
THEMORADIO THERAPY TREATMENT
OF MALIGNANT TUMORS.
FRACTIONATION REGIME AND
OBJECTIVE END POINTS. HEAD AND
NECK CANCER.

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Hyperthermia has been proven to increase the response of malignant tumors to radiation therapy in both experimental animal tumors and the clinical treatment of human cancer. Based on our multi-year experience, first in re-treatment of previously radiated fields that necessitated the use of low dose radiation fractions as adjunct to the heat treatments, and then progressively applying the encouraging results obtained to areas treated "de novo" and eventually to situations allowing a potentially curative intent, treatment protocols have been devised and tested that yield positive preliminary data showing superior tumor response rates and less side effects when compared with historical controls at our Institute.

The hyperthermia part of the protocol extends the number of heat treatments to correspond to the number of radiation-fractions, as each hyperthermia treatment proceeds or follows each radiation treatment in close time proximity. The number of hyperthermia treatments therefore varies from 25-50 per course for each treated field. Outcomes confirm that more Hyperthermia fractions improve both tumor response and survival.

The radiation protocol consists of progressively decreasing daily doses of radiation therapy combined with the daily hyperthermia treatments. Typically the treatment is started at a daily dose of 180cGy gradually reduced to 100cGy protracting a typical radiation therapy treatment course from 5000cGy in five weeks to 5000cGy given in over eight weeks; or 7000cGy in seven weeks to 7000cGy in 14 weeks. According to the ELLIS TDF formula, this results in a 15% or 25% reduction of the effective radiation dose. The total dose is of course adapted to the clinical situation. To this effect, the use of objective end result parameters is introduced, including MR Spectroscopy, PET Scanning and Tumor Marker levels. Increased radiation doses improve tumor response, but not survival, when enough Hyperthermia is given. Increased Hyperthermia doses, increase both response and survival.

Conclusion

Protracted Hyperfractionation

- Decreases the radiation dose by 15% and 25%.
- Decreases the side effects of XRT (no diarrhea, fistula or pneumonitis in PH cases).
- Allows for more combined XRT-Hyperthermia treatments.
- Increases the effectiveness of the combined treatment in superficial and deep tumors.
- More Hyperthermia increases tumor response and survival.

ONE PATIENT RESULTS

ADENOCARCINOMA, PAROTID GLAND.

These pictures were taken before and after the Hyperthermia treatment, combined with low radiation dose.

Thermoradiotherapy (Hyperthermia combined with low dose radiation) Hyperfractionation technique (division or fractionation of radiation therapy in small radiation doses) was used to treat this case of **Adenocarcinoma, Parotid Gland.**

Before treatment



After 8 weeks of treatment

