

# Treatment of Breast Cancer using Radiofrequency Ablation

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## Commentary

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## DESCRIPTION

Breast cancer is the most commonly diagnosed cancer in women and the main cause of cancer death worldwide. The World Health Organization's International Agency for Research on Cancer reported a dramatic increase in breast cancer worldwide in 2013, a spike of more than 20% from 2008. Breast cancer accounts for one-fourth of all malignancies in women, resulting in a significant economic and social burden. The current standard of care for breast cancer is surgery. Surgical considerations include cancer staging the Tumor, Node, Metastases method and tumour size in relation to residual breast tissue.

Patients with non-metastatic breast cancer are often stratified according to clinical stage, clinical stage I, IIA, or IIB (T2N1), or locally progressed breast cancer, clinical stage IIB (T3N0) to IIIC. The surgical options range from a lumpectomy, which is a simple removal of the tumour with a margin of healthy breast tissue, to a total mastectomy with sentinel node biopsy for axillary staging. Although the best oncological results are favoured, issues such as breast conservation and cosmetic outcomes are also crucial considerations in breast cancer treatment.

Surgical resection has long been the gold standard for treating primary solid tumours that have spread to organs such as the lung, colon, and breast. New research in radiofrequency ablative therapy has shed light on noninvasive alternatives. Nonsurgical methods provide a number of advantages, including a lower risk of anaesthetic problems,

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greater cosmesis, and a shorter recovery period. Many patients have co-morbidities and poor functional status, which raises the risk of post-operative complications such as haemorrhage, stroke, and/or death. In certain circumstances, a nonsurgical approach may reduce patient morbidity and mortality.

Another potential benefit of less invasive breast cancer treatment is improved cosmesis, such as breast conservation and less scarring. Unlike other solid tumours, breast cancer is distinguished by the significance of minimising surgical deformity.

Radiofrequency Ablation (RFA) is a minimally invasive procedure that has received a lot of attention. It is used to treat and relieve symptoms in a variety of primary and secondary solid tumours, including hepatocellular carcinoma, non-small cell lung cancer, and renal neoplasms. RFA heats and coagulates specific tissue using a radiofrequency electrode with imaging guidance, typically CT or ultrasound. The thermal energy is targeted to cause necrosis of only cancerous tissue while causing minimal damage to adjacent healthy cells. RFA use in breast cancer is a new area of study that is especially promising given the current move toward less invasive breast cancer treatments.

Radiofrequency ablation, the most promising of the noninvasive ablation procedures, involves frictional heating created by ions in the tissue attempting to follow changing directions of a high frequency alternating current. The radiofrequency probe is usually guided into the tumour by ultrasound, and the ablation is done with real-time ultrasound monitoring. Preliminary research including RFA plus routine surgical resection has shown that this technique is effective for surgical ablation of small (2 cm) primary breast cancers.

As breast cancer treatment progresses toward less invasive treatments, the potential of eliminating the main tumour without surgery are the next step. Radiofrequency ablation, the most promising of the noninvasive ablation procedures, involves frictional heating induced by ions in the tissue attempting to follow the changing directions of a high-frequency alternating current. The accuracy of the ultrasound evaluation, which is utilised to determine tumour size, identify the tumour for treatment, and monitor the progress of the ablation, is the most critical factor for successful radiofrequency ablation.

Although mastectomy or breast-conserving therapy remains the gold standard for breast cancer treatment, minimally invasive alternatives to surgery are becoming more appealing to some patient populations. Image-guided therapy has several advantages, including technological advancements, reduced morbidity, enhanced cosmesis, and the ability to offer treatment in an outpatient setting. Radiofrequency Ablation (RFA) has been studied due to its low cost, minimal morbidity, and high technical success rates.

Image guidance during ablation entails using real-time ultrasound or magnetic resonance imaging to target the tumour and check ablation adequacy. Tumor size, location, histologic type, and good visualisation under ultrasonography (or other imaging modalities) are all critical factors in determining patient eligibility and planning procedures. RFA alone, or in conjunction with hormone therapy, or followed by conventional radiation therapy with or without chemotherapy, may prove to be feasible treatment choices in patients with localised breast cancer who decline surgery or are not candidates for surgery. RFA may be appropriate for palliation of bigger symptomatic tumours in patients with locally progressed or metastatic illness.