

# Non-surgical treatment of early breast cancer: techniques on the way

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**Abstract:** Trials are still on the way to evaluate different non-surgical techniques to treat early breast cancer with achieving maximum oncological control and aesthetic outcome. Also these techniques can help old patients to bypass surgical and radiation complications and facilitate the treatment of early breast cancer with minimum side effects.

**Keywords:** Breast cancer; non-surgical treatment; techniques

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Breast cancer represents the most common cancer in females (1). With the application of screening mammography, many patients are now discovered in early stage of breast cancer with small tumors less than 2 cm (2). Therefore scientists and oncologists are trying to discover new non-surgical treatment for these small tumors, specially for old women to bypass surgical interventions and their side effects.

Many trials were designed to bypass surgery using chemotherapy or radiotherapy as a sole treatment but recurrence rates were very high comparing to surgical treatment. One randomized trial had gained popularity by using endocrine treatment (Tamoxifen) as a sole treatment to old females with ER+ for small tumors, but the local control was poor. However, it can be reserved for old or failed patients for temporary cancer control (3).

There is on the way a technique called cryoablation which is used by introducing a cryoprobe into the center of a tumor under ultrasound guidance in order to freeze the tissue to temperatures between -160 and -190 Celsius. Several small studies have now demonstrated the safety, feasibility, efficacy, and limitations of cryoablation in the treatment of early breast cancer. Successful cryoablation requires only moderate proficiency in ultrasound and percutaneous ultrasound guided placement of the probe within the center of the tumor, monitoring the formation of the ice ball and occasionally injecting saline between the ice ball and the skin to prevent thermal damage. Studies

are now assessing the oncological outcome and the rate of recurrence of this technique. The cosmetic outcome of the cryotherapy is outstanding: as the scar after cryotherapy is not bigger than that of percutaneous core biopsy, and after leaving the frozen tissue in place which will be resorbed later by the body leaving natural size and shape, with no resultant volume loss or deformity (4-9).

Radiofrequency (RF) ablation is another technique that had succeeded in treatment of unresectable tumors of the liver. Therefore some studies had been applied on early breast cancer and showed as a promising non-invasive treatment. RF is produced by frictional heating. Electrode tips placed in the lesion produce a high-frequency current that flows into the surrounding tissue, initiating ionic agitation that causes heat followed by cell destruction. The RF probe is typically placed under ultrasound guidance and the tumor ablation is monitored by magnetic resonance imaging (MRI). One of the limitations of RF was assessment of the margins of the ablated tumor to show the marginal status, decrease local recurrence and to make sure that the tumors had been all ablated. Still follow-up data regarding local effects on the surrounding breast tissue or recurrence rates are hardly available. Further research will be necessary to establish the optimal technique, and to demonstrate the long-term oncological and cosmetic effects of RF ablation (10-14).

Important technique on the rise is the high-intensity focused ultrasound (HIFU) is a completely non-invasive

technique. During HIFU, the ultrasound beam is focused into a small target volume to reach high focal power levels, resulting in temperature elevations causing cell death in a small target volume of tissue while surrounding structures are spared. HIFU can be guided by MRI (MR-HIFU) or by conventional diagnostic ultrasound (US-HIFU). Worldwide, thousands of patients with uterine fibroids, liver cancer, breast cancer, pancreatic cancer, bone tumors, and renal cancer have been treated by US-HIFU. Also studies are still needed for further evaluation of this technique (15-19).

An important drawback of the previous techniques is that the whole pathological assessment of the tumors, the marginal status can't be assessed and also the patients need receive radiotherapy after using these techniques especially the HIFU.

Breast cancer management never stops at one management but always evolves to try to conserve the breasts and to decrease the morbidity of the surgical treatment.

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