Chronic Myeloid Leukemia (CML) Background

CML Statistics

Worldwide, CML has an incidence of **1** to **2** cases per **100,000** people per year[1]

15% CML is responsible for **15%** of all adult cases of leukemia[2]

67 Average age at diagnosis is **67**[2]

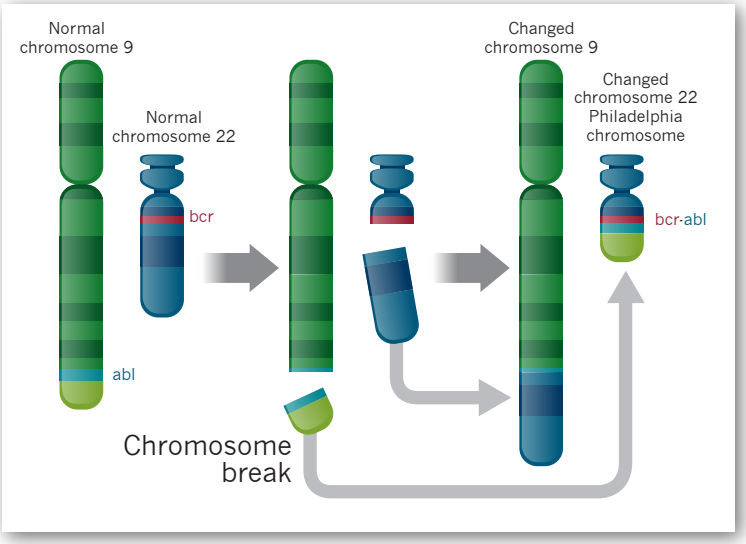
CML is slightly more common in **men**; the reasons for this are unknown[3]

CML is rarely seen in children[3]

What is CML?

Chronic myeloid leukemia, or CML, is a cancer of the blood and bone marrow in which the body overproduces white blood cells. Chronic means a relatively slower-growing cancer that may take years to progress. Myeloid refers to the type of white blood cell being overproduced[4]. Most patients find out that they have CML in the early, chronic phase and many will remain in chronic phase for a number of years without progressing to a more advanced phase[2].

Almost all patients with CML have a chromosomal abnormality known as the Philadelphia chromosome – a rearrangement in the genetic material on chromosomes 9 and 22 – which is present in 95% of patients with the disease[4]. The Philadelphia chromosome produces an abnormal gene called BCR-ABL that signals the bone marrow to keep making abnormal white blood cells[4].



How is CML Treated?

BCR-ABL is the key cause of Philadelphia chromosome-positive (Ph+) CML[4]. Research has led to the development of drugs called tyrosine kinase inhibitors (TKIs), which specifically block the ability of the BCR-ABL gene to send signals to produce the cancerous white blood cells[4]. Today, the goal of Ph+ CML treatment is to have fewer leukemia cells in the body by certain time points and to prevent disease progression[2].

With TKI treatment, the amount of BCR-ABL decreases.

Advances in CML treatment are demonstrating sustained responses and improvements in overall survival to the extent that many patients have a normal life expectancy[5].

How is CML monitored?

Research has also led to advances in the monitoring of CML, including the development of the RT-Q-PCR test. RT-Q-PCR test measures BCR-ABL levels, which can enable a more precise assessment of response to treatment with TKIs[6,7]. Routine RT-Q-PCR tests can also detect early response trends and signs of resistance to CML treatment and provide consistent information about how a patient is responding to treatment, which may drive clinical decisions, such as the need to change therapy[6,7]. Current guidelines recommend getting a RT-Q-PCR test at diagnosis, then every 3 months until 2 years after CCyR has been achieved to monitor the level of disease, and every 3-6 months thereafter[2].

It is important for CML patients to work with their doctor to establish treatment goals or milestones that are specific to them. Patients who are not reaching their treatment goals can work with their doctors to help them get back on track.

How is CML diagnosed?

Most patients with CML do not show symptoms when it is diagnosed, and often times the disease is found when a doctor orders a blood test for unrelated health problems or during a routine checkup[3].

Symptoms of CML can often be vague and non-specific, but common symptoms include fatigue, weight loss, night sweats, fever and a pain or a feeling of fullness below the ribs[4].

In order to confirm diagnosis, a doctor can conduct a variety of tests to be certain of the diagnosis. These tests include blood or bone marrow samples, complete blood count (CBC) tests, magnetic resonance imaging scans, ultrasounds and genetic tests such as a RT-Q-PCR test[3].

Frequently Used CML Abbreviations

BCR-ABL: An abnormal gene formed when pieces of chromosomes 9 and 22 break off and trade places in an event known as translocation. This gene produces the BCR-ABL protein, a type of protein called a tyrosine kinase, which signals the bone marrow to keep making abnormal white blood cells[4].

Chronic phase (CP): An early stage of CML in which most patients are diagnosed and where patients typically have less than 10% blasts (immature white blood cells) in the blood or bone marrow. For CML patients in this phase, symptoms are usually mild and the disease responds well to treatment[3].

Philadelphia (Ph) chromosome: An abnormal chromosome that is responsible for the uncontrolled production of white blood cells (myeloid cells) that are present in Ph+ CML[3].

Real-Time Quantitative Polymerase Chain Reaction (RT-Q-PCR): A very sensitive test that monitors a patient's level of disease. Disease levels are measured on the international scale (IS), which is a means of standardizing and validating a patient's test results[2]. The RT-Q-PCR on the IS test is a simple and convenient blood test that measures the amount of leukemia in the body, and is sensitive enough to find a single Ph+ CML cell out of up to one million normal cells[2].

Tyrosine Kinase Inhibitors (TKIs): A type of drug that targets and blocks the ability of the abnormal BCR-ABL gene to send signals that drive production of the leukemic blood cells.

References

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2. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Chronic Myelogenous Leukemia V.1.2016. ©National Comprehensive Cancer Network, Inc 2015. All rights reserved. Accessed [May 19,2016]. To view the most recent and complete version of the guideline, go online to www.nccn.org. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, NCCN GUIDELINES®, and all other NCCN Content are trademarks owned by the National Comprehensive Cancer Network, Inc. as noted.
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