

## **Clinical studies and evidences of modulated RF conductive heating (oncothermia) method**

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**Background:** Hyperthermia is an ancient treatment modality, but more than two millennia were not enough for its wide acceptance. Modulated RF-conductive heating (oncothermia [1]) introduces a new controllable, successful paradigm. It has twenty years experience in the clinical practices. During this long time, a huge number of patients were treated with the method in their advanced states, in combination with conventional therapies, or sometimes, when those were fall, applied as monotherapy. Object of our present paper is to show the clinical evidences collected by application of Oncothermia.

**Methods:** Oncothermia method is well described in the relevant literature [2]. In our present paper we had collected results of some retrospective and a prospective studies performed by oncothermia for higher (usually third and subsequent) treatment-lines, boosting or re-sensitizing the effect of the conventional therapies. We show some results when oncothermia was applied as monotherapy when the conventional therapies fall. These high-lines of treatments are mostly determined by the individual decisions of the physicians, usually without having help from any evidence based statistical approvals. The results have to be concluded from observational studies and their historical and data-base comparisons. Make the result as objective as could be, we compared the collected results of the same localizations and same protocols from various clinics. They common significant difference from the databases could be accepted as a kind of evidence.

**Results:** The 1st year survival and its improvement compared to the largest US database (SEER) is shown in the table. This presentation is an invitation to share the challenge of the new method, share the excitement to apply a new effective treatment, and share the enjoyment of the results. We concentrate on the results of anyway complicated diseases, like brain gliomas, pancreas carcinoma, metastatic liver from colorectal carcinoma. In glioma cases a prospective study (Regensburg University, [3]) had shown the safety of oncothermia even in dose escalation. The efficacy results are everywhere significantly better than any of the data in public databases (SEER, Eurocare):

Tumor	1st year survival (%)	Gain to SEER (%)
Bone	100	42
Brain glioma (1)	79.3	90.63
Brain glioma (2)	86.2	107.21
Breast	97.1	7.5
Cervix Uteri	86.8	5.2
Colo-rectal	84.9	20.5
Corpus uteri	100	15
Esophagus	41.7	34
Head&Neck	92.2	29.5
Kidney	84.6	22.2
Liver	72	250.9
Lung	64.7	96.7
Ovary	100	51.1

- ASCO (2003) [3] the median survival time (MST) for anaplastic astrocytoma (AA) 106m (n=9) and 20m (n=27) for glioblastoma multiforme (GBM) patients,
- ASCO (2008) [4] 38.2m (n=53) and 20.3m (n=126) for AA and GBM respectively,
- Witten-Herdecke University published [5] 70.2m (n=17) and 25.2m (n=19) as well as [6] 26.1m (n=40) and 16m (n=92) data for AA and GBM MST, respectively.
- ACNU combination was used in Phase II trial recurrent glioblastoma (n=19) [7]. MST was 21.8m; while MST from first oncothermia was 8.8m.
- HTT-Med MST results [10] were 36m (n=8) and 14m (n=10) for AA and GBM, respectively.
- Empoli Hospital shown in very advanced relapsed cases [8] 9m MST (n=12) for GBM. In pancreas carcinoma mEHT results
- ASCO (2002), [9]; first year survival 41.7%, while the subsequent years are: 20.6%, 13.5%, 9.4%, 4%, with MST 10.8m.
- ESHO (2003), DEGRO (2004) [10], [11], the 1yS in HTT-Med (n=73) 52.1% (MST=12.7m), and in Peterfy Hospital (n=26) 46.2% (MST=12.0m). In the subsequent years were 31.5% & 15.4%, 16.4% & 11.5%, 9.6% & 3.8% and 2.7% & 3.8%, which data are higher than expected from the large databases
- Results were repeated in six different clinics in two countries significantly improving the achievements of the conventional treatments shown in summary [12]. In addition to the above two more clinic showed its 1yS: Veramed (n=42) 52.4% and Nurnberg Nord (n=13) 46.2%

In metastatic liver cases mEHT has also distinguished results:

- The colorectal liver metastasis was the topic of four different studies on liver [13],

- ASCO (2007) [14], MST was 20.5w, 50% presented evidence for increase well being.
- ICACT [15], had shown definite benefit for 25 patients (n=30) by mEHT
- ESHO (2005) [16], had shown in second line treatment 80% response rate.

Conclusions: Summary of our results conclude the feasibility of the oncothermia and despite of the high- line treatments shows evidences by the parallel studies in the various clinics.

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