Liver Cancer Early Detection, Diagnosis, and Staging

Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- Can Liver Cancer Be Found Early?
- Signs and Symptoms of Liver Cancer
- Tests for Liver Cancer

Stages of Liver Cancer

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- Liver Cancer Stages

Outlook (Prognosis)

Doctors often use survival rates as a standard way of discussing a person's outlook (prognosis). These numbers can't tell you how long you will live, but they might help you better understand your prognosis. Some people want to know the survival statistics for people in similar situations, while others might not find the numbers helpful, or might even not want to know them.

- Liver Cancer Survival Rates

Questions to Ask About Liver Cancer

Here are some questions you can ask your cancer care team to help you better

understand your liver cancer diagnosis and treatment options.

- What Should You Ask Your Health Care Team About Liver Cancer?

Can Liver Cancer Be Found Early?

It is often hard to find liver cancer early because signs and symptoms often do not appear until it is in its later stages. Small liver tumors are hard to detect on a physical exam because most of the liver is covered by the right rib cage. By the time a tumor can be felt, it might already be quite large.

There are no widely recommended screening tests for liver cancer in people who are not at increased risk. (Screening is testing for cancer in people without any symptoms.) But testing might be recommended for some people at higher risk.

Many patients who develop liver cancer have long-standing cirrhosis (scar tissue formation from liver cell damage). Doctors may do tests to look for liver cancer if a patient with cirrhosis gets worse for no apparent reason.

For people at higher risk of liver cancer due to cirrhosis (from any cause) or chronic hepatitis B infection (even without cirrhosis), some experts recommend screening for liver cancer with alpha-fetoprotein (AFP) blood tests and ultrasound exams every 6 to 12 months. In some studies, screening was linked to improved survival from liver cancer.

Ultrasound uses sound waves to take pictures of internal organs.

AFP is a protein that can be present at increased levels in patients with liver cancer. But looking at AFP levels isn't a perfect test for liver cancer. Many patients with early liver cancer have normal AFP levels. Also, AFP levels can be increased from other kinds of cancer as well as some non-cancerous liver conditions.

The American Cancer Society does not have recommendations for liver cancer screening.

- References

See all references for Liver Cancer

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Signs and Symptoms of Liver Cancer

Signs and symptoms of liver cancer often do not show up until the later stages of the disease, but sometimes they may show up sooner. If you go to your doctor when you first notice symptoms, your cancer might be diagnosed earlier, when treatment is most likely to be helpful. Some of the most common symptoms of liver cancer are:

- Weight loss (without trying)
- Loss of appetite
- Feeling very full after a small meal
- Nausea or vomiting
- An enlarged liver, felt as a mass under the ribs on the right side
- An enlarged spleen, felt as a mass under the ribs on the left side
- Pain in the abdomen or near the right shoulder blade
- Swelling or fluid build-up in the abdomen
- Itching
- Yellowing of the skin and eyes (jaundice)

Some other symptoms can include fever, enlarged veins on the belly that can be seen through the skin, and abnormal bruising or bleeding.

People who have chronic hepatitis or cirrhosis may feel worse than usual or just have changes in lab test results, such as alpha-fetoprotein (AFP) levels.

Some liver tumors make hormones that act on organs other than the liver. These hormones may cause:

- High blood calcium levels (hypercalcemia), which can cause nausea, confusion, constipation, weakness, or muscle problems
- Low blood sugar levels (hypoglycemia), which can cause fatigue or fainting
- Breast enlargement (gynecomastia) and/or shrinkage of the testicles in men
- High counts of red blood cells (erythrocytosis) which can cause someone to look red and flushed
- High cholesterol levels

Many of the signs and symptoms of liver cancer can also be caused by other conditions, including other liver problems. Still, if you have any of these problems, it's important to

see your doctor right away so the cause can be found and treated, if needed.

- References

See all references for Liver Cancer

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Tests for Liver Cancer

If you have some of the signs and symptoms of liver cancer, your doctor will try to find if they are caused by liver cancer or something else.

Medical history and physical exam

Your doctorwill ask about your medical history to check for risk factors and learn more about your symptoms. Your doctor will also examine you for signs of liver cancer and other health problems, probably paying special attention to your abdomen and checking your skin and the whites of your eyes looking for jaundice (a yellowish color).

If symptoms and/or the results of the physical exam suggest you might have liver cancer, other tests will probably be done. These might include imaging tests, lab tests, and other procedures.

Imaging tests

Imaging tests use x-rays, magnetic fields, or sound waves to create pictures of the inside of your body. Imaging tests are done for a number of reasons, including:

- To help find suspicious areas that might be cancerous
- To help diagnose liver cancer
- To help a doctor guide a biopsy needle into a suspicious area to take a sample
- To learn how far cancer might have spread
- To help guide certain treatments in the liver

- To help determine if treatment has been effective
- To look for a possible recurrence of the cancer

People who have (or may have) liver cancer may get one or more of the following tests.

Ultrasound

Ultrasound is often the first test used to look at the liver.

Ultrasound (ultrasonography) is the use of sound waves to create an image on a video screen. This test can show masses (tumors) growing in the liver, which then can be tested for cancer, if needed.

Computed tomography (CT)

The CT scan is an x-ray test that produces detailed cross-sectional images of your body. A CT scan of the abdomen can help identify many types of liver tumors. It can provide precise information about the size, shape, and position of any tumors in the liver or elsewhere in the abdomen, as well as nearby blood vessels. CT scans can also be used to guide a biopsy needle precisely into a suspected tumor (called a *CT-guided needle biopsy*). If you are found to have liver cancer, a CT of your chest may also be done to look for possible spread to the lungs.

Magnetic resonance imaging (MRI)

Like CT scans, MRI scans provide detailed images of soft tissues in the body. But MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed and then released in a pattern formed by the type of body tissue and by certain diseases. A computer translates the pattern into a very detailed image of parts of the body.

MRI scans can be very helpful in looking at liver tumors. Sometimes they can tell a benign tumor from a malignant one. They can also be used to look at blood vessels in and around the liver, and can help show if liver cancer has spread to other parts of the body.

Angiography

An angiogram is an x-ray test that looks at blood vessels. Contrast medium, or dye, is injected into an artery to outline blood vessels while x-ray images are taken.

Angiography can be used to show the arteries that supply blood to a liver cancer, which can help doctors decide if a cancer can be removed and to help plan the operation. It can also be used to help guide some types of non-surgical treatment, such as embolization (see the section Embolization Therapy for Liver Cancer).

Angiography can be uncomfortable because a small catheter (a flexible hollow tube) must be put into the artery leading to the liver to inject the dye. Usually the catheter is put into an artery in your groin and threaded up into the liver artery. You have to stay very still while the catheter is in place. A local anesthetic is often used to numb the area before inserting the catheter. Then the dye is injected quickly to outline all the vessels while the x-rays are being taken.

Angiography may also be done with a CT scanner (CT angiography) or an MRI scanner (MR angiography). These techniques are often used instead of x-ray angiography because they can give information about the blood vessels in the liver without the need for a catheter in the artery. You will still need an IV line so that a contrast dye can be injected into the bloodstream during the imaging.

Bone scan

A bone scan can help look for cancer that has spread (metastasized) to bones. Doctors don't usually order this test for people with liver cancer unless you have symptoms such as bone pain, or if there's a chance you may be eligible for a liver transplant to treat your cancer. .

For more information about imaging tests see the section Exams and Tests to Find and Diagnose Cancer.

Other tests and procedures

Other types of tests may be done if your doctor thinks you might have liver cancer but the imaging test results aren’t conclusive.

Laparoscopy

Laparoscopy can be used for liver cancer:

- To help doctors confirm a diagnosis of cancer through biopsy
- To confirm the stage or (extent) of the cancer
- To help plan surgery or other treatments

Laparoscopy is usually done at an outpatient surgery center. In this procedure, a doctor inserts a thin, lighted tube with a small video camera on the end through a small incision (cut) in the front of the abdomen to look at the liver and other internal organs. (Sometimes more than one cut is made.) This procedure is done in the operating room. Usually you are under general anesthesia (in a deep sleep), although sometimes the person may just be sedated (made sleepy) and the area of the incision will be numbed.

Because the surgeon only makes a small incision to insert the tubes, you should not have much pain after surgery. You should be able to go home after you recover from the anesthesia.

Biopsy

A biopsy is the removal of a sample of tissue to see if it is cancer. Sometimes, the only way to be certain that liver cancer is present is to take a biopsy and look at it under a microscope.

But in some cases, doctors can be fairly certain that a person has liver cancer based on the results of imaging tests such as CT and MRI scans. In these cases, a biopsy may not be needed. Doctors are often concerned that sticking a needle into the tumor or otherwise disturbing it without completely removing it might help cancer cells spread to other areas. This is a major concern if a liver transplant might be an option to try to cure the cancer, as any spread of the cancer might make the person ineligible for a transplant. That is why some experts recommend that patients who could be transplant candidates only have biopsies done at the center where the transplant will be done.

If a biopsy is needed, it can be done in several ways. For more information about biopsies and how they are tested, see Testing Biopsy and Cytology Specimens for Cancer

Needle biopsy: A hollow needle is placed through the skin in the abdomen and into the liver. The skin is first numbed with local anesthesia before the needle is placed. Different-sized needles may be used.

Laparoscopic biopsy: Biopsy specimens can also be taken during laparoscopy. This lets the doctor see the surface of the liver and take samples of abnormal-appearing areas.

Surgical biopsy: An incisional biopsy (removing a piece of the tumor) or an excisional biopsy (removing the entire tumor and some surrounding normal liver tissue) can be done during an operation.

Lab tests

Your doctor could order lab tests for a number of reasons:

- To help diagnose liver cancer
- To help determine what might have caused your liver cancer
- To learn how well your liver is working, which can affect what types of treatments you can have
- To get an idea of your general health and how well your other organs are working, which also could affect what types of treatments you can have
- To see how well treatment is working
- To look for signs that the cancer has come back after treatment

Alpha-fetoprotein blood (AFP) test

AFP is normally present at high levels in the blood of fetuses but drops to low levels shortly after birth. Levels in adults can go up from liver disease, liver cancer, or other cancers.

If AFP levels are very high in someone with a liver tumor, it can be a sign that liver cancer is present. But because liver cancer isn't the only reason for high AFP levels and many patients with early liver cancer have normal levels of AFP, it isn't very helpful in determining if a liver mass might be cancer.

This test is sometimes useful in people already diagnosed with liver cancer. The AFP level can help determine what treatment might be an option. During treatment, the test can be used to help give an idea of how well it is working, as the AFP level should go down if treatment is effective. The test can be used after treatment as well, to look for possible signs that the cancer has come back (recurred).

Other blood tests

Liver function tests (LFTs): Because liver cancer often develops in livers already damaged by hepatitis and/or cirrhosis, doctors need to know the condition of your liver before starting your treatment. A series of blood tests can measure levels of certain substances in your blood that show how well your liver is working.

If the part of your liver not affected by cancer isn't working well, you might not be able to have surgery to try to cure the cancer, as the surgery might require removal of a large

part of your liver. This is a common problem in people with liver cancer.

Blood clotting tests: The liver also makes proteins that help blood clot when you bleed. A damaged liver might not make enough of these clotting factors, which could increase your risk of bleeding. Your doctor may order blood tests such as a prothrombin time (PT) to help assess this risk.

Tests for viral hepatitis: Your doctor might order blood tests to check for hepatitis B and C.

Kidney function tests: Tests of blood urea nitrogen (BUN) and creatinine levels are often done to assess how well your kidneys are working.

Complete blood count (CBC): This test measures levels of red blood cells (which carry oxygen throughout your body), white blood cells (which fight infections), and platelets (which help the blood clot). It gives an idea of how well the bone marrow (where new blood cells are made) is functioning.

Blood chemistry tests and other tests: Blood chemistry tests check the levels of a number of substances in the blood, some of which might be affected by liver cancer. For example, liver cancer can raise blood levels of calcium, while blood glucose levels may fall. Liver cancer can also sometimes raise cholesterol levels, so this may be checked as well.

- References

See all references for Liver Cancer

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Liver Cancer Stages

The stage of liver cancer is a description of how widespread it is when it is diagnosed. The cancer's stage is one of the most important factors in choosing treatment options and predicting a patient's outlook.

Liver cancer is staged based on the results of the physical exam, imaging tests (ultrasound, CT or MRI scan, etc.) and other tests, which are described in the section Tests for Liver Cancer as well as by the results of surgery if it has been done.

There are several staging systems for liver cancer, and not all doctors use the same system.

The American Joint Committee on Cancer (AJCC) TNM system

A staging system is a standard way for the cancer care team to sum up information about how far a cancer has spread. Doctors use staging systems to get an idea about a patient's prognosis (outlook) and to help determine the most appropriate treatment.

The TNM system for staging contains 3 key pieces of information:

- **T** describes the number and size of the primary **tumor(s)**, measured in centimeters (cm), and whether the cancer has grown into nearby blood vessels or organs.
- **N** describes the extent of spread to nearby (regional) lymph **nodes,** which are bean-sized collections of immune system cells to which cancers often spread first.
- **M** indicates whether the cancer has **metastasized** (spread) to distant parts of the body.

Numbers or letters that appear after T, N, and M provide more details about each of these factors:

- The numbers 0 through 4 indicate increasing severity.
- The letter X means "cannot be assessed" because the information is not available.

T groups

TX: Primary tumor cannot be assessed

T0: No evidence of primary tumor

T1: A single tumor (any size) that hasn't grown into blood vessels

T2: Either a single tumor (any size) that has grown into blood vessels, OR more than one tumor but no tumor is larger than 5 cm (about 2 inches) across

T3a: More than one tumor, with at least one tumor larger than 5 cm across

T3b: At least one tumor (any size) that has grown into a major branch of a large vein of the liver (the portal or hepatic vein)

T4: The tumor (any size) has grown into a nearby organ (other than the gallbladder), OR the tumor is growing into the thin layer of tissue covering the liver (called the visceral peritoneum)

N groups

NX: Regional (nearby) lymph nodes cannot be assessed.

N0: The cancer has not spread to the regional lymph nodes.

N1: The cancer has spread to the regional lymph nodes.

M groups

M0: The cancer has not spread to distant lymph nodes or other organs.

M1: The cancer has spread to distant lymph nodes or other organs. Liver cancer most often spreads to the lining of the belly (peritoneum), the lungs, and to bones.

Stages of liver cancer

Once the T, N, and M groups have been determined, they are then combined to give an overall stage, using Roman numerals I to IV (1 to 4).

Stage	Stage grouping	Stage description
I	**T1, N0, M0**	There is a single tumor (any size) that has not grown into any blood vessels. The cancer has not spread to nearby lymph nodes or distant sites.
II	**T2, N0, M0**	Either there is a single tumor (any size) that has grown into blood vessels, OR there are several tumors, and all are 5 cm (2 inches) or less across. The cancer has not spread to nearby lymph nodes or distant sites.
IIIA	**T3a, N0, M0**	There is more than one tumor, and at least one is larger than 5 cm (2 inches) across. The cancer has not spread to nearby lymph nodes or distant sites.

IIIB	**T3b, N0, M0**	At least one tumor is growing into a branch of a major vein of the liver (portal vein or hepatic vein). The cancer has not spread to nearby lymph nodes or distant sites.
IIIC	**T4, N0, M0**	A tumor is growing into a nearby organ (other than the gallbladder), OR a tumor has grown into the outer covering of the liver. The cancer has not spread to nearby lymph nodes or distant sites.
IVA	**Any T, N1, M0**	Tumors in the liver can be any size or number and they may have grown into blood vessels or nearby organs. The cancer has spread to nearby lymph nodes. The cancer has not spread to distant sites.
IVB	**Any T, Any N, M1**	The cancer has spread to other parts of the body. (Tumors can be any size or number, and nearby lymph nodes may or may not be involved.)

Other liver cancer staging systems

The staging systems for most types of cancer depend only on the extent of the cancer, but liver cancer is complicated by the fact that most patients have damage to the rest of their liver along with the cancer. This also affects treatment options and prognosis.

Although the TNM system defines the extent of liver cancer in some detail, it does not take liver function into account. Several other staging systems have been developed that include both of these factors:

- The Barcelona Clinic Liver Cancer (BCLC) system
- The Cancer of the Liver Italian Program (CLIP) system
- The Okuda system

These staging systems have not been compared against each other. Some are used more than others in different parts of the world, but at this time there is no single staging system that all doctors use. If you have questions about the stage of your cancer or which system your doctor uses, be sure to ask.

Child-Pugh score (cirrhosis staging system)

The Child-Pugh score is a measure of liver function, especially in people with cirrhosis. Many people with liver cancer also have cirrhosis, and in order to treat the cancer, doctors need to know how well the liver is working. This system looks at 5 factors, the first 3 of which are results of blood tests:

- Blood levels of bilirubin (the substance that can cause yellowing of the skin and

eyes)
- Blood levels of albumin (a major protein normally made by the liver)
- The prothrombin time (measures how well the liver is making blood clotting factors)
- Whether there is fluid (ascites) in the abdomen
- Whether the liver disease is affecting brain function

Based on these factors, liver function is divided into 3 classes. If all these factors are normal, then liver function is called *class A*. Mild abnormalities are *class B*, and severe abnormalities are *class C*. People with liver cancer and class C cirrhosis are often too sick for surgery or other major cancer treatments.

The Child-Pugh score is actually part of the BCLC and CLIP staging systems mentioned previously.

Liver cancer classification

Formal staging systems (such as those described before) can often help doctors determine a patient's prognosis (outlook). But for treatment purposes, doctors often classify liver cancers more simply, based on whether or not they can be entirely cut out (resected). Resectable is the medical term meaning "able to be removed by surgery."

Potentially resectable or transplantable cancers

These cancers can be completely removed by surgery or treated with a liver transplant and the patient is healthy enough for surgery. This would include most stage I and some stage II cancers in the TNM system, in patients who do not have cirrhosis or other serious medical problems. Only a small number of patients with liver cancer have this type of tumor.

Unresectable cancers

Cancers that have not spread to the lymph nodes or distant organs but cannot be completely removed by surgery are classified as unresectable. This includes cancers that have spread throughout the liver or can’t be removed safely because they are close to the area where the liver meets the main arteries, veins, and bile ducts.

Inoperable with only local disease

The cancer is small enough and in the right place to be removed but you aren’t healthy enough for surgery. Often this is because the non-cancerous part of your liver is not

healthy (because of cirrhosis, for example), and if the cancer is removed, there might not be enough liver tissue left for it to function properly. It could also mean that you have serious medical problems that make surgery unsafe.

Advanced (metastatic) cancers

Cancers that have spread to lymph nodes or other organs are classified as advanced. These would include stages IVA and IVB cancers in the TNM system. Most advanced liver cancers cannot be treated with surgery.

- References

See all references for Liver Cancer

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Liver Cancer Survival Rates

Survival rates tell you what part of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. These numbers can't tell you how long you will live, but they may help give you a better understanding about how likely it is that your treatment will be successful.

What is a 5-year survival rate?

Statistics on the outlook for a certain type and stage of cancer are often given as 5-year survival rates, but many people live longer – often much longer – than 5 years. The 5-year survival rate is the percentage of people who live at least 5 years after being diagnosed with cancer. For example, a 5-year survival rate of 50% means that an estimated 50 out of 100 people who have that cancer are still alive 5 years after being diagnosed. Keep in mind, however, that many of these people live much longer than 5 years after diagnosis.

But remember, the 5-year relative survival rates are estimates – your outlook can vary based on a number of factors specific to you.

Relative survival rates are a more accurate way to estimate the effect of cancer on survival. These rates compare people with cancer to people in the overall population. For example, if the 5-year relative survival rate for a specific type and stage of cancer is 50%, it means that people who have that cancer are, on average, about 50% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

But remember, survival rates are estimates – your outlook can vary based on a number of factors specific to you. Your doctor can tell you how these numbers apply to you, as he or she is familiar with your situation.

Cancer survival rates don't tell the whole story

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can't predict what will happen in any particular person's case. Your doctor can tell you how the numbers below may apply to you, as he or she is familiar with the aspects of your particular situation.

Survival rates for liver cancer

The numbers below come from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database, and are based on patients who were diagnosed with liver cancer (hepatocellular type) between 2005 and 2011.

The SEER database does not divide liver cancer survival rates by AJCC TNM stages. Instead, it groups cancer cases into summary stages:

- **Localized** means the cancer is still confined to the liver, and includes stages I, II, and some stage III cancers. This includes a wide range of cancers, some of which are easier to treat than others. The 5-year relative survival rate for people with **localized liver cancer** is about 31%.
- **Regional** means the cancer has grown into nearby organs or has spread to nearby lymph nodes, and includes stages IIIC and IVA cancers. For **regional stage liver cancer**, the 5-year survival rate is about 11%.
- **Distant** means that the cancer has spread to distant organs or tissues and is the same as stage IVB. The 5-year relative survival rate for **distant stage liver cancer** is about 3%.

In general, survival rates are higher for people who can have surgery to remove their cancer, regardless of the stage. For example, studies have shown that patients with small, resectable tumors who do not have cirrhosis or other serious health problems are

likely to do well if their cancers are removed. Their overall 5-year survival is over 50%. For people with early-stage liver cancers who have a liver transplant, the 5-year survival rate is in the range of 60% to 70%.

- References

See all references for Liver Cancer

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What Should You Ask Your Health Care Team About Liver Cancer?

As you cope with liver cancer and its treatment, we encourage you to have honest, open discussions with your cancer care team . Ask any question, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add others as you think of them.

When you're told you have liver cancer

- What kind of liver cancer do I have? (Some types of liver cancer carry a better prognosis than others.)
- Where in my liver is the cancer? Has it spread beyond my liver?
- What is my cancer's stage, and what does that mean?
- How well is my liver functioning?
- Will I need other tests before we can decide on treatment?
- Will I need to see other doctors?

When you're deciding on a treatment plan

- How much experience do you have treating this type of cancer?
- What are my treatment choices?

- Can the cancer be removed with surgery?
- What do you recommend and why?
- What is the goal of the treatment?
- What risks or side effects are there to the treatments you suggest?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?

After treatment

- How will treatment affect my daily activities?
- What are the chances my cancer will recur with these treatment plans?
- What will we do if the treatment doesn't work or if the cancer recurs?
- What type of follow-up will I need after treatment?

In addition to these sample questions, you might want to write down some of your own. For instance, you might want to ask about second opinions or about qualifying for clinical trials.

- References

See all references for Liver Cancer

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