

TECHNIQUES FOR THE PROCEDURE OF WHOLE-BODY HYPERTHERMIA WITH INDUCED HYPERGLYCEMIA AND MULTIDRUG CHEMOTHERAPY

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The result of clinical application of modifying factors in the treatment of cancer patients, the trends in hyperthermic oncology the world over, employment of novel equipment facilitated improvement of whole-body hyperthermia techniques.

The techniques developed at the State Institution "N.N. Alexandrov Research Institute of Oncology and Medical Radiology" for the procedure of whole-body hyperthermia with induced hyperglycemia and multidrug chemotherapy is carried out with obligatory use of balanced anesthesia and controlled ventilation.

Setting up and sustaining of high temperature is implemented by means of electromagnetic high-frequency (13.56 MHz) hyperthermic units introduced into clinic in 1988.

The design of the hyperthermic units enables to reduce the heat burden on the integumentary tissues (skin and subcutaneous fat), to accurately control the hyperthermic mode, to promptly reach hyperthermic reference temperatures: 40° C is attained during 25-40 min, 41.8-42.2° C – 60-75 min from the start of heating.

The maximum temperature is limited by 41.8-42.2° C of rectal sensor reading and maintained as accurate as 0.2° C for 60-80 min (the period of temperature plateau). Depending on the treatment regimen, additional heating of gas mixture up to 40° C for controlled ventilation is performed. During the hyperthermic period, the patient's head is air-cooled (10° C), the temperature in the upper third of the esophagus not exceeding 41.2° C.

Our investigation demonstrated that the combination of electromagnetic heating and coplanar lay-out of emitting aerials makes it possible to establish a temperature in tumour masses exceeding the rectal temperature by 0.5° C as a minimum, thus producing a maximal therapeutic effect. The skin temperature of the ventral and dorsal surface of the patient's body remains within the limits of 41° C.

The indices of the patient's central hemodynamics are the restricting factor for duration of a hyperthermic procedure.

Hyperglycemia is induced by infusion of 40% glucose solution concurrently with the start of heating. The glucose level in blood higher than 22 mmol/l is reached for 30 min and sustained for no less than 100 min.

Mono- or multidrug chemotherapy is administered with regard to the pharmacokinetics of the acting drugs.

Herpetic infection is prevented by acyclovir at a dose of 500 mg; antiemetic therapy includes ondansetron 8 mg, dexamethasone 16 mg or prednisolon 60 mg.

After the heating being completed, the patient's body is cooled in the natural way. The overall duration of the hyperthermic period is 150-210 min, of anesthesiological aid – 180-240 min.

All the detected changes in biochemical blood indices, electrocardiographic findings and the patient's general condition are corrected in the course of and after the completion of the procedure.

The established techniques of whole-body hyperthermia performance was implemented in 2100 treatment procedures, including those for childhood patients, carried out from 1988 through 2006.