

Lithuania has a long history of heart surgery (cardiac surgery), which should first of all be associated with the Faculty of Medicine established in 1781 in the old Vilnius University (founded in 1579), and the Fraternity of Vilnius Surgeons – its 500<sup>th</sup> anniversary was celebrated in 2009.

Scientific progress from European and other world countries has made its way to Lithuania via these institutions of science and practice, contributing to the rapid development of medical sciences and leaving its imprint on the history of Vilnius University. Being near to the old European scientific and cultural centres and an advocate of a free spirit of scientific thinking, the University raised a number of talented medical specialists whose works give us a good reason to be proud of today. Cardiovascular disease research there goes back to the early 19<sup>th</sup> century. The first dissertations on problems associated with heart diseases were written by J. Chrzszonowicz in 1812 and S. Rosolowski in 1818.

Rapid progress in medical sciences in the 19<sup>th</sup> century created conditions for the heart surgery practice. In the second half of the 19<sup>th</sup> century, a solution to anaesthesia-related problem was found, harmful effects of micro organisms were disclosed, and an autoclave (a device used to kill bacteria by subjecting them to high temperature) was invented. The discovery of blood groups created a possibility for more complex surgeries which needed blood transfusion. Despite the prevailing opinion that the surgeon's knife would never touch the human heart, L. Rehn, a German surgeon, successfully repaired a stab wound to the heart on 9 September 1895.

In the first half of the 20<sup>th</sup> century, Americans E. C. Cutler and S. A. Levine started an era of closed heart surgeries. The blood vessel sewing technique developed by A. Carrel and C. Guthrie opened possibilities for experimental modelling of heart diseases and their surgical treatment. The first surgeries were done to treat congenital heart defects, and hypothermia was introduced, which made open heart operations possible. Later, a device for artificial blood circulation was designed. So, starting in 1950, heart surgery has changed the canons of treatment of many cardiovascular diseases for centuries.

The very first successful operation on heart not only in Lithuania but in East Europe was performed in Vilnius in 1900 by G. Romas. V. Gusevas, a surgeon from Panevėžys, was the first in Lithuania to perform a suture of a heart wound in 1926. After the occupation of Vilnius and Vilnius region, the development of Lithuanian medicine moved to Kaunas. Many medical doctors returned for work in



Lithuania after their university studies in Europe and Russia. Very soon they became distinguished professors of Vytautas Magnus University which opened in 1922. The Clinics of Kaunas University was that place, where the medical elite in pre-war Lithuania worked and matured. Professors V. Kuzma, V. Kanauka, and S. Stankus, well known for their scientific research and perfect surgical techniques, worked there in 1929–1940.

During World War II, many celebrated medical doctors left Lithuania to settle in the West, while the rest were deported to Siberia. The revival broke out at the Faculty of Medicine of Vilnius University after the war. In 1922, Kaunas Medical Institute was founded. Some of specialists who escaped repressions returned to their work. Medical doctors from Kaunas such as S. Pavilionis, K. Katilius, A. Sučila, V. Girdzijauskas, J. Šopauskas, and others, who had moved to Vilnius during the years of German occupation, became professors and department heads. After the war, rather low qualification surgeons from Russia, mainly military surgeons, had been appointed heads of surgery departments. Professors P. Norkūnas and A. Pronckus, associate professor K. Katilius, surgeon B. Efosas became top-rated surgeons in Vilnius, while associate professors A. Stropus, J. Jocius, and T. Šiurkus were considered leading surgeons in Kaunas. The ranks of talented young surgeons kept increasing.

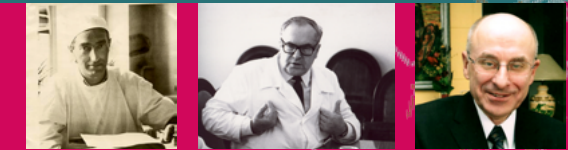
Cardiac surgery progressed rapidly in the clinics of Vilnius and Kaunas universities, where a large number and a great variety of closed heart operations were carried out, as well as experiments for open heart operations. Because of a large number of young and talented surgeons and proactive medical students there, the clinics grew into centres for progress in cardiac surgery. Heart operations were gradually introduced at Vilnius University and Kaunas Medical Institution. Two departments at Vilnius University – one of Hospital Surgery Clinics, led by Prof. P. Norkūnas, and the other of Facultative Surgery Clinics, led by associate professor K. Katilius, actively participated in the heart surgery development. A. Sučila, an associate professor and then professor at the Facultative Surgery Clinics, sutured a stab wound to the heart in 1952, and removed the calcified pericardium in 1953. He was the first in Lithuania to perform a probe diagnostic catheterisation procedure on heart with a self-made probe heart catheter in 1956 and a closed heart operation (mitral commissurotomy) in 1958. Prof. A. Pronckus from the Hospital Surgery Clinics began closed heart surgery procedures in September 1958. He operated on a number of patients with valve mitral stenosis, aortic stenosis, and diseased pericardium.

B. Efosas, a surgeon from Vilnius Railway Hospital, performed the first successful closed mitral commissurotomy in Lithuania on 12 March 1958 by separating with the finger the mitral valve leaflets fused because of rheumatism, and one year later he placed a ligature on an open atrial duct. B. Efosas also did surgeries to remove pericardium and operated on lungs. In 1962, seeing the rapid progress in cardiac and vascular surgery, Prof. P. Norkūnas established a the Cardiac and Vascular Surgery Laboratory in Vilnius University. Prof. A. Marcinkevičius worked on cardiac surgery experiments and Prof. A. Dirsė did experimental work in vascular surgery in this lab. Soon A. Marcinkevičius gathered separate teams of surgeons, cardio surgeons, anaesthesiologists, haematology, biochemistry and immunology specialists, which contributed to the improvement of modern heart surgery.

Similar trends in heart surgery development could be observed in Kaunas Medical Institute. Everything started with closed heart operations. In 1953, J. Jocius removed a needle from a heart, and in 1952 he performed a pericardium removal surgery, the first in Lithuania. But the biggest contribution to cardiac surgery development in Kaunas was made by Prof. J. Brėdikis who did a mitral commissurotomy on 14 November 1958, only six months later after a similar operation performed by his colleague B. Efosas in

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4	5	6

1. Dr. Borisas Efosas
2. Prof. Algimantas Marcinkevičius
3. Prof. Vytautas Sirvydis
4. Prof. Jurgis Brėdikis
5. Prof. Giedrius Uždavinys
6. Prof. Rimantas Benetis



After the first successful heart transplantation

Vilnius. J. Brėdikis worked with enthusiasm to extend the range of closed heart surgery procedures. After accumulating enough experience in closed cardiac surgery and with the assistance of Prof. G. Solovoyov from A. Bakulev Cardiac and Vascular Institute in Moscow, he ushered in the era of modern cardiac surgery in Kaunas by introducing an artificial blood circulation there. J. Brėdikis and his colleagues continued to perform surgeries on open heart by focusing his efforts on the construction of heart pacemakers and surgical treatment of heart rhythm disorders, a completely new sphere within the cardiac surgery in the former Soviet Union. They widely used heart stimulation and did various surgical procedures to eliminate rhythm disorders. J. Brėdikis and his team were pioneers in this field. During this very active period of scientific research, he made 60 inventions.

Many closed heart operations and the first open heart operation in Vilnius and in Kaunas were performed by surgeons who had returned from skills improvement practice in the leading clinics in Moscow or with the assistance of distinguished Russian heart surgeons during their visits to Vilnius and Kaunas. It could be noticed that the first open heart operations in Moscow and Leningrad (now St. Petersburg) were carried out in 1959 with the help of British surgeons and a team of artificial blood circulation experts under the leadership of D. Melrose. This means that surgeons in Moscow, Leningrad and Novosibirsk had accumulated some experience at the time when their Lithuanian colleagues were just preparing for their first open heart operations at around 1964. By coincidence, heart surgeon from Vilnius B. Efosas had a possibility to stay in Moscow for 6 weeks to learn from E. Meshalkin, a member of the Russian Academy of Sciences. Upon his return home from the skills improvement practice in E. Meshalkin's clinics, B. Efosas did the first closed mitral com-



Emblem of the Fraternity of Vilnius Surgeons



Founding of Vilnius Academy by Stefan Bathory

missurotomy. After E. Meshalkin agreed to be a scientific consultant for Marcinkevičius' doctoral thesis in 1956, a long-year cooperation started between the famous Russian surgeon and Marcinkevičius with his disciples. When the Cardiac and Vascular Surgery Laboratory in Vilnius received a machine for artificial blood circulation in 1963 and experimental operations started, E. Meshalkin invited A. Marcinkevičius and a group of his colleagues to the Blood Circulation Pathology Institute in Novosibirsk. So, the group received a possibility to continue experiments and take part in open heart operations during which artificial blood circulation was used. During their stay in Novosibirsk, the surgeons from Vilnius could learn the subtleties of artificial blood circulation from Dr. J. Stundžia, a Lithuanian deportee, the head of the Artificial Blood Circulation Division at Novosibirsk Institute.

On 14 October 1964, A. Marcinkevičius and his colleagues with the participation of E. Meshalkin carried out the first open heart operations in Lithuania, during which artificial blood circulation was used. Five weeks later, J. Brėdikis with the assistance of Prof. G. Solovyov from Moscow performed a suture of the defect in atrial septum in Kaunas. Hence, open heart surgeries started almost simultaneously in Vilnius and Kaunas. For a quarter of a century before the Restoration of Independence in 1990, heart surgery schools in Vilnius and Kaunas continued to gather momentum. Almost all types of heart operations that had started as new procedures in various parts of the world were introduced in Vilnius and Kaunas, including the Lithuania's first successful heart transplantation which was performed by A. Marcinkevičius and his colleagues in Vilnius on 2 September 1987. Also, it was the first heart transplantation in Baltics.

Heart surgeons from Vilnius in cooperation with engineers of Vilnius drill factory designed an authentic artificial blood circulation machine which allowed to improve the perfusion techniques (A. Baublys and others) and in many ways helped to introduce complex surgeries for congenital defects, heart valve operations, coronary artery bypass, aortic and cardiac aneurysms, and other advanced heart surgeries. A. Marcinkevičius appointed V. Sirvydis responsible for the refinement of heart valve and congenital heart defect surgeries, V. Triponis and E. Barkauskas responsible for vascular anaplasty and bypass operations, D. Kavoliūnas – for valve surgeries and auxiliary blood circulation, and G. Uždavinyš – for coronary by-pass procedures and left ventricle aneurysms surgery. Targeted specialisation has not impeded the general growth of professional skills, as all these surgeons used to participate in various operations performed by A. Marcinkevičius.

Heart surgeons from Kaunas continued to lead in the construction and improvement of pacemakers and development of arhythmologic surgery. Another surgeon, A. Dumčius grew simultaneously with Prof. J. Brėdikis. A. Dumčius worked as the head of cardiac and vascular laboratory in 1979 and later, in 1993, became the head of the Ischemic Heart Disease Surgery Clinics.

The professional life of Lithuanian heart surgeons has changed tremendously during the Independence period. They could go for study trips to other countries, participate in joint scientific research programs, and take part in international events and congresses. The doors of the most advanced world clinics have opened for them. The case of R. Benetis, a heart surgeon from Kaunas, could be mentioned here. After his practice in Moscow and Vilnius in 1989, for some time he worked as a heart surgeon in J. Brėdikis' clinics in Kaunas, but during the first years of the Independence he moved to work to Denmark. From there he moved to Belgium, worked shortly in Sweden and England. Upon his return to Lithuania, R. Benetis was elected the head of the Heart Surgery Clinic in Kaunas. In short time he introduced a number of new operations such as heart and lung transplantations, application of homotransplants as valve prostheses, surgery of aorta and its branches, artificial heart implantation, and other combined heart operations.

In the years of Independence, Vilnius saw significant changes too. After Prof. V. Sirvydis became the head of the Heart Clinic, another heart surgery centre was founded in 1993, this time in the Sailors Hospital in Klaipėda. G. Kundrotas and a Vilnius-prepared team of surgeons and anaesthetists went for work in the Heart Surgery Department there. Today, this is a group of experienced specialists who perform 350 to 400 surgeries a year.

The number of heart operations at Vilnius University Clinics grew to 1500 a year. Six operating-rooms and two emergency departments have been rebuilt and repaired. The Clinics also received the Norwegian government assistance for the modernisation of its Neonate and Infant Unit for Congenital Heart Disease Surgery. Together with heart surgeons from Kiel University in Germany, its specialists participated in the research of hypothermia effect on brain function. The research work went on simultaneously in Vilnius and Kiel. In 1992, a group of 23 doctors and nurses participated in specialisation courses at Deborah Heart and Lung Centre in the USA. J. McGrath, a surgeon from this centre, arrived in Vilnius in a special airplane carrying with him a lot of equipment to perform here 19 complex operations on congenital heart defects in one week only. V. Sirvydis and his colleagues made every effort to implement the latest heart surgery innovations in Lithuania. For instance, the first external artificial heart was implanted in Lithuania in 1999, and a more sophisticated internal artificial heart was first placed in a human being in 2003. In a short time, Vilnius became the leader in East Europe by the number of artificial heart implants and results of such surgeries.

The data of the defended dissertations suggest that the country has developed a research-based strategy for heart and lung insufficiency treatment, can offer the most complex heart surgeries in the world on adults and neonates and heart transplantation in children and neonates, advanced auxiliary artificial blood circulation and advanced myocardium protection methods, and open heart surgery through hybrid and minimally invasive approach, namely, per catheter valve prosthesis implantation (A. Aidietis), small incisions approach surgery in adults, neonates and infants (V. Tarutis, V. Lebetkevičius), antiarrhythmic surgeries with small incisions (A. Aidietis, K. Ručinskis). Lithuanian heart surgeons have refined the techniques for complete arterial revascularization using thoracic and radial artery grafts, accumulated huge experience in left ventricular geometry and volume restoration in patients with postinfarction left ventricular aneurysms (G. Uždavinyš, G. Kalinauskas, A. Valaika), and developed coronary revascularization on the beating heart (G. Kalinauskas, A. Valaika).

The achievements of Lithuanian surgeons have not been left unnoticed. To mark significant contribution of a small country to the development of cardiac surgery, the 15<sup>th</sup> Congress of the World Society of Cardio-Thoracic Surgeons was organised in Lithuania in 2005, which elected V. Sirvydis its president. In 2005, the National Prize was awarded to the staff of Vilnius Heart Surgery Centre for the surgical treatment of ischemic heart disease. And in 2006, professors A. Marcinkevičius, V. Sirvydis, and G. Uždavinyš were awarded the National Prize for Progress in Science for making cardiothoracic surgery a part of medical practice. Dr. V. Tarutis was elected the head of Vilnius Heart Surgery Centre in 2009 and has continued in this position until now.

Today, Lithuanian cardiologists and cardio surgeons in Vilnius, Kaunas and Klaipėda work together to introduce global innovations and further improve heart surgery, a vital medical field. Implementation of new treatment methods and collective effort to analyse reasons behind each failure provide grounds for deeper understanding of heart diseases and more effective treatment results, and make Lithuania's contribution to the domestic and world medical science even more significant.

*Prof. Giedrius Uždavinyš*



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