Commentary
Volume 6:6, 2021

Journal of Oncology Medicine & Practice

ISSN: 2576-3857 Open Access

Therapeutic Hyperthermia: Principles, Uses, and Advantages

Tony Sahidh*

Department of Nuclear Medicine and Diagnostic Imaging, Graduate School of Medicine, Kyoto University, 54 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan

Abstract

The application of minimally invasive surgical to the therapy of gynaecologic malignancies is growing. For women with early-stage cervical cancer who want to save their fertility, extreme vaginal trachelectomy with laparoscopic pelvic lymphadenectomy has evolved as a safe and feasible choice. Similarly, laparoscopic surgery assisted radical vaginal hysterectomy has been described in detail, is practical, and can be administered to women with early-stage cervical cancer who do not want to have children in the future. The surgical approach of laparoscopic hysterectomy, peritoneal washings, pelvic and Para-aortic lymph node dissection, with or without an omentectomy, is being compared to the same surgical treatment via laparotomy in the collaborative Gynaecological Oncology Group LAP 2 study, which has completed accrual, and appears to be a reasonable designed clinical in the treatment of early stage endometriosis. Extra peritoneal laparoscopic for Para-aortic and vaginal lymph node dissections has been proved to provide appropriate nodal counts, as well as being secure and practical in the treatment of gynaecologic malignancies.

Keywords: Gynaecologic malignancies • Vaginal lymph node • Peritoneal washings • Cervical cancer.

Introduction

Along with surgery, radiation, chemotherapeutic, and gene and immunotherapy, hyperthermia (HT) is a method of cancer treatment. In oncology, HT employs an external heat source to raise tissue temperature and kill or slow the growth of cancer cells. As most studies have shown, high temperatures induce direct harm to malignant cells and sensitize them to other therapeutic approaches, as well as augmenting radiotherapy and chemotherapy with minimal or no damage to normal tissues. As a result, HT is commonly utilized as a cancer adjuvant therapy.' Advances in nanoparticle-assisted thermal treatment have the potential to solve most of these issues, although there are still worries concerning nanoparticle usage. Normal tissues have increased thermo tolerance against cancer cells, but the mechanisms that govern this are mainly unclear. Different treatment approaches can be used depending on the location of the tumor (e.g., superficial or deep-seated) [1].

Methods of Treatment

High-temperature applications can be done in three ways, depending on the organ to be targeted, the phase of the disease, and the energy distribution technology. Heat is distributed to localised, progressing or deep-seated, and scattered cancers via local, regional, and whole-body HT, respectively.

Local hyperthermia: Local HT is reserved for tumors that are relatively small (between 3 and 6 cm in diameter) and are situated superficially or within an accessible bodily cavity such as the rectum or esophagus. To transfer heat to tumors in local HT, superficial intraluminal applicators can be utilized, and microwaves, radio waves, or ultrasound are most typically used. With a contacting layer termed a bolus, superficial applicators of various forms and kinds (e.g., waveguide, spiral, and current sheet) are positioned on the surface of superficial tumors. Water boluses are employed concurrently to regulate the skin temperature at around 37°C to prevent any negative effects. Interstitial HT is a more intrusive method than brachytherapy and is only suited for lesions that are less than 5 cm in diameter. This approach necessitates the placement of a number of applicators under local or, in some cases, general anaesthesia [2].

Regional hyperthermia: A portion of the patient's blood is taken, heated, and then reinserted into the limb or organ, usually coupled with anticancer medicines, in the regional perfusion HT technique.The use of Hyper Thermic Intraperitoneal Chemotherapy (HIPEC) to treat tumors of the peritoneum, such as primary peritoneal mesothelioma and stomach cancer, has been advised. This approach involves inserting a heated chemotherapeutic drug into the peritoneal cavity, which raises the tissue temperature inside the cavity to 41–42˚C. Heating upper abdominal tumors is problematic due to a lack of regular temperature measuring methods. Other anatomical locations, like as the thorax or neck, require regional HT, which is not achievable. The approach has been used in conjunction with radiation in the majority of clinical studies on regional HT [3].

Whole body hyperthermia: Whole body hyperthermia (WBH) raises the temperature of the entire body to at least 41˚C using either radiation heat or extracorporeal technology. Immersion in a boiling water bath and solar radiation with UV light are the most common methods for WBH. Radiant WBH involves the application of heat to the entire body using heated comforters, induction loops, or thermal chambers. Extracorporeal WBH is produced by extracting hot blood from the extracorporeal circulation. An extracorporeal ring is formed by a blood circuit that runs across the body. The flowing blood is heated in a water bath or with hot air before being injected into the main vein. By adjusting and measuring the present volume of warmed injected blood, the expected body temperature is modified and monitored [4].

Instruments used in the treatment of hyperthermia

Heat is applied to tumors using microwaves (433 to 2450 MHz), radio waves (100 KHz to 150 MHz), ultrasound, hot water perfusion resistant wire embeds, ferromagnetic seeds, nanoparticles, and infrared radiators.In HT, two types of probes are employed. One to transport energy to the tissue, one to apply it to the tissue, and one to monitor the temperature of the tissue. Every applicator has a bolus that is applied to the patient's skin. This bolus is filled with flowing water that may be heated as needed during therapy. The bolus aids in the physical connection of electromagnetic waves to the patient's body, reducing reflection and energy loss. Interstitial and intracavitary probes, as well as external antennas, can then be used to provide heat [5].

Conclusion

HT can be administered in a variety of ways, with the approach chosen based on the kind of tumor and its location in the body. HT has been shown

***Address for Correspondence:** Tony Sahidh, Department of Nuclear Medicine and Diagnostic Imaging, Graduate School of Medicine, Kyoto University, 54 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan, E-mail: saahidht43@kuhp.kyoto-u.ac.jp*

Received 04 November 2021; **Accepted** 18 November 2021; **Published** 25 November 2021

in several trials to be a successful cancer therapy. However, depending on the location, certain approaches must be used. Furthermore, using HT in conjunction with standard cancer therapies like chemotherapy and radiation can help patients live longer.

References

1. Tabuchi, Yoshiaki., Shigehito Wada, Yukihiro Furusawa, and Kenzo Ohtsuka, et al. "Gene networks related to the cell death elicited by hyperthermia in human oral squamous cell carcinoma HSC-3 cells." *Int J Mol Med* 29 (2012): 380-386.
2. Issels R. "Hyperthermia combined with chemotherapy–Biological rationale, clinical application, and treatment results." *Oncol Res Treat* 22 (1999): 374-381.
3. Mills Michael D., and Raymond E. Meyn. "Hyperthermic potentiation of unrejoined DNA strand breaks following irradiation." *Radiat Res* 95 (1983): 327-338.
4. Chen Fang, WengeWang, Wafik S.El-Deiry. "Current strategies to target p53 in cancer." *Biochem Pharmacol* 80 (2010): 724-730.
5. Peer, Adrienne J., Melissa J Grimm, Evan R Zynda, and Elizabeth A Repasky. "Diverse immune mechanisms may contribute to the survival benefit seen in cancer patients receiving hyperthermia." *Immunol Res* 46 (2010): 137-154.

How to cite this article: Sahidh, Tony. "Therapeutic Hyperthermia: Principles, Uses, and Advantages". *J Oncol Med & Pract* 6 (2021): 146