The Role of Microwave Hyperthermia/Ablation for Cancer Treatment: Current Status and Future Challenges

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According to CDC, every year approximately two million people were diagnosed with some type of cancer in the United States alone. Leading causes of death among women and men are lung/breast and lung/prostate, respectively. Historically, the only three major procedure used for cancer treatment are surgical removal of the tumor, chemotherapy, and radiation therapy. The idea of killing cancer cells by using high temperatures has been around for many decades. However, only RF/Microwave ablation has found a wide spread used for liver tumors that are formed as a result of metastasis. Hyperthermia has been successfully used for superficial cells such as chest wall reoccurrence of the breast. In addition, recently, it has been shown that heat treatment combined with the chemotherapy and radiation therapy increases the effectiveness of the therapy and the survival rates. This improvement in the treatment comes from the fact that the heat allows the cancer cells to absorb the chemotherapy drugs more efficiently and the same logic is true for radiation therapy. Some clinical studies have shown a three-fold increase in the survival rates when chemotherapy/radiation therapies are combined with hyperthermia.

In this talk, a historical background of microwave/RF hyperthermia and ablation will be given. A detailed discussion will be provided on the existing devices on the market and some of the up-to-date current studies will be provided. To give a better insight, two specific applications, one for mild hyperthermia and another for microwave ablation will be given. The talk will continue with the future challenges and some discussion on new and emerging application.