congenital malformations of the cardiovascular system" submitted for the degree of Philosophy doctor (PhD) in the specialty 6D110100 – «Medicine»

Actuality of the thesis. Congenital Heart Defects are an important problem in pediatrics and cardiac surgery. The importance of this problem is based on its high prevalence. Significant health impairments associated with Congenital Heart Disease limit the activity of the sick children and thus necessitate their early surgical correction (Bokeria L.A., Sarsenbayev G.I., 2008; Gadaev A.S., 2011).

According to WHO (2019), CHD occurs in 1% of newborns in any country, regardless of socio-economic status and the level of development of medicine. The range of identified Congenital Heart Disease incidence varies widely from 2.4 to 14.15 per 1000 live births (Sharykin A., 2009). In Kazakhstan, each year born about 3,000 children with Congenital Heart Disease, from whom 80% die before the age of one year, up to 27% during the first month and up to 20% during the first weeks of life. The percentage of birth and detection of children with this patholstudy groupy is increasing each year (Tulegenova A.G., 2012). In our country, in 2015, the incidence of Congenital Heart Disease in children was 265.8 per 100,000 population [statistical collection. Astana, 2016]. There is a tendency to increase the prevalence of this patholstudy groupy.

In accordance with the presented data, reduction of mortality from Congenital Heart Disease in infants and improvement of prstudy groupnosis for recovery in the newborns are among the unsolved and important issues in pediatric cardiac surgery, pediatric surgery and pediatrics. Thus, an improvement of surgical care of the newborns and infants with Congenital Heart Disease is an actual question, which demands a scientific research in this area.

Purpose. Optimization of measures for providing surgical care to newborns with congenital heart diseases, taking into account the structural features of neonatal cardiac surgery, risk factors, and mortality rates.

Objectives:

1. Analysis of the structure and prevalence of congenital heart defects in newborns and infants;
2. Identification of risk factors and causes of death of congenital heart diseases;
3. Investigation of the results of mini-invasive surgery in newborns with critical congenital heart defects.
4. Improving surgical care for newborns and infants with congenital heart defect

Study object: 424 newborns and children under 1 year of age with a diagnosis of congenital heart defects, established for the first time in life.

Study subject: Congenital Heart Disease, echocardistudy groupraphy, ECG and chest X-ray.

Study design: The research was conducted in two stages: the first stage was a case-control study of the distribution and structure of congenital heart diseases, risk factors, and mortality rates. the second stage was a prospective analysis of the use of mini-invasive thoracotomic "clipping" and classic thoracotomic "ligation" in patients with an open arterial duct.

Scientific novelty of study results:

- For the first time, as a result of complex studies, a deep analysis of the dynamics of the spread of Congenital Heart Disease among newborns and infants in the Zhambyl region, including the most common types (interventricular, malformations of the inter-cardiac septa, tetralstudy groupy of Fallot and patent ductus arteriosus) was carried out.
- Identified a group of risk factors that have a significant impact on the treatment of newborns with Congenital Heart Disease and conducted a deep analysis of early and late neonatal causes of death.
- Formed steps to improve the treatment of newborns with Congenital Heart Disease, especially in critical defects using minimally invasive thoracoscopically and thoracotomies surgical techniques (patent for utility model "Method of clipping of patent ductus arteriosus (PDA) in preterm and term infants in stationary conditions" (Registration No. 2020/007. 2).
- A General algorithm for organizing medical care for suspected Congenital Heart Disease in infants in the postnatal period and antenatal fetus has been developed.

Practical significance. The data provided in the practical part of the dissertation work and obtained during the research on the structure and distribution of Congenital Heart Disease among infants, risk factors and causes of death that lead to their occurrence, can serve as the basis for the development of a regional prstudy groupram aimed at improving pediatric and cardiac care. And also, the data obtained in the study can be submitted in a single registration and monitoring of existing children with the goal of improving medical care and health institutions at all levels of Zhambyl region. In this regard, a "General algorithm for organizing medical care for suspected Congenital Heart Disease in infants in the postnatal period and antenatal fetus" was developed.

The result of the research work shows the need for a differentiated treatment of children with congenital malformations; preterm infants who are in critical condition in the intensive care unit, the need for surgery without the transfer of patients to the operating room; the advantages of mini-invasive thoracotomies and thoracoscopic clipping (Patent utility model from 10.01.2020 g. Application No. 2020/007.2). Systematization of the material allowed to standardize the attitude to the problem of surgical treatment of children. The study made it possible to improve the results of surgical treatment of children with PDA.

Key issues of the thesis:

1. The prevalence of Congenital Heart Disease among children under one year of age was revealed: ventricular septal defect, ventricular septal defect by the type of open oval window and open arterial duct.

2. The highest risk factors for developing Congenital Heart Disease in children are the age of the parents, the number of pregnancies, infectious and inflammatory diseases of the mother during pregnancy, intrauterine fetal infections, and the presence of a history of Congenital Heart Disease in the mother. Also, significant influence on the development of patholstudy groupy has cases directly related to pregnancy (severe toxicosis, gestosis of pregnant women, anemia). The main causes of death in children of the first age were complex combined heart defects, exacerbations that occurred during acute correction and complications in the postoperative period.

3. Based on the results of a study of mini-invasive surgical treatment of newborns with congenital critical heart defects, a surgical correction of the congenital open arterial duct was performed in premature newborns. As a result of surgical intervention, the number of complications and postoperative mortality rates decreased in premature children with Congenital Heart Disease.

4. The development of a General algorithm for organizing medical care for suspected Congenital Heart Disease in infants during the antenatal and postnatal period served as the basis for organizing the registration (register) of patients with Congenital Heart Disease and monitoring at the regional and regional level.

Presentation of the results. The materials of thesis were presented at: International scientific-practical conference "the 9th European Conference on Biolstudy groupy and Medical Science" (Vienna, Austria 5 March 2016); 55 - th International scientific-practical conference "Modern medicine: current issues" (Novosibirsk, Russia 4 may 2016.), International scientific-practical conference" Priorities and strategies for the development of medicine and pharmacolstudy groupy "(Tolyatti, Russian Federation 1 June 2016), the I International scientific-practical conference" Actual problems of clinical medicine " (G. Taldykorgan, June 10, 2016), the International scientific and practical conference "Priorities of world science: experiment and scientific discussion" (Kemerovo, Russian Federation, June 22, 2016) and the International scientific and practical conference "Modern medicine: new approaches and current research" (Moscow, Russian Federation, 2018, 2019).

Publications: on the topic of the dissertation, 26 publications were published, including 6 articles in journals recommended by the Committee for control in the field of education and science of the MES of Kazakhstan, 14 collections of foreign and international scientific conferences (Austria, Russia and Kazakhstan), 3 publications (Journal of Cardiovascular Pharmacology 2021(quartile - Q2, percentile-82); Current Pediatric Research 2021 (quartile - Q4, percentile-30); Systematic Reviews in Pharmacy 2020(quartile - Q2, percentile-68)) in foreign journals included in the Scopus database. According to the results of the dissertation work, 1 textbook ("Congenital malformations of mature and premature babies" 2019) was published and 2 copyright

("Congenital malformations of mature and premature babies") on the subject of the State Register of rights protected by the author's right from May 17, 2019 No. 3403 and "modern minimally invasive surgical methods of treatment of open arterial duct in premature babies" State Register of rights to objects protected by author's rights No. 13898 from December 11, 2020). was obtained.

Conclusions:

1. The prevalence of Congenital Heart Disease among infants in the Zhambyl region (2014-2018) was 9.0±1.2 per 1000 children and had no gender differences (53% for girls and 47% for boys). At the same time, isolated ventricular septal defect (4.8±0.5 per 1000 population), atrial septal defect (0.45±0.1) and Fallot tetrad (0.45±0.1) are the most common among Congenital Heart Disease. Among premature infants, an open arterial duct is often found-2.3±0.1, which increases the normal population distribution by 6 times (0.38±0.08).

2. The most important risk factors for developing Congenital Heart Disease in children were medico-biolstudy groupical factors: Congenital Heart Disease in the mother (study group=4.1±0.3 vs. control group=4.1±0.2, $p<0.05$ r=0.74), gestosis and fetal infections (study group=2.9±0.7 vs. control group=1.7±0.5; $p<0.001$), termination of pregnancy (study group=12.5±0.4 vs. control group=5.1±0.2; $p<0.001$), acute respiratory viral diseases (study group=18.3±0.7 vs. control group=10.8±0.3; $p<0.001$), chronic pyelonephritis (study group=8.8±0.3 vs. control group=2.7±0.5; $p<0.001$), and preeclampsia (study group=4.4±0.1 vs control group=2.7±0.5; $p<0.001$). According to the results of our study, anemia (study group=49.2±1.5 g / control group=13.5±1.6 , $p<0.001$) in pregnant women is the greatest risk factor for the development of Congenital Heart Disease. Correlation - strong, positive r=0.890 ($p>0.05$). In 2014-2018, 46 cases of death from Congenital Heart Disease were carried out in the Zhambyl region among infants. Infant mortality from this disease was 7 (8.3%) in 2014, 13 (14.1%) in 2015, 14 (13.8%) in 2016, 7 (13.8%) in 2017, and 5(7.4%) in 2018. At the same time, a high indicator was observed in 2015 and the growth increased by 1.8 times.

3. Results of mini-invasive surgical treatment in newborns with critical congenital heart defects showed complete correction of the congenital open arterial duct in premature newborns. An improved method of minimally invasive thoracotomy "clipping" allowed the closure of the defect in children of any age and any weight. The technolstudy groupy of clipping OAP through mini-thoracotomy outside the pleural route allows to achieve in 95.4% of cases complete cessation of blood flow through the OAP in the first day after surgery, in 100% of cases correction of clinically significant blood flow in the child, more than 68% - the transition from ventilator to independent breathing. Timely surgical closure of a hemodynamically important PDA in preterm infants reduces the time of mechanical ventilation. Surgical intervention for PDA in premature babies with the use of the improved method reduced the rates of postoperative mortality and complications.

4. To optimize the process of organizing care for children with Congenital Heart Disease, diagnostic criteria for Congenital Heart Disease, guidelines and an algorithm for identifying Congenital Heart Disease during the initial treatment and examination of the child, as well as guidelines for health departments for organizing the registration (register) of patients with Congenital Heart Disease, as well as monitoring systems at the regional and regional levels have been developed.