

Radiofrequency thermoablation in locally advanced breast cancer

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The authors report their experience of 8 cases of breast cancer treated by radiofrequency thermoablation. Two patients had bilateral breast cancer infiltrating the skin. All patients, but one, were alive at two years follow-up. The age range was 54 to 75 years old (median, 60 years old). We observed complete regression of four tumours (50%) and in only partial regression in the remaining four (50%). The authors believe that radiofrequency, alone or associated with other treatments, is an easy and useful alternative for the management of breast cancer, in selected patient who cannot undergo surgery or refuse surgical treatment and other treatments.

Introduction: Thermoablation is an easy and repeatable procedure and it can be carried out as a day case under local anaesthetics. Furthermore, it can be associated with other treatments like surgery, hormonal therapy, radiotherapy, and preoperative bulk reduction chemotherapy. A preliminary feasibility studies carried out by Fornage BD et al, has shown the safety and feasibility of US guided radiofrequency thermoablation in small (≤ 2 cm) breast cancer. We report our experience of radiofrequency thermoablation in larger breast cancers (median size of 4 cm), 50% of which had palpable axillary nodes.

Material and Methods: Over a period of 36 months we treated 8 cases of breast cancer by thermoablation. All patients has local advanced disease. Two patients had bilateral advanced breast cancer. All patients had refused to undergo surgical treatment. Contributing factors that had lead patients to refuse any form of surgical treatment were recent stroke, past history of other types of cancer (including malignant skin cancer and uterine cancer), depression, severe heart disease. Median age was 60 years old (range: 54 to 75 years old). Median tumor size was 4 cm (range: 2 to 6 cm). In 4 cases, axillary nodes were palpable prior to treatment. In four patients carcinoembryonic antigen (CEA) and cancer antigen 15-3 (Ca 15-3) were raised. Mammograms and cytology were positive in all patients. Prior to the procedure all patients underwent a standard pre-operative workup consisting of chest X-ray, ECG, routine blood tests, and oncologic markers. The procedure was carried out using a Valleylab's cool-tip™ RF electrode ACT2030 needles that were inserted inside the tumour under ultrasound guidance. The radiofrequency generator was used to deliver a temperature of 60°C for 15 minutes within the tumour. Ultrasonography was used to assess the effectiveness of the treatment. During vaporization of the tumour associated to the thermal effect an hyperechoic area extends gradually to the whole tumour. In the weeks that follow the procedure the gradual disappearance of peritumoral inflammation can be assessed ultrasonographically. In one patient who was affected by severe cardiac disease and orthopnoea, the procedure could be carried out with the patient sitting in and upright position. One diabetic patient who had a nodule infiltrating the cutaneous layer suffered a second degree skin burn, which was successfully treated with simple dressings. Blood glucose levels were carefully monitored. Hormonal therapy was prescribed to all patients. Tamoxifen was administered to all patients but two who were treated with aromatase-inhibitors, due to high thromboembolic risk.

Results: At two years follow up, all patients (100%) were alive. All reported a good quality of life. In two patients the tumour markers had returned to normal values. In 50% of patients there was a complete regression of the tumour. In the remaining 50% we observed a partial size reduction of the tumour with stabilization of the disease. In no patient there was an observable rapid progression of the disease. One patient, with bilateral advanced disease, died three years after treatment.

Discussion: The effect of heat on cancer cells has been known since ancient times. The ancient greek physician Hippocrates had already indicated the benefits of heat to treat tumours. Thermoablation is a technique that uses radiofrequency waves to generate heat and cause coagulative necrosis of tissues. It can be associated with tumorectomy to reduce the risk of local recurrence, and with preoperative chemotherapy to reduce the bulk of the tumour. Therefore, it can be used also to carry out conservative breast surgery (e.g. lumpectomy). The use of thermoablation to treat early stage breast cancer has been reported by several authors, mainly in pilot studies and conducted in research settings as feasibility studies. In tumours of less than 1.5 cm diameter, thermoablation followed by radiotherapy has been reported to achieve promising results. It has been suggested that by releasing cytokines, thermoablation could stimulate the immune system to attack cancer cells. In our limited experience the use of radiofrequency in breast cancer at different stages seems a valid tool in selected patients who refuse conventional surgery or when surgery is contraindicated. Thermoablation has several advantages: it is easy to perform, it can be carried out under local anesthetics as a day case, it is repeatable, and is more easily accepted by patients.

Conclusion: The use of radiofrequency ablation in locally advanced breast cancer could be an useful tool in selected cases where surgery is not feasible. More studies are necessary to evaluate the effectiveness, limits and indication of thermoablation in the treatment of early and advanced inoperable breast cancer.

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