Microwaves in Medicine '91

by Branka Jokanovic
MTT-S AdCom

The 1st International Scientific Meeting: Microwaves in Medicine '91 was held on April 8-11 in Belgrade, Yugoslavia. The conference was conceived by Yugoslav MTT Chapter and organized jointly by the IEEE MTT-Society, the Scientific Committee of Serbia and the Institute of Microwave Technique and Electronics (IMTEL), Belgrade.

About 100 participants from Belgium, Bulgaria, Czechoslovakia, Hungary, Italy, Japan, Poland, South Africa, USA, USSR and Yugoslavia participated at the conference, which featured five invited presentations and 42 papers. They were sessions on medical applications of microwaves, dosimetry and instrumentation, biological effects, health hazards and safety standards, and the use of polarized light. The meeting also included a roundtable discussion on electromagnetic compatibility techniques led by Prof. R. De Leo of the University of Ancona, Italy, and review of potential medical applications of printed antenna structures led by Prof. A. Nesic of IMTEL in Belgrade. A small exhibition on microwave medical equipments was set up parallel to the conference.

The invited paper "Microwave Acupuncture as Stimulus for the Interaction Between Electromagnetic Fields (EMF's) and Nervous System," by Prof. A. Vander Vorst of Catholic University of Louvain in Louvain-la-Neuve, Belgium, as well as a series of papers from USSR, described the use of millimeter waves (40-80GHz) to stimulate acupuncture points, based on traditional Chinese medicine. According to M. Golant and V. Nadejeva from RPA "Istok," Moscow, this form of acupuncture is widely used in USSR, where 40,000 patients with conditions ranging from stomach polyps, duodenal ulcers, arterial hypertension, angina pectoris to traumas and advanced neoplasms have been treated using commercially available devices. More than 20 years of experience in USSR in theoretical and experimental research of non-thermal effects in millimeter waves action on living systems will be also presented at the International Scientific Meeting Millimeter Waves of Non-Thermal Intensity in Medicine which will be held 24-27 September 1991 in Moscow, USSR.

Yugoslav, Czech and South African engineers have developed several interesting devices using microwave energy. For instance, Dr. B. Downing of the University of Cape Town, South Africa, has designed a low cost microwave system, operating at 2.45 GHz for deactivating HIV—the virus associated with AIDS—in breast milk collected to feed premature newborns. And S. Manola and co-workers at the Institute of Physics in Belgrade presented a way of using microwave-induced low energy gas plasmas for sterilization of medical instruments and plastic items at 75-80°C.

Prof. P. Walinsky of the Dept. of Medicine at Thomas Jefferson University Hospital in Philadelphia, reported that microwave balloon angioplasty of the coronary and peripheral blood vessels is a promising form of therapy for atherosclerotic vascular disease. In his invited talk, he concluded that microwave angioplasty was more effective than conventional angioplasty in maintaining vascular patency in the presence of thrombus.

The treatment of an enlarged prostate using microwave hyperthermia was addressed by Dr. H. Arastu and associates at the Albert Einstein Medical Center in Philadelphia, in their invited lecture on "The Efficiency of Transurethral Interstitial Microwave Hyperthermia in the Management of Benign Prostatic Hyperplasia (BPH)" and by Dr. B. Sawarz and colleagues at MMA Postgraduate Medical School in Warsaw, in a paper on the treatment of BPH with intrarectal and intraurethral microwave applicators. The two presentations indicate that intraurethral microwave hyperthermia in advanced BPH is an efficient and safe alternative to surgery.

With respect to microwave hyperthermia, Dr. B. Kolundzija of the University of Belgrade presented a mathematical model for plotting energy deposition and temperature distributions, and Dr. Y. Nikawa and F. Okada of Japan's National Defense Academy in Yokosuka described an innovative applicator. In addition, Dr. E. Khizhnyak of the Institute of Cell Biophysics of the USSR Academy of Sciences in Pushchino and group led by Prof. F. Bardati of the University of Rome, Italy, described noninvasive techniques to map heating during hyperthermia. The dielectric properties of biological tissue were described from a theoretical point of view by Dr. S. Caorsi and coworkers at the University of Genoa in Italy and from an experimental point of view by IMTEL's V. Napijalo and B. Jokanovic.

In a series of three papers, Dr. Z. Stojanovic of the Institute of Aviation Medicine in Belgrade, Dr. Zoran and Milan Djordjevic of the Pacemaker Center at the University Clinical Center in Belgrade, and Dr. Z. Kelecevic, also of the Institute of Aviation Medicine, described their work on microwave-induced health effects and protective clothing. Z. Stojanovic, a medical doctor, presented the results of a clinical study of 253 radar operators which found an incidence of irregularities in the lymphocytes and the nervous system of the workers chronically exposed to microwaves.

In the review of the possible link between EMFs and cancer, Dr. S. Szmigielski of the Center for Radiobiology and Radiation Safety in Warsaw, Poland, concluded that EMFs should be classified as "possible" carcinogens.

The Belgrade meeting, the first conference of microwave applications in medicine, was an opportunity to introduce recent developments in this field. The organizers hope that it will stimulate further research, particularly because this field is potentially one of the most important non-military uses of microwave technology. Positive results of microwave applications in medicine both diagnostic and treatment as well as the current reduction of military projects give us a promise that the further explorations in this field would have a better financial support than earlier.

The 2nd International Scientific Meeting: Microwaves in Medicine '93 will be held in Italy. Those interested in attending should contact Professor Robert De Leo, University of Ancona, Via Brecce Bianche, 60131 Ancona, Italy, Fax (071) 2204 835.

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