

DOI: 10.5455/msm.2017.29.73-75

Received: 13 February 2017; Accepted: 10 March 2017

© 2017 Zijo Begic, Sanko Pandur, Edo Omerbasic, Almira Kadic, Mirza Halimic

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

REVIEW

Mater Sociomed. 2017 Mar; 29(1): 73-75

Evaluation of Congenital Heart Defects Treatment Options—Establishment of Pediatric Cardiology/Cardiosurgery in Bosnia and Herzegovina

Zijo Begic¹, Sanko Pandur², Edo Omerbasic², Almira Kadic¹, Mirza Halimic¹

¹Pediatric Clinic, University Clinical Center Sarajevo, Sarajevo, Bosnia and Herzegovina
²Heart Center, University Clinical Center Sarajevo, Sarajevo, Bosnia and Herzegovina

Corresponding author: Zijo Begic, Pediatric Clinic, University Clinical Center Sarajevo, Sarajevo, Bosnia and Herzegovina. E-mail: begiczijo@gmail.com. ORCID ID: <http://orcid.org/0000-0002-1863-5755>

ABSTRACT

Introduction: Modern pediatric cardiology mainly deals with congenital heart defects (CHD), as the most common congenital anomalies. In most cases CHD requires surgical or interventional treatment.

Goal: The goal of the research was to evaluate CHD treatment at Pediatric Clinic, University Clinical Center (UCC) Sarajevo, Bosnia and Herzegovina (B&H). UCC Sarajevo is the only institution in B&H where cardiac treatment of CHD in pediatric population is performed. Pediatric cardiosurgery has started to develop in Bosnia and Herzegovina in April 1997. **Patients and methods:** Study included 745 patients (period from April 1997 to January 2017). **Results:** Cardiac treatment was performed on 745 patients with CHD, 541 (72.6%) of them were acyanotic patients and 204 (27.4%) were cyanotic patients. Reoperation was performed in 49 (6.5%) of patients. Out of total number of patients, 59 (7.9%) died. In 660 children (88.5%) a complete correction and in 85 (11.5%) a palliative operation/correction was performed. Defects with left to right shunt were present in 397 (53.2%) patients, complex heart defects with Tetralogy of Fallot in 173 (23.2%), obstructive heart defects in 106 (14.2%), obstructive heart defects with shunt in 53 (7.1%), and others in 16 (2.1%) of patients. During surgery, extracorporeal circulation was regulated in 554 (74.3%) patients. Peri and early postoperative complications occurred in 180 (24.1%) of patients. During this period 24 pacemakers were implanted and 24 radiofrequency ablations were performed. **Conclusion:** Results of CHD cardiac treatment in childhood, which took place simultaneously, followed by the contractual joint programs and individual work of the Bosnian and Herzegovinian team has reached the highest level in the last two years, not only by the number,

type and complexity of corrected CHD, but also by the age and body weight of the patients who underwent surgery, and development of invasive procedures, arrhythmology, pacemaker placement, intensive peri and postoperative treatment. That led pediatric cardiac surgery of UCC Sarajevo, to a position of leading center in the region.

Keywords: congenital heart defects, treatment, trend.

1. INTRODUCTION

Pediatric cardiology has always been a basis of pediatrics, simultaneously making its integration and having significant affects on the reduction of perinatal mortality; which is the backbone of the development for evaluating medicine in a country (1,2). Modern pediatric cardiology mainly deals with congenital heart defects (CHD); the most common congenital anomalies.

The incidence of congenital heart disease depends on the development of health system of a country or of diagnostic methods that are available to a doctor. Before the introduction of echocardiography, incidence figures ranged from five to eight per 1 000 live births but better diagnosis has detected many more with milder forms, so that current estimates range from eight to 12 per 1 000 live births (3).

In stillborn children, the incidence is 2%, and in 10-25% spontaneous abortions fetus had CHD. At least 2% of premature infants also had CHD, excluding persistent ductus arteriosus (PDA)—premature infants and infants up to the end of the third month, as well as the bicuspid aortic valve (bicuspid aortic valve can be found in about 1% of adults). The risk of CHD in the same family depends on the etiology of the anomaly as well as

from the existence of extracardiac malformations and other signs of certain hereditary diseases. Approximately 2-4% of all CHD are associated with detrimental factors from the environment, 3% of children with CHD have a monogenic caused inherited disease, and 5-8% of patients with CHD have a chromosomal aberration (4).

About 85% of children have a multifactorial etiology of CHD, which is usually the only malformation in a child, and is result of interaction of many, in individual effect, still undefined genes and a number of other causes (5,6,7). Progress in understanding of etiology and pathogenesis of these conditions, that occurred lately, helps in the diagnosis and monitoring of these patients, as well as in the genetic counseling of the family in which we have CHD. Hereditary foundation of CHD and genetic mechanisms of inheritance are the subject of intensive examination. In most cases CHD demand, surgical or interventional treatment.

2. AIM

The aim of the research was to evaluate the treatment of CHD in Bosnia and Herzegovina (B&H).

3. PATIENTS AND METHODS:

Research was conducted at the Pediatric Clinic, UCC Sarajevo, Bosnia and Herzegovina and it included period from April 1997 to January 2017. Total of 745 patients were involved in the research. Pediatric cardiosurgery has started to develop in Bosnia and Herzegovina in April 1997.

4. RESULTS

Cardiac treatment was performed on 745 patients with CHD, 541 (72.6%) of them were acyanotic patients and 204 (27.4%) were cyanotic patients. Reoperation was performed in 49 (6.5%) patients. Out of total number of patients, 59 (7.9%) died (Figure 1).

In 660 children (88.5%) a complete correction and in 85 (11.5%) a palliative operation/correction was performed. Defects with left to right shunt were present in 397 (53.2%) patients, complex heart defects with Tetralogy of Fallot in 173 (23.2%), obstructive heart defects in 106 (14.2%), obstructive heart defects with shunt in 53 (7.1%), and others in 16 (2.1%) patients (Figure 2).

Isolated CHD was found in 489 (65.6%) patients. CHD associated with a genetic syndrome was present in 70 patients (9.3%), of which 61 (87.1%) patients had Down syndrome. During surgery, extracorporeal circulation was regulated in 554 (74.3%) patients. Peri and early postoperative complications occurred in 180 (24.1%) patients. During this period 24 pacemakers were implanted and 24 radiofrequency ablations were performed.

The Austrian team did 332 operations, Swedish 226, USA team 50 and local team, independently without supervision, did 137 operations (Figure 3).

5. DISCUSSION

After many years of international cooperation, where the visiting teams performed corrections of CHD, gradually pediatric cardiosurgery of Bosnia and Herzegovina started to develop. The first 50 patients were operated by W. Novick (Memphis, USA), during the period 1997-1999 (with the assis-

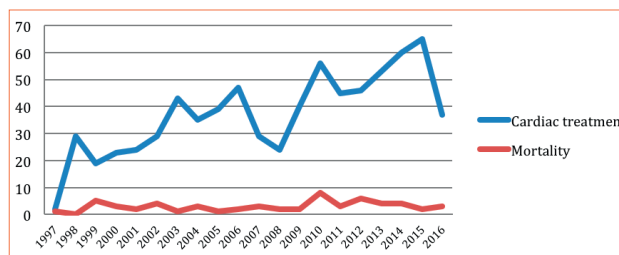


Figure 1. Relation between cardiac treatment and mortality during period April 1997 – January 2017

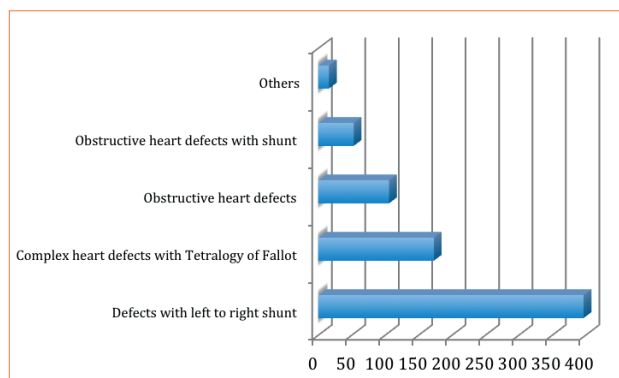


Figure 2. Distribution of patients according to CHD (April 1997 – January 2017)

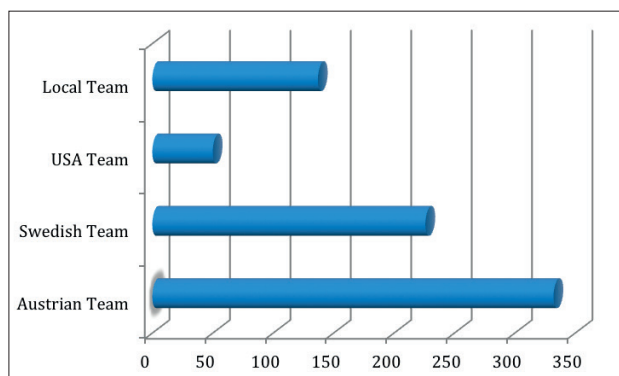


Figure 3. Local team, independently without supervision, did 137 corrections (April 1997 – January 2017)

tance of B&H cardiac surgeons, anesthetists, perfusionists and other staff). From 2000 to 2016 Austrian team, led by G. Wollonek (Vienna, Austria), operated 332 patients. Since 2000, at the same time, local team has started with their work. From 2006 Swedish team led by J.P. Johansson (Lund, Sweden) operated 226 children (up to 2015). Since 2016, CHD corrections were done by local team independently. Along with cardiac surgery, invasive diagnostic has also progressively evolved towards diagnostic and interventional catheterization.

Despite advances in medical and surgical care, the etiology of CHD is still not completely understood; and with more children with CHD surviving to adulthood and starting families, it becomes even more critical to understand the origins of CHD (8).

In Bosnia and Herzegovina in the foreground comes the issue of prenatal or preventive cardiology. Today we talk about prenatal (preventive) cardiology which actually consists of fetal echocardiography and fetal interventional cardiology. The basic need for fetal echocardiography determine factors that increase the risk of prenatal heart disease and they are actually indications for fetal echocardiography. They are di-

vided mostly into two groups: a group of elevated risk factors where we include CHD in the family and diseases of pregnant women and a group of pathological findings in pregnancy that are called fetal or factors related to the fetus. Factors related to the family are parents with CHD, younger child or a fetus with CHD, chromosomal abnormalities, genetic disorders or syndromes with congenital heart disease or cardiomyopathy. Factors related to the mother are primarily metabolic diseases, particularly in poor control at an early gestational age, such as diabetes, phenylketonuria, exposure of the mother to known cardiogenic teratogenic factors, anticonvulsants, retinoic acid, lithium, etc., as well as virus infections (rubella, CMV, Coxsackie, parvovirus) and toxoplasmosis. CHD in the mother and family history of cardiomyopathy, treatment of the mother with NSAIDs after 25 to 30 weeks of gestation.

Factors related to the fetus are suspected CHD or disease during gynecological examinations, fetal hydrops, hydrothorax, extracardiac malformation (omphalocele, diaphragmatic hernia, duodenal atresia, tracheal esophageal fistula, cystic hygroma), chromosomopathy, thickening of the nuchal region, arrhythmia and other conditions which are known to cause heart failure (well vascularized tumors, arteriovenous fistula, lack of the ductus venosus, acardiac twin, feto-fetal transfusion).

With the development of prenatal diagnostics Bosnia and Herzegovina would come in line with the western countries. Surely this requires education of personnel, as well as the development of infrastructure of the health system itself. Continuation of successful trend of development of children's cardiology and cardiac surgery depends primarily on the level of investment in training of existing staff, education and training of new staff, and also investment in infrastructure and diagnostic methods (9-11).

6. CONCLUSION

CHD treatment include diagnostics and therapy. The gold standard of diagnosis is echocardiography with complementary non-invasive methods: patient history, physical examination, X ray, electrocardiography, laboratory test, phonocardiography, fetal echocardiography, transesophageal echocardiography, ergometry, continuous ECG Holter monitoring, tilt table test, ambulatory continuous monitoring of blood pressure, MRI, PET CT, and invasive radioisotope methods, cardiac catheterization with angiocardiography. The development of pediatric cardiology/cardiac surgery has led to the introduction of new diagnostic methods and therapeutics procedures. It has increased the number of CHD corrections, especially of complex heart defects, and moved the time of correction in infancy. It has raised the preferring use of catheterization, and brought our country closer to the countries of Western Europe, by imposing the imperative of future development. Results of CHD cardiac treatment in childhood, which took place simultaneously, followed by the

contractual joint programs and individual work of the Bosnian and Herzegovinian team has reached the highest level in the last two years, not only by the number, type and complexity of corrected CHD, but also by the age and body weight of the patients who underwent surgery, and development of invasive procedures, arrhythmology, pacemaker installation, intensive peri and postoperative treatment. That led pediatric cardiac surgery of UCC Sarajevo, to a position of leading center in the region. Unfortunately, all of the progress is not the result of a clear concept, nor work and responsibilities of the institutions and the health system, it is rather a result of individual efforts with all the risk that they carry. There is no clear and safe future of continuing of development and operation of pediatric cardiac surgery treatment of CHD in the complex social situation.

• Conflict of interest: none declared.

REFERENCES

1. Begic Z, Dinarevic SM, Pesto S, Begic E, Dobraca A, Masic I. Evaluation of Diagnostic Methods in the Differentiation of Heart Murmurs in Children. *Acta Inform Med.* 2016; 24(2): 94-8. doi:10.5455/aim.2016.24.94-98.
2. Begic Z, Begic E, Mesihovic-Dinarevic S, Masic I, Pesto S, Halimic M, et al. The Use of Continuous Electrocardiographic Holter Monitoring in Pediatric Cardiology. *Acta Inform Med.* 2016; 24(4): 253-6. doi:10.5455/aim.2016.24.253-256.
3. Hoffman JI. The global burden of congenital heart disease. *Cardiovascular Journal of Africa.* 2013; 24(4): 141-5. doi:10.5830/CVJA-2013-028.
4. McCrindle WB, Shaffer MK, Kan SJ, Zahka GK, Rowe AS, Kidd L. Cardinal Clinical Signs in the Differentiation of Heart Murmurs in Children. *Arch Pediatr Adolesc Med.* 1996; 150: 169-74.
5. Etchells E, Bell C, Robb K. Does This Patient Have an Abnormal Systolic Murmur? *JAMA.* 1997; 277: 564-71.
6. Gessner HI. What Makes a Heart Murmur Innocent? *Pediatric Annals.* 1997; 26: 282-91.
7. Amaral F, Granzotti JA. Cardiologic evaluation of children with suspected heart disease: experience of a public outpatient clinic in Brazil. *Sao Paulo Med J.* 1999 May 6; 117(3): 101-7.
8. Richards AA, Garg V. Genetics of Congenital Heart Disease. *Current Cardiology Reviews.* 2010; 6(2): 91-7. doi:10.2174/157340310791162703.
9. Masic I, Rahimic M, Dilic M, Kadribasic R, Toromanovic S. Socio-medical characteristics of coronary disease in Bosnia and Herzegovina and the world. *Mater Sociomed.* 2011; 23(3): 171-83. doi: 10.5455/msm.2011.23.171-183.
10. Masic I, Alajbegovic J. The significance of the psychosocial factors influence in pathogenesis of cardiovascular disease. *International journal of preventive medicine.* 2013; 4(11): 1323-30.
11. Masic I, Dilic M, Raljevic E, Vulic D, Mott D. Trends of cardiovascular diseases in Bosnia and Herzegovina. *Med Arh.* 2010; 64(5): 260-3,9-11