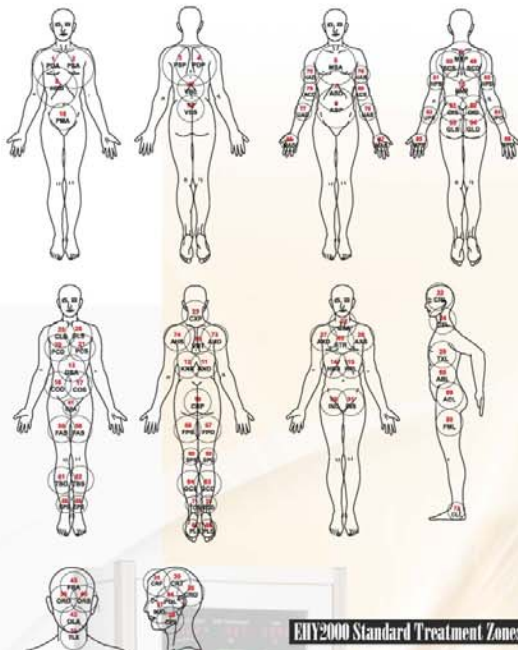




Summary Guidelines



EHY-2000 Standard Treatment Zones

SUMMARY OF ONCOTHERMIA APPLICATION

Applicator
 Applicator size should match the application zone and tumor size. Applicator is applied in the skin directly or through a thin fabric. In case of external fistulas, ulcers or weeping, applicator is applied through a thin moisture-absorbing paper. Applicator should be applied to that surface of the body which is closer to the tumor. Heating is the most effective at the 2-15 cm distance from the active (upper) applicator. Applicator should cover the entire projection of the tumor and adjacent lymph nodes, if possible. Applicator should be parallel to upper surface of the couch (neutral electrode), if possible. If it's impossible, the angle between the applicator and the couch should be as small as possible and open toward the nearest wall. The entire surface of water bolus should be in a tight contact with the skin without any air interlayer. Loose contact between applicator and skin leads to energy losses, reducing the heating efficiency and increasing the likelihood of burns. Applicator should be fixed firmly but without unpleasant pressure to the patient. Only water bolus should contact the patient. Applicator body (black) and RF cable shouldn't contact patient's body as it may cause burns.

Position of the Patient
 Patient position should provide the shortest distance between the upper applicator and the tumor. In deep tumors, the preferable position is that one where there is a minimum layer (between upper electrode and the tumor) of the following structures (in descending order of importance): a) fat, b) bone and c) muscle structures. The posture should be comfortable to allow the patient to sustain it during entire procedure. The basic patient position is lying on the back. If the tumor is located closer to the dorsal surface of the body, the patient is laid on his stomach. Some tumor localizations require lateral position (head, neck, etc.) During the procedure, the patient, if possible, should be immovable.

On the human body, there is a finite number of treatment zones. Each zone is designed to act on specific organs. For each treatment zone, there are certain recommendations on the size of the applicator, power and mode of exposure. The map of the treatment zones is shown on the left. The table of treatment zones and modes of exposure is shown below (big number is the treatment time, lower number is MRP). The complete list of the treatment zones and modes of exposure in accordance with ICD10 is contained in Annex B for the Technology.

Power
 EHY2000 PLUS maximum power is 150W. Applied power depends of applicator size.

Size	D, cm	MSP, W	MRP, W	MSP, W	MPP, W
Small	10	25	80	130	140
Standard	20	40	130	150	150
Big	30	60	150	150	150

- MSP - Minimum Start Power:** the power which does not cause pain in 90% of patients. Pain at MSP is a contraindication for oncothermia treatment.
- MPP - Maximum Recommended Power:** the power limit, above which the balance shifts towards classical hyperthermia, reducing the effectiveness of non-thermal mechanisms. Below MRP, the possibility of side effects and complications is minimal (less than 3%). MPP value may vary by different tissues and organs.
- MSP - Maximum Safe Power:** the power, above which the likelihood of surface tissues burns increase provided incoherent use of applicators. It is allowed to exceed MSP level only in the presence of a trained doctor and under his/her supervision.
- MPF - Maximum Permitted Power:** the power which is safe subject to highly qualified application. MPP application is justified when tumor is resistant to lower powers.

In practice, the principle of oncothermia treatment is «maximum tolerable power».

Maximum Tolerable Power (MTP) is an individual patient parameter, the threshold power of pain. Exceeding of MTP is associated with a high probability of adverse effects, particularly superficial and subcutaneous burns. MTP is an individual and dynamic variable. Typically, MTP increases during the treatment course and a session in view of adaptation of tissues to oncothermia impact. Usually the adaptation is completed in 3-9 sessions, but sometimes (rarely) MRP can not be reached. In this case the power should continue at MTP, increasing the duration of the session according to the following calculation:

$$t^* = t + (MTP - P) \cdot (MTP - P) / (MTP - P)$$

where t^* - scheduled duration of the session; t - corrected duration; MTP - time to reach MTP

Increment and interval of power increase
 Oncothermia is targeted for continuity of heat-up, not to reach the maximum plateau temperature. Therefore, the increase of power is carried out gradually and incrementally. The gradual increase of power also allows tissues to adapt to higher temperatures and reduces the toxicity of the method.

Recommended increment of power is 10 W, minimum 5 W, maximum 20 W. Recommended interval of power increase is 10-15 minutes, minimum 5 minutes, maximum 20 minutes.

Modulation
 Modulation is applied by default. Poor tolerance of oncothermia treatment is the only reason to discontinue modulation. It could happen mainly at brain treatment. In this case, the course should be started without modulation. Modulation starts gradually during the course, and then becomes constant. Adaptation of the patient to modulation is the target because it is modulation which allows to realize the full effect of oncothermia.

Duration and termination of a session
 Standard duration of a session is 40-60 minutes for small applicator, 60 minutes for standard applicator and 90 minutes for big applicator. A session could be terminated after reach of scheduled time or dose. Maximum duration of a session with dose limitation is 120 minutes.

Interval between sessions
 Recommended interval between sessions is 1-3 days (2-3 times a week). If necessary, the interval could be extended above 3 days. In combined treatment (chemo- and radiotherapy), an interval between sessions is determined by the basic treatment. Daily use is possible.

Number of sessions and duration of the course
 The average course consists of 6 treatments. The standard recommended course is 10 sessions, the minimum effective course is 5 sessions. The number of sessions for combined use (chemo- and radiotherapy) is defined by a protocol of the basic treatment. Recommended course of oncothermia as a monotherapy is 15 sessions and more. The maximum number of sessions is unlimited. The longest described course for multiple liver metastases lasted for 100 days with more than 200 oncothermia sessions.

EHY-2000 Standard Treatment Zones	Anatomic Origin / Area	Treatment Zones																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Right Pulmonary Front																				
2	Left Pulmonary Front																				
3	Right Pulmonary Rear																				
4	Left Pulmonary Rear																				
5	Right Breast																				
6	Left Breast																				
7	Right Breast																				
8	Left Breast																				
9	Right Breast																				
10	Left Breast																				
11	Right Breast																				
12	Left Breast																				
13	Right Breast																				
14	Left Breast																				
15	Right Breast																				
16	Left Breast																				
17	Right Breast																				
18	Left Breast																				
19	Right Breast																				
20	Left Breast																				

EHY-2000 Standard Treatment Zones	Anatomic Origin / Area	Treatment Zones																			
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