Personalization of oncothermia

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Objective

Oncothermia is based on the energy delivery to the target tissue. This energy is well focused on cellular level, and makes the dose of energy optimal for cell destruction. The personal feedback of the patient is the important control of the process. The dose of energy is well focused on the primary sensor of the treatment protocol. This gives good safety records and low toxicity and side effects for the patients. However, the objective dose is not equal for them. We know that, but the dose is an important factor. The too low is ineffective, the too high is toxic. Our objective is investigating the personalized feedback in point of view of the objectivity of the dose.

Method

The objectivity of the treatment is definitely depends on the biofrequency current and its gained voltage on the given impedance on the tumor. This current is well regulated by the skin conductance and by the connected physiological changes. The incorrect feeding of 15 Hz feeding defines a pain that, which depends on every objective and individual factors. A good approach is regarding the nerves and sensitivity objective (the cellular processes are well unified), and regarding the personal differences as influence of physiological factors. The main factor for heat sensitivity is the blood perfusion and blood flow in the cutaneous layers where the heat sensing nerves are located. The high blood flow is an effective temperature rise, which is given volume, and the nerves tolerate higher energy flow through the layer. The high blood cooling is not only the facility to have higher energy flow, but also getting more current through the volume. The higher current density excites the nerve sensing, and the heating again an overheating, reduces down regulation. In the case of low blood perfusion the current is small, so the nerves can tolerate more intensities than anyway. The crucial point is the surface heat regulation, which has be carefully done by the electrode systems. When the surface temperature kept constant, the nerves really regulate the current density, which is the dual of the objective regulation. A dedicated mathematical model is worked out for this regulation mechanism, and applied in oncathermia treatment.

Bioelectromagnetic considerations

The energy is transmitted through the skin. The site, as described above, is physiologically controlled and changes its blood perfusion and by this the magnetic transmission are changed as well.

The subcutaneous adipose tissue is an electric blockade, and its conductivity decides the current transport at a fixed power transmission. The applied voltage depends on the contact area and on the applied frequency also.

Only the temperature has physiological blood flow response, the current has pain response from the skin. This pain tolerance is constant (saturated) at 15.69 Hz. This allows an objective pain sensing by the current, which depends on the thickness of the adipose layer. This makes a negative feedback signal when the fat is thin, the temperature grows and makes a temperature pain link which by stop up heating increases the blood flow by vasodilation. The current is in this way grows, but when the blood conductance becomes too high, the pain feedback will limit the process again, and continue the personal merit, which is purely objective due to the saturation of the current sensing.

Conclusion

Oncothermia with its surface stabilized sensing (patented action) uses the personal sensing in objectivity of the actual energy dose. The synergy of the technical and psychological regulations makes objective dose control for oncathermia processes, keeping the energy dose in the curative range.

The personalized oncathermia-dose is objective.

References

The necessity of integrated data-aquisition systems

The aim of all scientific experiment and measurement is to collect information about the measured object or incident. On the field of research it’s especially important to acquire all of measurable information during the experiments, because often we don’t know exactly, which of the parameters will give us new and useful informations. But in a lot of cases the data acquisition could be quite difficult, because:

• If during the measurement more instrument is used, the simultaneous and continuous observation all of them is not possible
• A lot of instruments don’t provide build-in data acquisition and storing
• Although some instruments have these functions, it could be difficult to synchronize the data acquired by various instruments

The solution of this problems is such a data collection system, that in real time collects and synchronizes all of the information, that the used instruments provide during the measurement and then stores them into a common database, allowing the common processing of them. By this way the efficiency of the scientific research could be greatly increased. For us at Oncotherm is a priority to make more efficient our R&D activity, so we started to develop integrated data-aquisition systems to support our research projects.

The main element of this systems is the LabView program suite, which is developed especially for data acquisition and instrument control and is provided by National Instruments. The main task of LabView is to control the NI’s own DA units, but the products of the most important instrument manufacturers are controllable by the suite too. During our projects we use both NI instruments and the instruments of other manufacturers (Tektronix, Rhode & Schwartz) too.

The instrumentation of an experiment

The key factor of destroying the tumor cells is the quantity of the current flowing through them. By maximizing the current in the tumor the efficiency of the therapy can be maximized too. During the propagation of the electromagnetic wave in cable, the formation of current maximum points is unavoidable. There was a concept, that by changing the tuning of the EHY 2000 device (to tune not to the perfect 1:1 SWR) that points can be moved along the cable into the tumor. The aim of the introduced experiment was to decide if that concept is right or not. For the experiment a body and tumor phantom was used, which was built up by a beef kidney inserted into a pork thigh.

The data acquisition system assembled to this experiment consisted of the following instruments and provided the following informations:

- EHY 2000 oncothermia device: the forwarded, reflected and useful powers transmitted by serial port
- Rhode & Schwartz power meter: the forwarded power to check the power meter of the EHY 2000) and the SWR by GPIB protocol
- Luxtron fluoroptical thermometer: this four channel device gives us information about the temperature changes of different parts of the tumor during the treatment. It transmits the collected data by serial port
- National Instruments USB 6009: this DA device was used to collect and transmit the data of the voltage sensors

By using the data provided by the reviewed instrumentation we got a clear picture about the electrical and heat effects of the various tuner settings, which gave important informations about the correctness of the concept.

Other possible usages

The data collecting systems always follow the demands of the current research projects, capitalizing the flexibility of the LabView based DA systems. On the grounds of our experiences until now we have more possible applications of LabView based data acquisition systems. The most important of them are:

- LabView LabEHY: LabEHY is a hyperthermia device specially developed for in vitro and in vivo experiments. Our ambition is to control the device by a LabView based surface using an NI device built into the instrument. This solution will give us the opportunity to monitor all of the inner activities of the instrument and control the device by various ways. For example by using the output data of other devices for the automatic control of the LabEHY

By realizing these conceptions we can improve both the effectivity and the speed of our R&D projects and improve the quality of our products, so we are committed towards these ways.
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Success of Oncotherm

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Objective

Oncotherm company became 31 years old. It was started in 1981 in the University. The idea was formulated as a part of the nuclear science in Leipzig, Institute of Nuclear Research, Leipzig University, followed by support from the German Government through the Intermediate Technology Development. The treatment, called Oncotherm, was introduced in 1986, when the business model approach of the idea was taken very seriously from then on. The tool at the request of the clinician was developed by Dr. Szasz. The device was successfully performed, using photon-therapy, and combining to the basic of the process of deep thermal coagulation and contact. The company is in a critical situation. We are considering the installation of a second generation TKF system using the TCF and the CCF apparatus for the production and production processes. Optionally, the company is prepared for the possible large-scale production. Oncotherm is provided with the latest technology, which is supported by extensive and successful medical studies, excellent customer service, and a strong network.

Method

Our challenge is to keep the idea of developing and manufacturing devices in the USA. Oncotherm does not follow the traditional industrial companies making their past and present efforts of the company. We are committed to share the knowledge of the German German medical knowledge. (MMO in Germany) together with the well-established tradition of the German products, we are engaged for the best of quality, for the immediate implementation of the new research results, and for the highest reliability of the material. Oncotherm will not stop developing. We are using a method of COMBINATION/AGA, we are using the high-level expertise, which is supported by extensive and successful medical studies, excellent customer service, and a strong network.

Efficacy principles

3E: Efficacy by targeted and directed therapy and the unique technology, easy to use, and effective as a consequence of the quality of the drug.

Safety principles

3S: Safety for the patient is always the priority of the Oncotherm/Oncotherm, making possible to use the latest technology in to the world.

Results

New paradigm is necessary for hypothermia in oncology. Necessity of oncotherm

Hypothermia indicates (1): "If the brain is with us, while the physics is against us" (W. Overgard, 1981)

Objective: Change the paradigm (1): "If the physician is with us, and the physics is against us" (S. Domby, 1982)

Oncotherm changes the paradigm (2): "The physical therapy is with us"

Hypothermia indicates (2): "Reference point is needed" (V. A. Stein, 1982)

Objective: Change the paradigm (3): "Back to the gold standards, use the energy instead of temperature"

Oncotherm is a personalized, non-toxic treatment which supports the natural processes (apoptosis, immune reactions, conditional effects, etc.) to be a helper of onco-hypothermia. Oncotherm is a new paradigm of the modern oncotherapies.

Conclusion

Oncotherm understands the update demands of the modern oncology:

- Personalized treatments
- Demand and condition is important
- Preventive and follow-up procedures
- Oncotherm is a convenient treatment for all the demands
- Side-effects
- Minimally invasive treatment
- High efficacy, local actions
- Oncotherm is non-toxic, local and does not cause the toxicity of other agents
- Oncotherm is used in a non-toxic manner and does not cause any toxicity
- Oncotherm is an ideal method to increase the QOL, increase of the survival time
- It is the main contribution factor, it is needed before the clinical results
- It is not enough if a method using only clinical evaluation
- Oncotherm is the clinical summation is definitely a longer survival
- The potential result is frequently observed

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References

CONCEPT AND MARKETING TOOLS
The focus of our work is informing doctors from all over the world about the method and possibilities of Oncothermia. We are dealing with oncothermia as a complex method and not simply market and sale of devices.
Our driving force is to help the suffering patients. Only when the doctors see and accept the complementary treatment option of Oncothermia, the patient can be helped by us. Physicians who are applying oncothermia are not only passive users, they are active helpers to build up the next development step for their better services and for wider possibilities of the oncothermia method. We are building up the future together with all the oncothermia users. Through different actions we are trying to offer the best possible service and support for our customers, mainly by keeping them informed on scientific results and backgrounds.
Our different tools include for example publications, website, newsletters, events, brochures, patient information and so on present our successful synergy of professional technique and the science.

The Menu of our new Website: www.oncotherm.org

ONCOTHERMIA is a complementary treatment in the war against cancer

Our newsletter is sent out monthly and informs the customers about news in science, the company and on events and new developments

The yearly organized Symposium is also a tool to inform about the method and support the customers with new studies and scientific results

CONCLUSION
Oncotherm works with a professional marketing concept based on the needs of our customers and their own „customers“, the suffering patients. Our aim is to make the method more prominent to help patients and to support the doctors using the oncothermia method. Oncotherm knows very well: we are united community with our customers, regarding them our partners in recognising the demands and introducing it in the permanent development of the oncothermia method. Oncothermia devices can not fulfill their intended prospective without our smart and active partners who are the complete medical personal applying everyday the method and using the oncothermia skills to win the war against cancer.
14 Years Experience in Locoregional and Whole Body Hyperthermia

Dr. K. Keefer, et al. - Institute for Hyperthermia and Immunotherapy IWIT, Vienna