5th INTERNATIONAL SEMINAR «NEW RESEARCH AREAS IN THE FIELD OF WELDING LIVE SOFT TISSUES»

On November 26–27, 2010 the 5th International Seminar «New Research Areas in the Field of Welding Live Tissues» was held in Kiev at the E.O. Paton Electric Welding Institute. More than 130 persons (surgeons, representatives of regional offices of the MOH of Ukraine, distributor companies, scientists and specialists in the field of biological and medical sciences, developers of medical equipment) from 16 regions of Ukraine, Russian Federation, Belarus Republic, Bulgaria, Poland, Macedonia, and the USA participated in the seminar. Seminar organizers were PWI and International Association «Welding».

The first day of the seminar was devoted to consideration of the results of recent studies on electric welding application in medicine by a number of the seminar participants. On the second day all the interested persons were able to try the technology and PWI new developments directly during an animal test. Foreign and Ukrainian surgeons participating in the practical part of the seminar, noted the importance of acquiring the skills directly from the developers, and were able to more profoundly appreciate the features of application of live tissue welding and its main advantages over coagulation. 30 papers were presented in the seminar dealing with theoretical and experimental aspects of the process of high-frequency (HF) electric welding of live tissues, development of equipment and tools, as well as experience of clinical application of this new surgical technology.

Opening the seminar, Prof. B.E. Paton noted that the value of these seminars lies in the possibility of exchange of experience on application of this most advanced technology in different directions of modern surgery. Joint discussion and experimental studies allow «...finding bottlenecks in the studied area and making appropriate corrections». Our goal is not to stop on the achieved level, but move ahead, improving the quality and widening the sphere of application of tissue-saving HF-electric welding technology. Prof. B.E. Paton further noted that over the ten year period of development of this advanced technology there are still a lot of unsolved problems of manufacturing and reconditioning of the respective electrosurgical tools that considerably limits its propagation.

A number of presentations were made at the seminar. In the presentation by G.S. Marinsky, Dr. of Sci (Eng.) (PWI), it was noted that by now PWI together with International Association «Welding» developed a new generation power source for HF-electric welding of soft tissues under an innovation project. The new modification was developed taking into account the experience of operation of earlier applied equipment, as weld as recommendations and proposals of surgeons of various specialities. This source which was tentatively designated EKZ-300-5, is at the stage of laboratory testing and is being prepared for batch production. At the same time, PWI is working on setting-up large-scale production of new tools for HF-electric welding of soft live tissues. Presentation by O.N. Ivanova and D.D. Kunkin (International Association «Welding») was devoted to improvement of instrumentation system for recording electrical parameters in live tissue welding. This system was the basis for development of a diagnostic complex for assessment of the quality of produced welded joint directly during the surgery in real-time mode. In the paper by M.P. Zakharash, Corresp. Member of AMSU (O.O. Bogomolets National Medical University, Kiev), devoted to bioethical aspects of electric welding of live organs and tissues in surgery, in particular, it was noted that an important bioethical aspect and priority of the technology of HF-electric welding of organs and tissues is the possibility of its application for rendering emergency surgical assistance in maximum short time to a large number of casualties in military conflict zone, in terrorist attacks, natural disasters, mine accidents, transportation and other emergencies. Presentations by Prof. A.V. Makarov and Cand. of Sci A.V. Linchevsky (Kiev City Clinical Hospital # 17) were devoted to the peculiarities of application of this technology for welding parenchymal organs at their rupture. It was noted that the main disadvantage of the equipment is a complete or partial absence of a tool for laparoscopic operations that does not permit performance of minimally invasive surgeries. In addition, in his paper Prof. A.V. Makarov substantiates the need to ensure favourable conditions for applying energy impact to the tissue that were documented using

the PWI developed diagnostic complex for assessment of the quality of the produced welded joint. Re-production of these conditions of energy impact further on allows a considerable lowering of the probability of tissue overcoagulation. In the paper by V.R. Zaremba (Head of Surgical Department of District Pediatric Hospital, Zhitomir) it is stated that despite the obvious advantages of welding, the capabilities of this technology cannot be fully used, in particular, because of unsatisfactory level of tool manufacturing quality and, hence, its short operating life (156.2 operations on average, and not more than 20 operations in the case with the laparoscopic tool). In addition, absence of fixation of the pressure of tool working parts aggravates the influence of the human factor and leads to unstable result of tissue joining, particularly in the manual mode. The paper by V.K. Tsap, representative of the company-distributor of live tissue welding equipment EK-300M1, highlighted the problems of technology promotion in the Ukrainian market. He noted, in particular, that the market capacity is equal to more than 8000 in-patient hospitals, and the number of applied systems in them is not more than 100 pcs. The causes for such limited application of local equipment are: insufficient budget funding of the facilities by MOH of Ukraine and inefficient approach to utilization of the allocated funds; absence of special state programs on introduction of this technology; insufficient data base and surgeons' conservatism.

In conclusion, Prof. B.E. Paton noted that «... since the time, when 10 years ago this technology was first applied under clinical conditions on humans, about 130 surgical procedures were developed that have been accepted in more than 50 clinics of Ukraine. So far, more than 65,000 operations have been performed, all of them successful. However, it is necessary to carry on research with the purpose of further improvement and development of new samples of equipment and tools for implementation of this advanced technology, development of new procedures, as well as searching for methods of precision energy impact on live structures.

In our opinion, each surgeon should master the new tissue-saving technology. For this purpose it is necessary to develop a national program on improvement of rendering emergency surgical assistance with application of the electrosurgical technology.

«Electric welding» term is gaining popularity in the world of medical equipment manufacturers both in the West and here in Ukraine. We appreciate such recognition. However, use of this term does not always guarantee the high quality of the welded joint. We, as the originators of this process, know what is required to guarantee the quality and how critical it is, when human life is at stake».

Cand. of Sci (Eng.) O.N. Ivanova,
Eng. D.D. Kunkin, IA «Welding»