Clinical Policy Bulletin:
Microwave Thermotherapy for Breast Cancer

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Policy

Aetna considers microwave thermotherapy (also known as focused microwave thermotherapy and focused microwave phase array thermotherapy) for the treatment of breast cancer experimental and investigational because of a lack of evidence in the peer-reviewed published medical literature of its safety and effectiveness in improving clinical outcomes.

Background

Recent clinical investigations have examined the feasibility of thermotherapy that uses focused microwaves for the treatment of primary breast cancer, based on the theory that heat could destroy microscopic carcinoma cells in the breast and reduce cancer recurrence. Heating the tumor and killing a large percentage or all of the tumor cells before surgery may improve the margins and reduce the possibility of inadvertently seeding viable cancer cells during the surgical procedure, thus reducing local recurrences in the breast. In addition, if a sufficient thermal dose is applied, thermotherapy treatment of early-stage breast cancer may destroy the tumor and completely eliminate the need for any further breast surgery or radiation therapy.

Gardner et al (2002) reported on the results of a pilot study of focused microwave phased array thermotherapy in the treatment of 10 patients with primary breast carcinomas beneath the skin ranging from 1 to 8 cm in maximum clinical size. After focused microwave phased array treatment, all patients underwent mastectomy. Eight of 10 patients had a significant tumor response (on the basis of tumor shrinkage measured by ultrasound) or tumor cell kill (on the basis of necrosis and aptosis measurements).
Singletary (2002) commented on the study by Gardner et al (2002) in an accompanying editorial: “These interesting preliminary results should provide needed background information for the implementation of a well-designed clinical trial to definitively test the usefulness of this new approach …. Nonetheless, as surgical excision with negative margins now offers excellent results, surgeons should be cautious about adopting these technologies outside the arena of clinical trials”.

Food and Drug Administration-approved multi-center phase II studies of focused microwave phased array thermotherapy in larger groups of patients are currently ongoing (Gardner et al, 2002). In a phase II non-randomized clinical trial on dose-escalation study of microwave treatment for the treatment of early stage breast cancer (n = 25), Vargas et al (2004) concluded that thermotherapy causes tumor necrosis and can be performed safely with minimal morbidity. The degree of tumor necrosis is a function of the thermal dose. Future studies will evaluate the impact of high doses of thermotherapy on margin status and complete tumor ablation. In an editorial that accompanied the paper by Vargus and colleagues, Copeland and Bland (2004) stated that “current enthusiasm for minimally invasive techniques must be measured against the gold standard results available from segmental mastectomy …. These techniques should not replace the tried and proven effective treatment of small cancers of the breast with segmental mastectomy, sentinel lymph node biopsy, and intact breast radiotherapy until these newer approaches have been thoroughly studie ....”.

Agnese and Burak (2005) stated that a number of minimally invasive techniques for the treatment of early stage breast cancers are being investigated. Ablative therapies such as laser ablation, focused ultrasound, microwave ablation, radiofrequency ablation, and cryoablation have been described. All of these techniques have shown promise in the treatment of small cancers of the breast; however, additional research is needed to determine the efficacy of these techniques when they are used as the sole therapy and to determine the long-term local recurrence rates and survival associated with these treatment strategies. This is in agreement with the observations of Houston and Simmons (2005) who noted that “it is cautiously optimistic that these therapies can be used as a routine adjunct in the treatment of selected breast cancers. The challenge will lie in the ability to identify multifocal disease and in situ carcinoma as well as to ensure complete and effective eradication of the breast cancer”.

In a review on minimally invasive ablative therapies for invasive breast carcinomas, van Esser and colleagues (2007) concluded that all studies on minimally invasive ablative modalities published so far show that these techniques are feasible and safe. However, at this stage only T1 tumors should be ablated in a clinical trial setting; it is unclear which of the modalities is most suitable.

Dooley et al (2010) stated that pre-operative focused microwave thermotherapy (FMT) is a promising method for targeted treatment of breast cancer. These researchers reviewed results of 4 multi-institutional clinical studies of pre-operative FMT for treating invasive carcinomas in the intact breast. Externally applied wide-field adaptive phased-array FMT were investigated both as a pre-operative heat-alone ablation treatment and as a combination treatment with pre-operative anthracycline-based chemotherapy for breast tumors ranging in ultrasound-
measured size from 0.8 to 7.8 cm. In phase I, 8 of 10 (80 %) patients receiving a single low-dose FMT prior to receiving mastectomy had a partial tumor response quantified by either ultrasound measurements of tumor volume reduction or by pathologic cell kill. In phase II, the FMT thermal dose was increased to establish a threshold dose to induce 100 % pathologic tumor cell kill for invasive carcinomas prior to breast-conserving surgery (BCS). In a randomized study for patients with early-stage invasive breast cancer, of those patients receiving pre-operative FMT at ablative temperatures, 0 of 34 (0 %) patients had positive tumor margins, whereas positive margins occurred in 4 of 41 (9.8 %) of patients receiving BCS alone (p = 0.13). In a randomized study for patients with large tumors, based on ultrasound measurements the median tumor volume reduction was 88.4 % (n = 14) for patients receiving FMT and neoadjuvant chemotherapy, compared with 58.8 % (n = 10) reduction in the neoadjuvant chemotherapy-alone arm (p = 0.048). The authors concluded that wide-field adaptive phased-array FMT can be safely administered in a pre-operative setting, and data from randomized studies suggest both a reduction in positive tumor margins as a heat-alone treatment for early-stage breast cancer and a reduction in tumor volume when used in combination with anthracycline-based chemotherapy for patients with large breast cancer tumors. They stated that larger randomized studies are needed to verify these conclusions.

Zhao and Wu (2010) performed a systematic review on minimally-invasive thermal ablation of early-stage breast cancer. A broad search was conducted in Pubmed, Embase and the Cochrane databases between January 1990 and December 2009. Clinical results of the relevant articles were collected and analyzed. The analyzed studies were almost all feasibility or pilot studies using different energy sources, patients, tumor characteristics and ablation settings. They were conducted in research settings for the assessment of technical safety and feasibility, and none of those was used alone in clinical practice. Despite many methodological differences, complete tumor ablation could be achieved in 76 to 100 % of breast cancer patients treated with radiofrequency ablation, 13 to 76 % in laser ablation, 0 to 8 % in microwave ablation, 36 to 83 % in cryoablation, and 20 to 100 % in high-intensity focused ultrasound ablation. The authors concluded that minimally-invasive thermal ablation is a promising new tool for local destruction of small carcinomas of the breast. Moreover, they stated that large randomized control studies are needed to evaluate the long-term advantages of minimally-invasive thermal ablation techniques compared to the current breast conserving therapies.

CPT Codes / HCPCS Codes / ICD-9 Codes

**CPT codes not covered for indications listed in the CPB:**

0061T

**Other CPT codes related to the CPB:**

77280 -
77295
ICD-9 codes not covered for indications listed in the CPB:

174.0 - 175.9  Malignant neoplasm of breast
198.81  Secondary malignant neoplasm of breast
233.0  Carcinoma in situ of breast

The above policy is based on the following references:
