Integrated PET-CT Scan - What to Expect

An integrated PET-CT scan combines images from a positron emission tomography (PET) scan and a computed tomography (CT) scan that have been performed at the same time using the same machine. Because a CT scan provides detailed pictures of tissues and organs inside the body, while a PET scan reveals any abnormal activity that might be going on there, combining these scans creates a more complete image than either test can offer alone.

Like the individual tests it combines, an integrated PET-CT scan is a diagnostic tool used to detect cancer and find out the cancer?s stage (a way of describing where the cancer is located, if or where it has spread, and whether it is affecting the functions of other organs in the body). Knowing the cancer?s stage helps you and your doctor decide what kind of treatment is best and helps predict prognosis (a patient?s chance of recovery). The scan can also be used to locate an area for a biopsy [1] (the removal of a small amount of tissue for examination under a microscope to determine whether cancer is present) or to evaluate the effectiveness of cancer treatments, such as chemotherapy or radiation therapy. In addition, the CT portion of this scan is often used for radiation therapy treatment planning.

About PET and CT scans

A PET scan [2] creates pictures of organs and tissues inside the body. A small amount of a radioactive substance is injected into a vein. This substance is absorbed mainly by organs and tissues that use the most energy. Because cancer cells tend to use more energy than healthy cells, they absorb more of the radioactive substance. A scanner then detects this substance to produce images of the inside of the body.

Meanwhile, a CT scan [3] creates a three-dimensional picture of the inside of the body with an x-ray machine. A computer then combines these images into a detailed, cross-sectional view that shows any abnormalities or tumors. Sometimes, a contrast medium (a special dye) is injected into a patient?s vein to provide better detail in the images.

One risk of this test is radiation exposure. Although it is minimal for the PET scan portion of the test because the radioactive substance only remains in your body for a short time, there is more radiation exposure associated with the CT scan. Usually the potential benefits of the test outweigh these risks, but if you are receiving multiple CT scans and x-rays, talk with your doctor about whether another type of test that involves less exposure to radiation can be done.

The medical team

An integrated PET-CT scan is given at the radiology, nuclear medicine, or radiation oncology department of a hospital or at an imaging center. It is performed by a nuclear medicine or radiologic technologist (health care professionals who are specially trained and certified to operate PET scanners) and interpreted by a nuclear medicine physician or a radiologist (doctors who perform and interpret imaging tests to identify problems in the body).

Preparing for the test

When you schedule your integrated PET-CT scan, you will receive detailed instructions about how to prepare. For example, you may be told to drink nothing but clear liquids beginning at midnight the night before your appointment and instructed to not eat or drink anything for at least four hours before your scan begins.

You will be asked to sign a consent form that states you understand the benefits and risks of the PET-CT scan and agree to undergo the test. Talk with your doctor about any concerns you may have about the scan.

In addition, tell your doctor about all medications you are taking, and ask whether you should take them on the day of the test. Also discuss any drug allergies or other medical conditions you have, especially any allergic reactions to iodine you may have experienced in the past. Women should tell their doctors if they are breastfeeding or if there is any chance they may be pregnant because a PET-CT scan could put the baby at risk.

Some facilities allow patients to listen to music during the scan, so you may want to ask whether you can bring your own music to make you feel more comfortable. You may also want to check your insurance plan to find out what it covers and whether you will have any out-of-pocket costs associated with the scan.

During the test

When you arrive for the PET-CT scan, you may need to change into a hospital gown or remove clothing or jewelry that could interfere with the scan.

A radiation technologist or nurse will then deliver the radioactive substance needed for the PET scan into your vein through an intravenous (IV)

injection. The IV line will feel like a pinprick when it is inserted, but the radioactive material will not cause any sensation in your body.

After the injection, the radioactive substance will take 30 to 90 minutes to reach the tissues that will be scanned. During that time, you will need to lie quietly without moving or talking because too much movement can interfere with the normal distribution of the radioactive material and make interpreting the study more difficult.

Depending on which part of your body is being scanned, you may also be given a contrast medium for the CT scan. It may be given orally (as a drink), through an IV line, or through an injection (shot). The dye will then travel through your bloodstream to help create a clearer picture of specific parts of your body.

If you are given the dye through an injection, you may feel heat or itching at the injection site or have a metallic taste in your mouth; however, both sensations should disappear after a few minutes. If you experience a more serious reaction, such as trouble breathing, tell the radiation technologist immediately.

When it is time for the test to begin, a technologist will help position you on a padded exam table outside the PET-CT scanner. The table may have straps, pillows, or a special cradle for your head to help hold you in place. You will probably lie on your back, although you may be asked to lie on your side or your stomach, depending on which part of your body is being scanned. If the scan is done as part of radiation therapy treatment planning, there may be special devices such as masks or body casts to keep your body in the same position that will be used for the radiation treatment.

During the examination, a technologist will monitor the test through a window or a video screen in a nearby control room, and you will be able to communicate through an intercom system.

The PET-CT scanner resembles a large donut. The exam table will slide back and forth through the large hole in the center of the machine as the scanner rotates around you. For the first scans, the table will move quickly through the scanner, which helps the technologist confirm that your body is properly positioned. For the remaining scans, the table will move more slowly. The scans are done sequentially?first the CT scans, then the PET scans.

A PET-CT scan is not painful. However, you will need to lie still for the entire scan, and you may need to keep your arms raised above your head, which could become uncomfortable. In addition, you may be asked to hold your breath during part of the scan because the motion created by breathing can blur the images. The exam table may be raised, lowered, or tilted to create the correct angle for the scan; ask the technologist performing the scan to tell you when the table will move. You can also expect to hear whirring or clicking sounds from the machine; some machines are noisier than others.

The appointment typically lasts up to an hour, although the scan itself only takes about 30 minutes. If a larger part of your body is being scanned, the test may last longer. The technologist should be able to give you a time estimate before you begin.

When the scan is finished, you may be asked to remain on the exam table while a radiologist reviews the images. If the images are blurred or otherwise unreadable, you may need to have an additional scan.

After the test

You can expect to return to your normal activities immediately after your PET-CT scan, including driving. Drinking water will help flush the contrast medium and radioactive substance out of your body.

Questions to ask your doctor

Before having an integrated PET-CT scan, consider asking your doctor the following questions:

- Who will perform the PET-CT scan?
- What will happen during the PET-CT scan?
- How long will the procedure take?
- What are the benefits and risks of having a PET-CT scan?
- Is the imaging facility accredited to perform PET-CT scans?
- Will I be given a contrast agent for the CT scan? If so, how will it be given to me?
- What are the restrictions on what I?m allowed to eat or drink before the examination?
- Does the facility have an emergency response plan if I have an allergic reaction to the contrast material used for the CT scan?
- When will I learn the test results? How will the results be communicated to me?
- Who will explain the results to me?
- Will I need any additional tests?

More Information

Tests and Procedures [4]

Additional Resources

RadiologyInfo.org: Positron Emission Tomography - Computed Tomography (PET/CT) [5]

Links:
[1] http://www.cancer.net/node/24406
[2] http://www.cancer.net/node/24648

[3] http://www.cancer.net/node/24486
[4] http://www.cancer.net/node/24959
[5] http://www.radiologyinfo.org/en/info.cfm?PG=pet&bhcp=1