Tests and Procedures for Neurological Conditions

Massachusetts General Hospital

Imaging
Step-by-Step: How Imaging Works
What to expect on your journey through the diagnostic imaging process.

GETTING STARTED

- You and your doctor need information to plan your care.
- Your doctor schedules an exam at one of our convenient locations.
- For safety, you may need a blood test if your exam will use contrast—a drink or injection that makes the image more vivid.
- A member of our expert staff reviews your case and carefully selects a protocol—a combination of equipment settings and exam steps—to ensure we capture the best possible images.

EXAM DAY

- You may need to refrain from eating or drinking before your appointment.
- Upon your arrival, we double-check safety information and review the exam with you.
- You receive contrast (if needed).
- Your technologist, the trained professional performing your exam, remains nearby and in communication throughout.
- We capture and store diagnostic-quality images in an electronic library.

YOUR RESULTS

- A radiologist examines the images.
- At Mass General Imaging, this radiologist is always a specialist—an expert in a particular area of the body or type of scan.
- The radiologist dictates a report including a diagnosis and recommendations.
- Your doctor receives the report and may also view your images.
- The information discovered through imaging helps your doctor plan the next steps in your care.

www.massgeneralimaging.org/howimagingworks
Welcome to Massachusetts General Hospital Imaging

Dedicated to delivering the clearest picture of your health.

- **Eight community locations** around Greater Boston
- **Over 100 board-certified radiologists**, each dedicated to an imaging subspecialty
- More than **600,000 imaging scans** reviewed annually
- A full range of **diagnostic imaging services** and **interventional procedures**

When you come to Mass General Imaging you'll get expert diagnosis—and clarity on the right course of care.

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**THE SPECIALIST ADVANTAGE**

Mass General Imaging’s radiologists all specialize in a certain part of the body or condition. A specialist is capable of seeing and understanding subtle things due to advanced training and singular focus. In addition to the training that all radiologists receive, a specialist has additional education, as well as extensive real-world experience in interpreting images for a particular body area or system.
Fundamentals:

- An MRI machine produces a strong magnetic field and radio waves. The atoms in your body respond to this energy in a certain way. The MRI detects this response and uses it to construct detailed images.
- MRI does not use X-ray radiation.
- MRI is great for looking at soft tissue, so it is the most sensitive technology for examining the central nervous system.

Specialty expertise:

- All of our MRI machines are state-of-the-art, and we offer the latest technologies, such as high-resolution 3T (Tesla) scanners.
- We use protocols—equipment settings plus exam steps—that are specially designed to capture images of the brain and spinal cord.
- Every scan is interpreted by a radiologist who specializes in the brain, neck and spine.
What to expect:

• Exams typically take 45 minutes.
• Many exams involve contrast—an injection that makes the images more vivid and informative.
• If you are over 60 or have kidney disease, diabetes, lupus or multiple myeloma, a blood test before your exam is necessary to make sure the contrast is safe for you.
• Because of the strong magnet, we need to make absolutely sure you don’t have any metal objects with you. We also need to know details about any implants in your body.
• The technologist performing your exam will be nearby and able to talk to you throughout the scan.
• MRI exams require that you lie still in a confined space. Most people have no problem, but talk to your doctor if you are concerned. Your doctor may prescribe a sedative (we cannot provide such medication).

More information:
www.massgeneralimaging.org/mri
CT ANGIOGRAPHY

CT angiography is a special kind of CT exam that reveals the structure of blood vessels, including the blood vessels that supply the brain. While it can diagnose many conditions, CT angiography is especially important for quickly determining the cause of a stroke—and choosing the best treatment—during the critical first hours after the stroke begins. In certain situations, angiography may also be performed using MRI technology or X-rays.

Fundamentals:

- A CT scanner rotates to take X-ray images from different angles all around your body. A computer puts these images together to form detailed, two-dimensional pictures.

- CT provides clearer, more detailed pictures than traditional X-rays.

- CT is used, for example, to spot an aneurysm, bleeding or a blood clot in the brain.

Specialty expertise:

- We pay special attention to minimizing radiation exposure—while still obtaining the highest quality images.

- We use the latest technology, including 64-slice and 128-slice CT scanners.

- A radiologist with special training in CT and the brain, neck and spine will interpret your exam.
What to expect:

• Exams typically take 15 minutes in total; the actual scanning takes just minutes.

• Many exams involve contrast agents—a drink or injection that makes the images more vivid and informative.

• If you are over 60 or have kidney disease, diabetes, lupus or multiple myeloma, you’ll need a blood test beforehand to make sure the contrast will be safe for you.

• The technologist performing your exam will be nearby and able to talk to you throughout the scan.

• CT exams require that you lie still in a confined space. But because the scanning time is so short, most people tolerate the experience well.

More information:
www.massgeneralimaging.org/ct
ULTRASOUND

Fundamentals:

• Ultrasound uses high-frequency sound waves to create images of internal body structures without X-ray radiation.

• Ultrasound is used in neurology, for example, to check blood flow to the brain in order to identify patients at risk of stroke.

Specialty expertise:

• State-of-the-art equipment ensures that the radiologist gets an ideal view and permits the making of 3D images, when needed.

• Your scan will be read by a Mass General radiologist specially trained in ultrasound imaging of the brain and of the arteries of the neck.

What to expect:

• Ultrasound exams typically take 30 minutes, however, certain exams may take up to an hour.

• The exam is performed by a trained professional, called a sonographer, who will apply a clear gel then move a handheld wand, called a transducer, over the area to be scanned.
• You will feel pressure from the transducer, but ultrasound is painless and does not use X-ray radiation.
• Certain exams may require you to fast for a few hours beforehand, arrive with a full bladder, or change positions and hold your breath during the exam.

More information: www.massgeneralimaging.org/ultrasound

NEUROLOGY EXPERTISE
Mass General Imaging has 10 dedicated neuroradiologists—internationally recognized experts on diseases and injuries of the brain, head, neck and spine. The group is recognized for cutting-edge research into advanced neuroimaging techniques for diseases including stroke, multiple sclerosis, Alzheimer’s disease and brain tumors.
Mass General Imaging also boasts one of the finest neurointerventional radiology services in the country. Members of this group hold leadership positions in national societies and help lead cutting-edge clinical research. The multidisciplinary team includes doctors for all of the neurovascular specialties—a unique advantage.
Beyond Diagnosis

In addition to diagnostic imaging, Mass General Imaging offers several procedures that use imaging technology to treat specific conditions. Specialty-trained doctors called interventional radiologists perform these minimally invasive, image-guided procedures.

Coil occlusion:
- Treats aneurysm—a bulge in a blood vessel wall that can rupture, causing a stroke
- Involves placement of small platinum coils at the bulge site through a catheter using image guidance
- Prevents blood flow into the bulge, reducing risk of rupture

Angioplasty and stenting:
- Treats narrowing or blockage of arteries
- Inflates a balloon to expand the artery wall; a stent may also be placed to hold the blood vessel open
- Improves blood flow, with less risk and recovery time than surgery
Register as a Patient

All patients need to register as Mass General patients. This is a quick process that can be done over the phone. Please call 866-211-6588.

Schedule an Exam

A doctor’s order is required to schedule an exam. Your doctor can choose to order your test online or call the location directly. Talk to your doctor about which location might be most convenient for you.