Leukemia - Chronic Lymphocytic - CLL - Diagnosis [1]

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ON THIS PAGE: You will find a list of the common tests, procedures, and scans that doctors can use to find out what's wrong and identify the cause of the problem. To see other pages, use the menu on the side of your screen.

Doctors use many tests to diagnose leukemia and find out more about the disease. Some tests may also determine which treatments may be the most effective.

This list describes options for diagnosing CLL, and not all tests listed will be used for every person. Your doctor may consider these factors when choosing a diagnostic test:

- Age and medical condition
- Type of leukemia suspected
- Signs and symptoms
- Previous test results

The following tests may be used to diagnose CLL:

- **Blood tests.** The process of diagnosing CLL usually begins with a routine blood test called a complete blood count (CBC) [3]. A CBC measures the number of different types of cells in a sample of a person's blood. A person may have CLL if the blood contains too many white blood cells. This result is called a high white blood cell count. The doctor will also use the blood test to find out which types of white blood cells are increased. The CBC also measures red blood cells and platelets. Low levels of red blood cells is called anemia. A low platelet count is known as thrombocytopenia.

- **Bone marrow aspiration and biopsy**. CLL is usually diagnosed with blood tests because the cancerous cells are easily found in the blood. A bone marrow biopsy [4] is usually not needed to diagnose CLL, but it is often done before beginning treatment. For some patients, a bone marrow aspiration and biopsy may help determine prognosis, which is the chance of recovery. It may also provide more information about the reasons that other blood counts are abnormal.

  A bone marrow aspiration and biopsy are similar and often done at the same time to examine the bone marrow before starting treatment. Bone marrow has both a solid and a liquid part. A bone marrow aspiration removes a sample of fluid with a needle. A bone marrow biopsy is the removal of a small amount of solid tissue using a needle. A pathologist then analyzes the sample(s). A pathologist is a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease. A common site for a bone marrow aspiration and biopsy is the pelvic bone, which is located in the lower back by the hip. The skin in that area is usually numbed with medication beforehand, and other types of anesthesia (medication to block the awareness of pain) may be used.

- **Flow cytometry and cytochemistry.** In these tests, chemicals or dyes are applied to the cancer cells in the laboratory. These chemicals and dyes provide information about the leukemia and its subtype. CLL cells have distinctive markers, called cell surface proteins, on the outside of the cell. The pattern of these markers is called the immunophenotype. These tests are used to distinguish CLL from other kinds of leukemia, which can also involve lymphocytes. Both tests can be done from a blood sample. Flow cytometry, also called immunophenotyping, is the most important test to confirm a diagnosis of CLL.

- **Genomic and molecular testing:** Your doctor may recommend testing the leukemia cells for specific genes, proteins, chromosome changes, and other factors unique to the leukemia. Because CLL cells divide very slowly, looking at the chromosomes often is less useful than using tests to find specific genetic mutations or changes. Fluorescence in situ hybridization (FISH) assays and other genetic tests, such as polymerase chain reaction, are used to find genetic changes.

  Some of the genetic changes that occur in CLL include:

- The deletion of the long arm of chromosome 13 [del(13q)], which is found in about half of patients.
- An extra copy of chromosome 12 (trisomy 12)
- del(11q)
- del(17p)
- NOTCH1 mutations
- SF3B1 mutations
- TP53 abnormalities
- MYD88 mutations
- IGVH, which may be important whether it is changed or unchanged

Results of genetic and molecular testing can determine how quickly the disease will progress and will help decide whether your treatment options include a type of treatment called targeted therapy (see Treatment Options [5]).

- **Imaging tests.** CLL is generally found in many parts of the body, even if the disease has been diagnosed early. Imaging tests are rarely needed to diagnose CLL. They are sometimes used before treatment to find all parts of the body that are affected by CLL or to find out whether particular symptoms may be related to CLL. Imaging tests may also be used to see how well treatment is working.
  - An x-ray is a way to create a picture of the structures inside of the body, using a small amount of radiation. It may show if leukemia is growing in lymph nodes in the chest.
  - A computed tomography (CT or CAT) scan [6] 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. It can detect lymph nodes with CLL around the heart, windpipe, lungs, abdomen, and pelvis. A CT scan can also be used to measure the size of the lymph nodes. Sometimes, a special dye called a contrast medium is given before the scan to provide better detail on the image. This dye can be injected into a patient's vein or given as a liquid to swallow. There is a risk of kidney problems from this contrast medium; talk with your doctor about this before the test.

CT scans can also help find out if CLL is in other organs, such as the spleen. If a person has no symptoms when diagnosed, a CT scan is generally not needed. When it is needed, it is usually done only before treatment and at the end of treatment.

- Positron emission tomography (PET) [7] scans have not been proven to be helpful in diagnosing or staging CLL.

Your doctor may recommend additional tests before starting treatment to learn more about the leukemia and help plan treatment. After diagnostic tests are done, your doctor will review all of the results with you. If the diagnosis is leukemia, these results also help the doctor describe the disease; this is called staging.

The next section in this guide is Stages [8]*, and it explains the system doctors use to describe the extent of the disease. Or, use the menu on the side of your screen to choose another section to continue reading this guide.*

Links
[1] http://www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/diagnosis
[2] http://www.cancer.net/about-us
[3] http://www.cancer.net/node/24716
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