

# Protocol

## Magnetic Resonance-Guided Focused Ultrasound

(701109)

<b>Medical Benefit</b>		<b>Effective Date:</b> 01/01/19	<b>Next Review Date:</b> 09/19
<b>Preauthorization</b>	No	<b>Review Dates:</b> 05/09, 05/10, 05/11, 05/12, 05/13, 05/14, 05/15, 05/16, 05/17, 05/18, 09/18	

***This protocol considers some applications of this test or procedure investigational. If the physician feels this service is medically necessary, preauthorization is recommended.***

*The following protocol contains medical necessity criteria that apply for this service. The criteria are also applicable to services provided in the local Medicare Advantage operating area for those members, unless separate Medicare Advantage criteria are indicated. If the criteria are not met, reimbursement will be denied and the patient cannot be billed. Please note that payment for covered services is subject to eligibility and the limitations noted in the patient's contract at the time the services are rendered.*

Populations	Interventions	Comparators	Outcomes
Individuals: • With uterine fibroids	Interventions of interest are: • Magnetic resonance-guided focused ultrasound	Comparators of interest are: • Alternative nonsurgical treatment • Surgery	Relevant outcomes include: • Symptoms • Quality of life • Resource utilization • Treatment-related morbidity
Individuals: • With metastatic bone cancer who have failed or are not candidates for radiotherapy	Interventions of interest are: • Magnetic resonance-guided focused ultrasound	Comparators of interest are: • Supportive care	Relevant outcomes include: • Symptoms • Functional outcomes • Health status measures • Quality of life • Treatment-related morbidity
Individuals: • With other tumors (e.g., brain cancer, prostate cancer, breast cancer, desmoid, nonspinal osteoid osteoma)	Interventions of interest are: • Magnetic resonance-guided focused ultrasound	Comparators of interest are: • Standard care	Relevant outcomes include: • Symptoms • Health status measures • Treatment-related morbidity
Individuals: • With medication-refractory essential tremors	Interventions of interest are: • Magnetic resonance-guided focused ultrasound	Comparators of interest are: • Neurosurgery	Relevant outcomes include: • Symptoms • Functional outcomes • Quality of Life • Treatment-related morbidity

### DESCRIPTION

An integrated system providing magnetic resonance-guided focused ultrasound (MRgFUS) treatment is proposed as a noninvasive therapy for uterine fibroids and pain palliation of bone metastases. MRgFUS is also being investigated as a treatment of other benign and malignant tumors as well as essential tremors.

## SUMMARY OF EVIDENCE

For individuals who have uterine fibroids who receive MRgFUS, the evidence includes two small randomized controlled trials (RCTs), nonrandomized comparative studies, and case series. Relevant outcomes are symptoms, quality of life, resource utilization, and treatment-related morbidity. One RCT (N=20) has reported some health outcomes, but its primary purpose was to determine the feasibility of a larger trial. It did not find statistically significant differences in quality of life outcomes between active and sham treatment groups, but it did find lower fibroid volumes after active treatment. This trial did not have an active comparator, the clinical significance of the primary outcome was unclear, and there were no follow-up data beyond one year. The second RCT (N=49) is ongoing; preliminary results at six weeks posttreatment, comparing MRgFUS with uterine artery embolization have shown that the two groups are comparable in medication use and symptom improvement following treatments. Patients in the MRgFUS group reported recovering significantly faster than patients in the uterine artery embolization group, as measured by time to return to work and time to normal activities. In a separate 2013 comparative study, outcomes appeared to be better with uterine artery embolization than with MRgFUS. Long-term data on the treatment effects, recurrence rates, and impact on future fertility and pregnancy are lacking. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals with metastatic bone cancer who have failed or are not candidates for radiotherapy who receive MRgFUS, the evidence includes a sham-controlled randomized trial and several case series. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related morbidity. The RCT found statistically significant improvements after MRgFUS in a composite outcome comprised of a reduction in pain and morphine use, and in pain reduction as a stand-alone outcome. A substantial proportion of patients in the treatment group experienced adverse events, but most events were transient and not severe. The case series reported reductions in pain following MRgFUS treatment, consistent with the RCT. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals with other tumors (e.g., breast cancer, brain cancer, prostate cancer, desmoid, nonspinal osteoid osteoma) who receive MRgFUS, the evidence includes small case series. Relevant outcomes are symptoms, health status measures, and treatment-related morbidity. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals with medicine-refractory essential tremors who receive MRgFUS, the evidence includes two systematic reviews that identified an RCT and several observational studies. Relevant outcomes include symptoms, functional outcomes, quality of life, and treatment-related morbidity. The assessment did not pool study results but concluded that, overall, MRgFUS decreased tremor severity and improved quality of life. The sham-controlled randomized trial found significant improvements in the treatment group in tremor severity, functional improvement, and quality of life after three months of follow-up. The improvements in hand tremor score, function, and quality of life were maintained at the two year follow-up. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

## POLICY

Magnetic resonance-guided high-intensity ultrasound ablation may be considered **medically necessary** for pain palliation in adults with metastatic bone cancer who have failed or are not candidates for radiotherapy.

Magnetic resonance-guided high-intensity ultrasound ablation may be considered **medically necessary** for the treatment of medicine-refractory essential tremors.

Magnetic resonance-guided high-intensity ultrasound ablation is considered **investigational** in all other situations including but not limited to:

- Treatment of uterine fibroids; and

- Treatment of other tumors (e.g., brain cancer, prostate cancer, breast cancer, desmoid).

## **POLICY GUIDELINES**

The procedure may be performed in a magnetic resonance imaging (MRI) suite with an open MRI scanner, which might not be available at many institutions. The procedure is performed in an outpatient setting, with the patient under conscious sedation.

## **BACKGROUND**

### **UTERINE FIBROIDS**

Uterine fibroids are one of the most common conditions affecting women in the reproductive years. Symptoms of uterine fibroids include menorrhagia, pelvic pressure, or pain.

#### **Treatment**

Several approaches currently available to treat symptomatic uterine fibroids include hysterectomy, abdominal myomectomy, laparoscopic and hysteroscopic myomectomy, hormone therapy, uterine artery embolization, and watchful waiting. Hysterectomy and various myomectomy procedures are considered the criterion standard treatments.

### **METASTATIC BONE DISEASE**

Metastatic bone disease is one of the most common causes of cancer pain.

#### **Treatment**

Existing treatments include conservative measures (e.g., massage, exercise) and pharmacologic agents (e.g., analgesics, bisphosphonates, corticosteroids). For patients who do not respond to these treatments, standard care is external-beam radiotherapy. However, a substantial proportion of patients have residual pain after radiotherapy, and there is a need for alternative treatments for these patients. (One option, radiofrequency ablation, is addressed in the Radiofrequency Ablation of Miscellaneous Solid Tumors Excluding Liver Tumors Protocol).

### **ESSENTIAL TREMORS**

Essential tremor (ET) is the most common movement disorder, with an estimated prevalence of 5% worldwide. ET most often affects the hands and arms, may affect head and voice, and rarely includes the face, legs, and trunk. ET is heterogeneous among patients, varying in frequency, amplitude, causes of exacerbation, and association with other neurologic deficits.

#### **Treatment**

The neuropathology of ET is uncertain, with some evidence suggesting that ET is localized in the brainstem and cerebellum. If patients with ET experience intermittent or persistent disability due to the tremors, initial therapy is with drugs ( $\beta$ -blockers or anticonvulsants). For medicine-refractory patients, surgery (deep brain stimulation or thalamotomy) may be offered, though high rates of adverse events have been observed.

### **MAGNETIC RESONANCE-GUIDED FOCUSED ULTRASOUND**

Magnetic resonance-guided focused ultrasound (MRgFUS) is a noninvasive treatment that combines two technologies: focused ultrasound and magnetic resonance imaging (MRI). The ultrasound beam penetrates through the soft tissues and, using MRI for guidance and monitoring, the beam can be focused on targeted sites. Ultrasound causes a local increase in temperature in the target tissue, resulting in coagulation necrosis while sparing the surrounding normal structures. Ultrasound waves from each sonication are directed at a focal point that has

a maximum focal volume of 20 mm in diameter and 15 mm in height/length. This causes a rapid rise in temperature (i.e., to 65° C-85° C), which is sufficient to ablate tissue at the focal point. In addition to providing guidance, the associated MRI can provide online thermometric imaging, a temperature “map”, to confirm the therapeutic effect of the ablation treatment and allow for real-time adjustment of the treatment parameters.

The U.S. Food and Drug Administration (FDA) approved the ExAblate MRgFUS system (InSightec) for two indications: treatment of uterine fibroids (leiomyomata) and palliation of pain associated with tumors metastatic to bone. The ultrasound equipment is specifically designed to be compatible with magnetic resonance magnets, and it is integrated into standard clinical MRI units; it also includes a patient table, which has a cradle that houses the focused ultrasound transducer in water or a light oil bath. Some models have a detachable cradle; only certain cradle types can be used for palliation of pain associated with metastatic bone cancer. For treating pain associated with bone metastases, the aim of MRgFUS is to destroy nerves in the bone surface surrounding the tumor.

MRgFUS is also being investigated for the treatment of other tumors, including breast, prostate, brain, and desmoid tumors as well as nonspinal osteoid osteoma.

### REGULATORY STATUS

In October 2004, the ExAblate® 2000 System (InSightec) was approved by the FDA through the premarket approval process for “ablation of uterine fibroid tissue in pre- or perimenopausal women with symptomatic uterine fibroids who desire a uterine sparing procedure.” Treatment is indicated for women with a uterine gestational size of fewer than 24 weeks who have completed childbearing.

In October 2012, the ExAblate® System, Model 2000/2100/2100 VI, was approved by the FDA through the premarket approval process for pain palliation in adults with metastatic bone cancer who have failed or are not candidates for radiotherapy. The device was evaluated through an expedited review process. FDA required a postapproval study with 70 patients to evaluate the effectiveness of the system under actual clinical conditions.

In July 2016, FDA approved the use of the ExAblate® Neuro System for the treatment of essential tremors in patients who have not responded to medication ( $\beta$ -blockers or anticonvulsant drugs) through the premarket approval process.

FDA product codes: NRZ, POH.

### RELATED PROTOCOLS

Occlusion of Uterine Arteries Using Transcatheter Embolization

Radiofrequency Ablation of Miscellaneous Solid Tumors Excluding Liver Tumors

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Services that are the subject of a clinical trial do not meet our Technology Assessment Protocol criteria and are considered investigational. *For explanation of experimental and investigational, please refer to the Technology Assessment Protocol.*

It is expected that only appropriate and medically necessary services will be rendered. We reserve the right to conduct prepayment and postpayment reviews to assess the medical appropriateness of the above-referenced procedures. **Some of this protocol may not pertain to the patients you provide care to, as it may relate to products that are not available in your geographic area.**

**REFERENCES**

We are not responsible for the continuing viability of web site addresses that may be listed in any references below.

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