



TRIP REPORT KEMEROVO, RUSSIA

APRIL 6TH THROUGH 20TH, 2013



International Children's
Heart Foundation
Where Hope Comes to Life

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Congenital Heart Disease

A. Definition

Congenital means present at birth. Congenital heart disease (CHD) refers to those diseases of the heart which occur during the development of the heart in the fetus and are then present at birth (*Cannon*, 139).

CHD occurs when the heart or blood vessels connected to it do not develop normally before birth usually involving either an obstruction to blood flow or an abnormal routing of blood through the heart chambers. The structural defect may occur in the heart wall, the heart's main blood vessels, the heart valves, or a combination of these structures (*Topol*, 205).

B. Symptoms

CHD can present itself in a number of ways. Cyanosis, or blue-tinted skin, is one of the most common symptoms in newborns with CHD. Cyanosis indicates that not enough oxygenated blood is circulating throughout the body. Another common symptom is clubbing of the hands and feet. When an infant has clubbing, the ends of the fingers and toes enlarge and bend forward (*Topol*, 206). Heart murmurs, eating difficulties, lack of strength, stunted growth and rapid, labored breathing are all signs of congenital heart defects.

C. Causes

The exact cause of CHD is unknown. However, there are factors that often correlate to the creation of these defects. Some defects may be hereditary and transmit from one generation to the other through genes. CHD can also be linked to chromosomal abnormalities, syndromes, maternal illnesses or even to medications taken during pregnancy.

D. Mortality Rates

The number of children who die each year from CHD is unknown. Per the CIA Worldfact Book, the infant mortality rate for the world is 39.48 deaths per every 1,000 live births. Congenital heart defect affects 8 to 10 of every 1,000 children and are the most frequent congenital malformations in newborns (*Topol*, 205). Congenital heart disease causes more deaths in the first year of life than any other birth defects (*WebbGD*).

E. Treatment

While some congenital defects can be effectively treated with medications, many still require surgery as a primary treatment. In order to properly treat the disease, a doctor must first be able to diagnosis the disease through clinical examinations, X-rays of the chest, electro and echocardiograms and cardiac catheterization. After a diagnosis is made, treatment of the defect will more than likely include open heart surgery. As one can see, treatment of these defects involves a substantial amount of equipment and skill. Many under developed countries lack access to the necessary expenses and knowledge required to save these children.



International Children's Heart Foundation

Where Hope Comes to Life

A Mission

It is every child's right to be born into a world where he or she can thrive, grow to be strong and make their parents proud. It is not, however, every child's destiny.

Approximately one in every 100 children born in the world will have a heart defect.

In the developing world, this number can be even higher. Many of these children will never see their first birthday because of congenital heart disease. Their parents will mourn the loss. They are powerless to save them because the resources required to treat and cure congenital heart disease are not easily accessible in developing countries and remote regions. Medical team skills, money to transport and house patients and their families, medicines, equipment and facilities are scarce.

Since 1993, the mission of the International Children's Heart Foundation (ICHF) is to bring the skills, technology and knowledge to diagnose and care for children with congenital heart disease to developing countries that request our help. ICHF does this regardless of country of origin, race, religion or gender.

Our teams are assembled from world class cardiac care centers. We implement our informational curriculum by operating with and educating local health care professionals. With this training, they in turn can care for the local children. Since inception, over 6,000 operations have been performed in countries that span five of the seven continents.

As a 501(c)3 charitable organization, the ICHF enlists your support to provide hope and life for children throughout the developing world.



Our Mission

Saving the lives of underprivileged children through heart surgery.

The Challenge

Every year, some 10,000 children in Russia are born with heart defects.

Only one third of these children are ever diagnosed. More than half die before their first birthday. The majority die over the course of a few years. It doesn't have to be this way.

Our Vision

To save the lives of as many Russian children born with treatable heart defects as possible by funding pediatric heart surgery, supporting medical missions to Russia to develop children's heart centers and participating in a unique matching grant program in Russia.

<http://www.rgol.org>

Babyheart Mission Trip

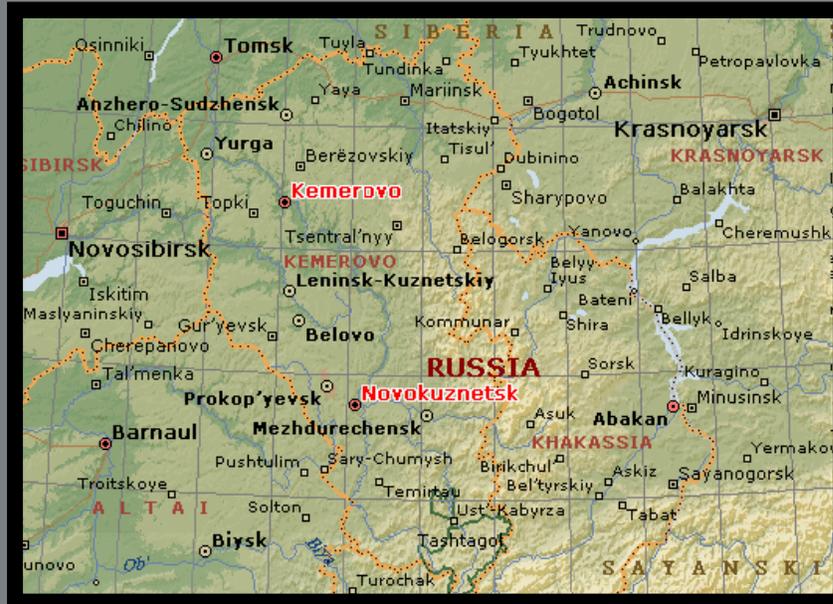
International Children's Heart Foundation made its 11th Babyheart mission trip to the Kemerovo Center of Cardiology in Kemerovo, Russia on April 6th through 20th, 2013.

The Babyheart team, led by our Founder and Medical Director, surgeon William Novick and surgeon Konstantin Drozdovski, consisted of two intensivists and one cardiologist. The team came from three different countries, all joining together for one cause – to save the lives of children with congenital heart defects.



During our team's visit to the Kemerovo Center of Cardiology, 10 children received operations and seven children received interventional catheterizations. Additionally, the volunteer doctors and nurses from the Babyheart team worked alongside the local staff teaching them the latest techniques in caring for children with congenital heart defects.

The International Children's Heart Foundation extends its sincere thanks to Russian Gift of Life for making this trip possible and for providing hope to these 17 children and their families. The parents of the children that benefited from these operations were extremely happy and appreciative that their children now have a chance to live a normal life.



Kemerovo, Russia

Kemerovo is located 2,164 miles east of Moscow. It is an industrial city developed during the Soviet Union with important chemical, fertilizer, and manufacturing industries and is linked to western Russia by a branch of the Trans-Siberian Railway. Since the disintegration of the Soviet Union, the city's industries have experienced a severe decline, creating high levels of unemployment.

There are an estimated 250 to 270 children with congenital heart defects that need open-heart surgery each year in Kemerovo. Only about 60 to 80 children receive the surgery they need. The Division of Pediatric and Congenital Heart Disease was established in Kemerovo five years ago and the surgeons can only perform open heart surgery on children over 12 months of age without complex disease.

Unfortunately, a large number of children with congenital heart disease need to be operated on during the first year of life or they will die. Children who need surgery emergently are being transported to other centers. Due to transportation problems and the critical condition of the children, many do not survive.

International Children's Heart Foundation has provided 143 procedures to the children of Kemerovo to date by sending our Babyheart teams to perform on-site life-saving surgeries.

Surgical Operative Patients List

#	Name	Age	Procedure
1.	Liza Arestova	5 Months	Double Switch Procedure & VSD Closure
2.	Nikita Artemiev	12 Years	RPA & LPA Augmentations
3.	Sumaya Dzhacalova	1 Year	ASD Closure
4.	Tatsyana Gerasimova	22 Years	Common Pulmonary Venous Return to the LA
5.	Nikita Gorlovikh	7 Months	MBTS Takedown & Hemifontan Operation
6.	Sofya Ignatyuc	7 Months	RVOT Stent Explantation, Transanular Patch & VSD Closure
7.	Alexandr Karpov	8 Months	MV Repair & Partial AV Canal Repair
8.	Danill Shabalin	1 Year	TCPC & RPA Augmentation
9.	Sergey Shakhov	1 Year	VSD Closure
10.	Denis Shmakov	10 Months	RVOT Stent Explantation, Transanular Patch & VSD Closure

Liza Arestova



Corrected transposition of the great arteries and ventricular septal defect

Liza is a five-month-old baby girl that suffers from two congenital heart defects: congenitally corrected transposition of the great arteries and ventricular septal defect.

In a healthy heart, the left ventricle sends blood to the entire body, whereas the right ventricle pumps blood to the lungs. The left ventricle is built stronger than the

right ventricle, because it has to work harder. In congenitally corrected transposition of the great arteries, the heart twists abnormally during fetal development, and the ventricles are reversed: The stronger left ventricle pumps blood to the lungs and the weaker right ventricle has the harder responsibility of pumping blood to the entire body.

Along with her CCTGA, Liza suffers from a common congenital defect known as ventricular septal defect. VSD is one of the most common congenital heart defects and occurs in 30% to 50% of children with congenital heart malformations. VSD is characterized by a hole between the heart's two bottom chambers, the ventricles. The hole permits oxygen-poor blood from the right ventricle to mix with oxygen-rich blood from the left ventricle.

The ventricular septum develops from four sources in the embryo which grow and meet to form a partition that separates the ventricles. When one or more of the four sources are defective, the ventricular septum fails to form completely and a hole is formed.

Life-Saving Surgery

CCTGA can cause problems, particularly for the right ventricle, which must work harder than it was meant to. The opening in Liza's ventricular septum can be very dangerous as well as it permits blood from her left ventricle to shunt into the right, thereby overloading the right ventricle.

On April 16th, Liza received a corrective surgery from the Babyheart team known as a double switch procedure where they created a conduit to shunt the blood from one side of her heart to the other. Her heart's major arteries were also detached and reconnected. This corrects the circulation so that the heart's left side serves the body and the right side serves the lungs. The team then closed the opening in Liza's ventricular septum by placing a synthetic patch over the hole between her heart's two chambers.

Denis Shmakov

Tetralogy of Fallot and major aortopulmonary collateral arteries

Ten-month-old Denis suffers from two severe defects: tetralogy of Fallot and major aortopulmonary collateral arteries.

Tetralogy of Fallot, or TOF, accounts for 10% of congenital heart disease and is a combination of four heart defects that are present together at birth. These four defects are:

1. Pulmonary valve stenosis, due to the absence of his pulmonary valve, Denis' pulmonary artery is abnormally narrow impeding blood flow from his right ventricle to his lungs.
2. Ventricular septal defect, VSD, resulting from the hole between Denis' two ventricles permitting oxygen poor blood from the right ventricle to mix with oxygen-rich blood from the left.
3. Right ventricular hypertrophy, or RVH, characterized by a thickening and enlargement of the muscles of the right ventricles.
4. Overriding aorta, where the main artery exiting the left ventricle appears at the opening of both the left and right ventricles, permitting oxygen-poor blood to flow through the VSD into his aorta.

Because of these four defects, children with TOF suffer from "blue" spells where they will turn blue due to the lack of blood permitted to the lungs preventing oxygen to reach the body. Without a corrective operation, the lack of oxygen will not only damage Denis' heart, but also his brain.

Life-Saving Surgery

Thankfully, Denis received a corrective operation from the Babyheart team on April 11th. In order for Denis to be prepared for his corrective surgery, Denis previously received a right ventricular outflow tract stent to establish oxygenated blood flow.

During his corrective procedure, the Babyheart team reconstructed his right ventricular outflow, removed his stent, closed the VSD with a synthetic patch, realigned his aorta so that it comes from only the left ventricle and removing the excess muscle from the right ventricle.



Danil Shabalin



Double inlet left ventricle and transposition of the great arteries

Danil is a one-year-old little boy that suffers from double inlet left ventricle defect and transposition of the great arteries. Double inlet left ventricle is a rare birth defect in which the tricuspid valve and the mitral valve both lead into the left ventricle. These valves act as doors, letting blood flow from the atria to the ventricle.

Normally, the tricuspid valve leads into the right ventricle, and the mitral valve leads into the left ventricle. With this double inlet left ventricle, both valves let blood flow into the left ventricle, and only the left ventricle works. Because the right ventricle is not being used, it is small and not well developed. This is known as a single-ventricle heart defect because, with this defect, Danil only has one pumping chamber in his heart that works. Single-ventricle defects are some of the most complex heart birth defects.

On top of this defect, Danil suffers from transposition of the great arteries, or TGA. TGA is a congenital heart defect that occurs within the first eight weeks of pregnancy when the two major vessels that carry blood away from the heart – the aorta and the pulmonary artery – are transposed or switched. In TGA, the aorta is connected to the right ventricle, and the pulmonary artery is connected to the left ventricle - the exact opposite of a normal heart's anatomy. Because the aorta is connected to the right ventricle, it is forced to carry non-oxygenated blood to the body.

Life-Saving Surgery

Thanks to the support of the Russian Gift of Life, Danil received a palliative corrective procedure on April 10th. In order to divert venous blood from the right atrium to the pulmonary arteries without passing through the right ventricle, the Babyheart team performed a total cavopulmonary connection and right pulmonary artery augmentation. Danil recovered fantastically and left the ICU just four days after his procedure!

Babyheart Team

#	Name	Position	Origin
1.	William Novick	Surgeon	United States
2.	Konstantin Drozdovski	Surgeon	Belarus
3.	Alena Karalkova	Cardiologist	Belarus
4.	Pavel Shauchenka	Intensivist	Belarus
5.	Allison Carroll	Intensivist	Canada





**Thank you,
Russian Gift of Life,
for your generous support
of the children with
congenital heart disease in Russia**





References

Cannon, Christopher P. 2009. *Structural Heart Disease. The New Heart Disease Handbook.* 139.

The World Factbook. 2012. *Infant mortality rate.* Accessed from:
<http://www.cia.gov/library/publications/the-world-factbook/goes/xx.html>.

Topol, Eric. 2000. *Pediatric and Congenital Heart Disease. Cleveland Clinic Heart Book.* 10: 205-206.

Webb GD, Smallhorn JF, Therrien J, Redington AN. *Congenital heart disease.* In: Bonow RO, Man DL, Zipes DP, Libby P, eds. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, 9th ed.* Philadelphia, Pa: Saunders Elsevier; 2011: chap 65. Accessed from:
<http://www.nlm.nih.gov/medlineplus/ency/article/001114.htm>



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