



# Oncothermia Consensus

Prof. Dr. Andras Szasz  
 CSO of Oncotherm Group, Troisdorf, Germany, [Szasz@oncotherm.de](mailto:Szasz@oncotherm.de)

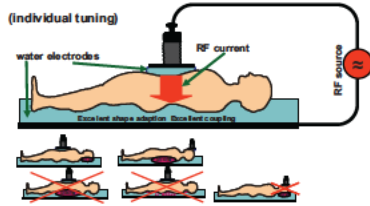
## Objective

Oncothermia became a widely used and popular method in over 15 countries of the world. It is not a "gold standard" yet, but it is on the way to reach its stable and important position as a "fourth column" among the main oncotherapy modalities. It has wide range applicability for every solid tumor in all possible localizations, irrespective of its primary or metastatic form. It could be applied together with all the known oncotherapy methods, and it is applicable in higher lines of the therapy protocols, even in the refractory and multirelapsed cases as well. Its applicability contains the curative and palliative approaches as well as it is well personalized to provide the optimal available treatment for the given case. Our objective is to propose a convention for various treatment conditions, to make a frame of the protocols which has to be filled up by the actual and well personalized details.

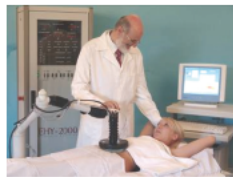
## Method

A comprehensive book [1], and numerous scientific and technical papers were published on oncothermia [2], so the technical basis is stable. Oncothermia has collected during its 21 year existence a massive expertise and large data collection, which are the basis of any convention for treatment protocols. The main factors to fix a personalized protocol are (1) kind of the complementary treatment, (decisional basis is the protocol of the "gold standard" therapy), (2) kind of the tumor entity, (3) kind of the personal status (4) physiological factors of the patient. The most frequently applied bimodal treatments are the oncothermia combined with chemotherapy or radiotherapy.

Patient is a part of a resonant circuit (individual tuning)



Easy to use, convenient to lay



Oncothermia works on conduction principle. RF current flows through the patient from one electrode to the other. Electrodes are flat metals, both under water pillow, one is in the bolus; one is under the water mattress. Water is a transmitter of the RF current, making possible a good fit of the human body to the flat metals. Both water electrodes (the water bed and the water bolus) are parts of the highly sophisticated electric circuit and not only a matter of convenience. The well constructed device does not radiate, the RF energy flows in a controlled way to the constrained directions, the current delivers the energy where the malignancy is. Both electrodes are active, current flows through them in all the frequency periods.

Oncothermia is a personalized, non-toxic treatment. Oncothermia, in most of the cases, is applied when the conventional cancer therapies fail, when the applied therapies need re-sensitizing or their substitution is necessary. Oncothermia efficacy is focused on patient centered values: survival time and quality of life. Oncothermia can be applied as triple or quadruple modality (radiochemotherapy and additional to surgery (adjuvant or neo adjuvant) as well as some supportive therapies (vitamins, enzymes, etc.) can be given alongside. Oncothermia is a versatile treatment for various solid tumors, its applicability is not limited to specialties, its universal applications could be easily fitted to all the "gold standards" as well as it could be a good complementary support for other oncotherapies too.

## Results

### Oncothermia consensus for TREATMENT

1. Apply only in combination (exception if the conventional treatments are not applicable)
2. Treatment time is 45-90 min (average is 60 min)
3. Treatment frequency 2-3 times a week (sometimes everyday low-dose for blood-perfusion)
4. Treatment number 4-12/cycles (average 5.8)
5. Treatment cycle follows the combination (average is 2.3)
6. Step-up heating, gradually increased power, (follow the adaptability of the patient)
7. Give time to adapt the modulation (in case of sensitive organs like the brain)

Protocols for combination with radiotherapy (RT) has to consider the blood perfusion of the tumor. When the tumor has adequate blood perfusion then due to its high oxygen content it is sensitive for RT. In this case RT has to be applied first, immediately following by oncothermia with the highest tolerable power. This combination process is repeated every second day, (while the fractionated radiation could be on its own protocol every day). Oncothermia follows RT immediately (in 30 min range). In case of low blood perfusion oncothermia has double role: increases the blood flow to sensitize the RT and supports the cell killing mechanisms. Fractionated RT follows oncothermia in this case in everyday application. In case of chemotherapy oncothermia has to be started when the highest chemo perfusion is expected in the tumor lesion to support the chemo infiltration and the chemo metabolism in the tumor. All the protocols have to be fitted to the request of the tumor localization, and its duration has to be actualized by the stage and the progress of the cancer.

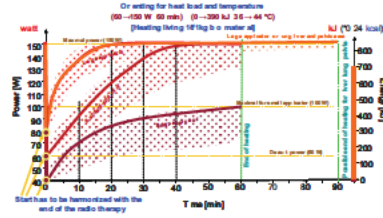
### Oncothermia consensus for SAFETY

- Physician and/or trained clinical staff must be in duty and monitor permanently the treatments!
- The treatment needs extra care, when the patient has reduced thermal sensitivity!
- Treatment is prohibited when the patient is unconscious!
- Treatment is prohibited when patient is under deep-sedation or anaesthesia!
- Treatment is prohibited in case of patient, who isn't able to communicate with physician!

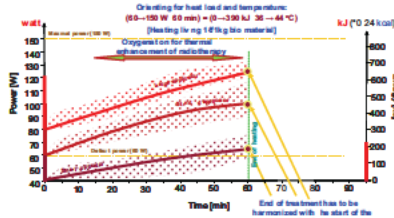
### Oncothermia consensus for PRACTICE

- If the patient has inclination to epilepsy, the physician has to take extra attention!
- Make pause of the treatment at rearranging and/or positioning the applicator!
- Clear away all metallic or magnetic pieces from the patients before treatment!
- Check the well filled electrode bolus, do not work with air-bubbles!
- Control the frame of electrode out of touching the skin!

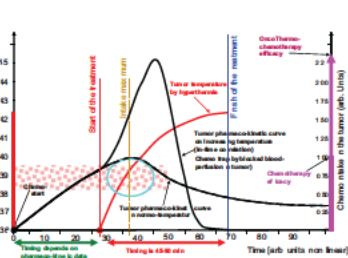
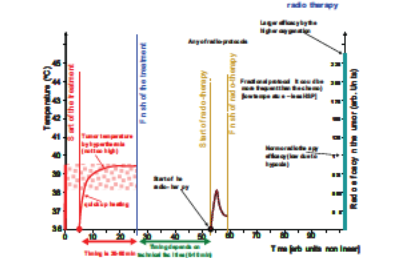
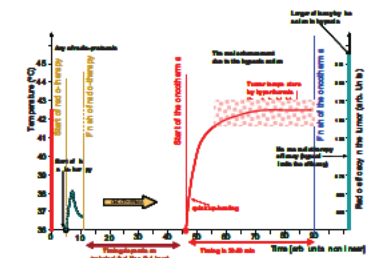
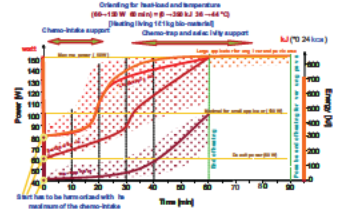
High blood perfusion, oncothermia is post treatment to radiotherapy



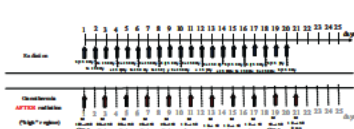
Low blood perfusion, oncothermia is pretreatment to radiotherapy



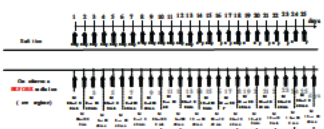
Combination with chemotherapy, oncothermia is a post treatment



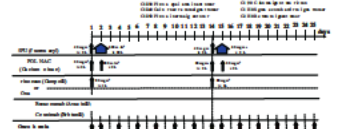
Example 60 Gy (1.5 Gy/fraction), (in middle progressive and variable)



Example "Oncothermia" protocol



Example "Oncothermia" protocol



high blood-perfusion the radiotherapy efficacy is expected high, its primary application is desirable. Oncothermia has to be applied afterwards with the highest tolerable dose to achieve the maximal result!

low blood-perfusion the radiotherapy efficacy is expected low. The primary application of oncothermia is desirable, with low power making the oxygenation effective. Radiotherapy has to be applied afterwards.

Chemotherapy has to be fitted to the chemo metabolism and pharmacokinetics of the actually applied drug. Oncothermia has to be applied before or during the chemo treatment. Administering the chemotherapy after the hyperthermia could decrease the chemo intake of the tumor, due to the fact that hyperthermia blocks the neoangiogenic blood flow. Best performance of the combination can be achieved, when the oncothermia is performed at the time when the given drug has the highest chemo dose by the tumor. These kinetic data of the actual drug are usually provided by the producer.

## References

[1] Szasz A, Szasz N, Szasz O (2010) Oncothermia Principles and Practices, Springer Verlag, Heidelberg <http://www.amazon.com/Oncothermia-Principles-Practices-Andras-Szasz/dp/9048194970>  
 [2] Szasz A (2006) Physical background and technical realization of hyperthermia. In Baronzio GF, Hager ED (eds) Locoregional Radiotherapy: Perfusional and Wholebody Hyperthermia in Cancer Treatment. New clinical aspects, Ch 3, Springer Science Eureka.com, pp 27-59 <http://www.springer.com/west/home/biomed/cancer/cancer?SGWID=4.125.22.150458762>  
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