Matthew **Mian, MD**
Brain and Spine Surgery

PATIENT GUIDE

MRI-guided focused ultrasound (fUS) thalamotomy: my guide for patients

What to expect before, during, and after focused ultrasound for tremor.

AT A GLANCE

Incision or anesthesia	Neither. You are awake, and nothing is implanted
Treatment doses	Brief, each less than one minute, with checks on your tremor in between
Monitoring afterward	One to two hours before you go home, and you need a ride
Follow-up	An appointment about 3 months after the procedure
Blood thinners	Stop aspirin, Plavix, fish oil, and warfarin 7 days before, and Xa inhibitors and Lovenox 2 days before

This information is intended as a general guide for my patients, and if you are seeing a different neurosurgeon, it should not substitute for advice, guidance, or instructions from that surgeon.

Introduction

MRI-guided focused ultrasound (abbreviated fUS) thalamotomy is a procedure in which an ultrasound array is used to create a tiny thermal (heat) injury in the brain. The purpose of the procedure is to reduce or treat tremor in patients with Essential Tremor and Parkinson's Disease. The procedure is a one-time treatment that is applied to one side of the brain to reduce tremor on the opposite side of the body.

fUS offers the advantages over other surgical treatments for tremor in that it does not require an incision, anesthesia, or a permanent implant. The effect of fUS is also immediate.

This is a guide for my patients on what to expect from an fUS procedure. For more background on fUS, please visit the focused ultrasound page on my website.

Benefits of fUS

For patients with tremor, several studies have established the following benefits of fUS:

- Improvement in tremor.
- Reduction in disability related to tremor.
- Improvement in functional status (ability to perform activities of daily living).
- Improvement in quality of life.

Alternatives to fUS

- Continued tremor management with medications.
- Deep brain stimulation (DBS).
- Other forms of thalamotomy: Gamma Knife (radiation), radiofrequency (open surgery).

Preparing for procedure day

My surgery scheduler and the Swedish fUS program coordinator will both confirm details for your arrival on the morning of your procedure. A few reminders:

- You will have an MRI performed a few weeks in advance to help plan your procedure.
- Do not have anything to eat or drink on the morning of your procedure.
- If you take a blood thinner, remember to stop taking it before your procedure. You can resume your medication the day after your procedure. Here is how long before the procedure you should stop:
  - Aspirin, Plavix (Clopidogrel), and Fish Oil: 7 days
  - Warfarin (Coumadin): 7 days
  - Factor Xa inhibitors (Xarelto, Eliquis, Pradaxa, Arixtra, etc.): 2 days
  - Lovenox (Enoxaparin): 2 days

What to expect on procedure day

You will receive separate instructions for checking in on the morning of your procedure. After checking in, you can anticipate the following steps for your procedure:

- You will meet members of your care team, including me, nursing staff from the recovery unit, Gaetha Mills (the focused ultrasound program coordinator), and MRI and ultrasound technicians who will be assisting with your procedure.

- Your head will be shaved. Ultrasound waves do not travel well through the hair, so the fUS procedure requires that the entire head be shaved. It is not necessary to shave your hair in advance.
- You will demonstrate your tremor to the team, often by drawing a straight line or a spiral. This will provide a point of comparison for later during the procedure.
- You will be administered medications to help keep you comfortable during the procedure, including medications for pain and nausea.
- I will apply numbing medicine to your scalp and then attach a frame to your head. The frame will help keep your head still during the procedure. For a few minutes, it will feel as if your head is being squeezed. This sensation then fades away.
- A rubber cap will be applied over the frame. This will help contain cold water that will circulate against your scalp during the procedure. The water helps conduct the ultrasound waves and also keeps your scalp from getting heated by the machine.
- You will be moved into the MRI machine, and your head will be fixed in place using the frame. MRI pictures will be taken to help plan your procedure.
- Once I have completed the targeting, I will administer one or more brief test doses of the ultrasound. I will then enter the MRI scanner to check on you. I will check your tremor and ask if you feel any unusual symptoms. Symptoms to monitor for:
  - Numbness or tingling, usually in the hands or fingers, face, or tongue
  - Slurring of speech
  - Weakness or changes in coordination
- Once I am satisfied with the test dose and your response, I will administer one or more treatment doses using the ultrasound. The treatment doses are brief (less than one minute). I will check on you between treatment doses.
- You will be awake during this time, and you will be able to communicate any questions or concerns directly to me and the rest of the team.
- Most patients see immediate improvement in their tremor.
- At the conclusion of treatment, you will be moved out of the MRI machine and transported to the recovery area. My team will remove the head frame. Band-aids will be applied to your forehead. You'll be monitored for one to two hours before being allowed to return home. You should plan to have someone drive you home.
- You will be prescribed a short course of steroids to help reduce swelling in the brain around the area that was treated. Please do not forget to take the steroids.

After procedure day

It is normal to feel fatigued. I perform most fUS treatments on Thursdays or Fridays. You should plan to take it easy for the weekend. Stay hydrated. For the first few days, fluids with salt (e.g. Gatorade, Powerade) are preferred over drinking large amounts of plain water.

Side effects are common in the days and weeks after the procedure, and these side effects tend to improve over time. Do not be alarmed if you experience the following in the days after your procedure:

- Headache
- Nausea
- Difficulty with balance, coordination, and gait
- Tingling or numbness
- Confusion or difficulty concentrating
- Slurring of speech
- Changes in sense of taste

You can resume any blood thinner medicines the day after your fUS treatment.

You can return to work and/or driving when you and your family feel that you are safe and ready. For most patients, this will be after a few days of recovery. Regarding driving, it's a good idea to practice with a family member before driving on your own.

I will schedule an appointment for 3 months after your procedure. You may need to follow up with your neurologist or primary care doctor before then to discuss making changes or reductions to your tremor medicines.

When to call my office

Side effects (see above) are common in the days and weeks initially after the procedure. Do not be alarmed if you experience them. You will be prescribed a short course of steroids to help reduce them. Most will disappear over time.

If your symptoms seem out of proportion to the side effects described above, please notify my office (see below). Other warning signs and symptoms that should prompt you to call me:

- Seizure.
- Sudden or severe weakness on one side of your body.
- Confusion that is gradually getting worse rather than better.
- Severe nausea or vomiting that is not responding to medications.
- Inability to speak or walk.

If you are experiencing a medical emergency, please dial 911.

For questions or concerns that are not a medical emergency, you can reach my medical assistant directly at (720) 599-3075 or MDMian@carepointhc.com. If needed, you can also call the CarePoint Neurosurgery main line: (303) 515-2320.