Interstitial, Endovascular and Perfusional Hyperthermia

Clifford L. K. Pang

Hyperthermia in oncology is the application of heat to a patient's body for the purpose of cancer treatment. The basic mechanisms involved in hyperthermia are well defined and involve an increase of temperature at the tumor site, leading to an increase in tumor cell death. Hyperthermia is usually delivered in conjunction with other treatment modalities such as radiation therapy, chemotherapy, or surgery. The goal of hyperthermia is to enhance the effectiveness of these other treatments and to reduce the side effects of cancer treatment.

Interstitial Hyperthermia

Interstitial hyperthermia involves the direct delivery of heat to the tumor through the insertion of needles or catheters. The heat is generated by placing electric current through the needle or catheter, which creates heat as a result of the joule effect. The heat is then transferred to the surrounding tissue, resulting in a localized increase in temperature. Interstitial hyperthermia can be delivered using a variety of techniques, including radiofrequency ablation (RFA), microwave ablation (MWA), and laser ablation.

Endovascular Hyperthermia

Endovascular hyperthermia involves the delivery of heat to the tumor through the vasculature. This is typically done by placing catheters into the tumor blood supply and using electrical current to generate heat within the tumor. Endovascular hyperthermia can be used to treat tumors located in the liver, kidney, or other organs with a substantial blood supply.

Perfusional Hyperthermia

Perfusional hyperthermia involves the delivery of heat to the tumor through the perfusion of heated blood. This is typically done by placing catheters into the tumor blood supply and infusing heated blood into the tumor. Perfusional hyperthermia can be used to treat tumors located in the liver, kidney, or other organs with a substantial blood supply.

Conclusion

In conclusion, hyperthermia is a well-established treatment modality that can be used in conjunction with other treatment modalities to enhance the effectiveness of cancer treatment. The specific technique used will depend on the location and characteristics of the tumor, as well as the overall condition of the patient. Further research is needed to optimize the use of hyperthermia and to determine the best combination of treatment modalities for each individual patient.

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References

Thermoradiotherapy and Thermochemotherapy

H. Heinrich Seegenschmiedt 2012-12-06

Hyperthermia has been found to be of great benefit in combination with radiation therapy or chemotherapy in the management of patients with difficult and unusual tumor problems. It has been demonstrated to increase the efficacy of ionizing radiation when used locally but also has been of help in combination with systemic chemotherapy, where hyperthermia is carried out to the total body. Problems remain with regard to maximizing the effects of hyperthermia as influenced by blood flow, heat loss, etc. The present volume defines the current knowledge relative to hyperthermia with radiation therapy and/or chemotherapy, giving a comprehensive overview of its use in cancer management.

Preface

In an attempt to overcome tumor resistance, hypoxia, or unfavorable tumor conditions, oncological research has come to focus on gene therapy, immunotherapy, new cytotoxic agents, and increasingly sophisticated radiotherapy. Radiation research has been directed towards heavy particle therapy and modification of the radiation response by either protecting or sensitizing agents. Improved dose localization using rotational or conformal strategies has also been accomplished. Recently, changes in radiation fractionation schedules have shown promise of better results. Hyperthermia in cancer therapy can be viewed similarly as another means to increase the effectiveness of tumors to radio- and chemotherapy.