Liver Imaging with LI-RADS

Chronic liver disease, or cirrhosis (https://www.radiologyinfo.org/en/info/cirrhosisliver), is when healthy liver is replaced by scar tissue. This scar tissue stops the liver from working normally. It may also lead to liver cancer or even death.

People with cirrhosis are at high risk for two types of liver cancer. Hepatocellular carcinoma (HCC), which begin in the cells of the liver, and cholangiocarcinoma, which begins in the bile ducts inside the liver.

If you have chronic liver disease, your doctor will monitor you with blood tests and medical imaging to look for changes in the liver. Your doctor may use ultrasound (https://www.radiologyinfo.org/en/info/abdominus), CT (https://www.radiologyinfo.org/en/info/abdominct), and/or MRI (https://www.radiologyinfo.org/en/info/mri-abdomen-pelvis) to image your liver. After the exam, the radiologist will analyze the images and prepare a report summarizing the findings and impressions. For more information on your imaging report, see How to Read Your Radiology Report. (https://www.radiologyinfo.org/en/info/article-read-radiology-report)

LI-RADS and Liver Imaging

If you are at high risk for HCC, the radiologist reading your imaging report will use the Liver Imaging Reporting and Data System, or LI-RADS. LI-RADS is a common language developed by experts in liver imaging and liver disease to report findings on your scan. It helps eliminate mistakes and improve communication between members of your care team.

The radiologist will assign a LI-RADS number or letter category to each lesion (which may also be called a mass, nodule, or observation) seen on the images. Your report may include more than one LI-RADS category because people with cirrhosis can have many different types of lesions in their liver. These LI-RADS categories may change from one imaging exam to the next. In patients with chronic liver disease, the way a mass looks can change over time.

Doctors only use LI-RADS for patients who have cirrhosis or who are at high risk of developing HCC. (No LI-RADS categories will appear if the patient is not at increased risk for HCC or is under the age of 18.)

<table>
<thead>
<tr>
<th>Doctors use LI-RADS for people at high risk for HCC, including:</th>
<th>Doctors do not use LI-RADS for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• cirrhosis from known causes.</td>
<td>• patients under 18.</td>
</tr>
<tr>
<td>• chronic hepatitis B viral infection.</td>
<td>• cirrhosis caused by a condition you were born with.</td>
</tr>
<tr>
<td>• a history of HCC.</td>
<td>• a cancer which has been biopsied or surgically removed.</td>
</tr>
<tr>
<td>• a patient on the list for liver transplant.</td>
<td>• a benign lesion that did not develop from liver cells and was biopsied or surgically removed.</td>
</tr>
<tr>
<td>• a patient who has received a liver transplant.</td>
<td></td>
</tr>
</tbody>
</table>

LI-RADS for Ultrasound (US)
Doctors use US to look for early signs of cancer in high-risk patients and to closely watch a diseased liver. US images cannot determine whether a lesion is cancer. If a lesion is found, your doctor may order a CT or MRI.

LI-RADS categories for US range from 1 to 3:

1: no evidence of cancer. Follow-up US in 6 months is typically recommended.
2: a small mass less than 1 cm. Follow-up US is recommended in 3-6 months.
3: a large mass more than 1 cm. Further imaging with contrast is recommended.

Your US study may also have a letter. This letter indicates if the radiologist was able to clearly see the liver or if the images were limited in some way.

Letter categories for US range from A to C:

A: no or minimal limitations
B: moderate limitations
C: severe limitations

LI-RADS for CT and MRI

Liver lesions seen on CT and MRI are categorized from 1 to 5:

LR-1: definitely not cancer (benign)
LR-2: probably not cancer
LR-3: intermediate probability of HCC
LR-4: probably HCC
LR-5: definitely HCC

Letters are used to describe other findings:

LR-M: the lesion looks like a malignant cancer other than HCC. An image-guided biopsy is typically recommended.
LR-TIV: cancer has spread into the blood vessels of the liver.
LR-NC: the abnormality could not be evaluated. This may happen when the image is blurry or not high enough in quality.

LI-RADS for Post-Treatment Imaging

When a patient treated for liver cancer has follow-up imaging, radiologists use the LI-RADS category "TR" (for treatment response). TR categories report how a tumor responded to treatment:

- LR-TR Non-evaluable: The treatment response cannot be evaluated because of poor image quality.
- LR-TR Nonviable: There is no remaining cancer.
- LR-TR Viable: There is a high likelihood of cancer at the treatment site.
- LR-TR Equivocal: The radiologist is not sure if there is remaining cancer at the treatment site. More imaging is usually needed.

Next Steps

The radiologist who read your imaging exam will send a signed report to your doctor who ordered the test. Your doctor will then share the results with you. Many patients can get their radiology reports and medical images online. Ask your imaging facility if
this is available.

If you have questions about your imaging report, you can ask the doctor who ordered your imaging exam. If you still have questions, contact the imaging facility to ask if the radiologist is available to talk to you.

It is a good idea to obtain a copy of your images and report. Bring them with you to appointments with your liver doctor and treatment team. Ask your imaging facility to download a copy of your imaging exam and report.

For more information, see How to Obtain and Share Your Medical Images. (https://www.radiologyinfo.org/en/info/article-your-medical-images)

To protect your privacy, only you can grant permission to share your imaging and report with others.

Your next step will likely be one of the following:

- You and your doctor will review and discuss the imaging report and create a treatment plan.
- Your doctor may refer you to a liver specialist who will work with you to create a treatment plan.
- Your doctor may meet with specialists to review your images and health information. After agreeing on the best plan, they will recommend treatment options for you and your doctor to review.
- You may ask for a second opinion at the same or another healthcare facility.

Disclaimer

This information is copied from the RadiologyInfo Web site (http://www.radiologyinfo.org) which is dedicated to providing the highest quality information. To ensure that, each section is reviewed by a physician with expertise in the area presented. All information contained in the Web site is further reviewed by an ACR (American College of Radiology) - RSNA (Radiological Society of North America) committee, comprising physicians with expertise in several radiologic areas.

However, it is not possible to assure that this Web site contains complete, up-to-date information on any particular subject. Therefore, ACR and RSNA make no representations or warranties about the suitability of this information for use for any particular purpose. All information is provided "as is" without express or implied warranty.

Please visit the RadiologyInfo Web site at http://www.radiologyinfo.org to view or download the latest information.

Note: Images may be shown for illustrative purposes. Do not attempt to draw conclusions or make diagnoses by comparing these images to other medical images, particularly your own. Only qualified physicians should interpret images; the radiologist is the physician expert trained in medical imaging.

Copyright

This material is copyrighted by either the Radiological Society of North America (RSNA), 820 Jorie Boulevard, Oak Brook, IL 60523-2251 or the American College of Radiology (ACR), 1891 Preston White Drive, Reston, VA 20191-4397. Commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is prohibited.

Copyright © 2023 Radiological Society of North America, Inc.