Non-Small Cell Lung Cancer Backgrounder

Lung cancer is the second-most common cancer among men and women in the United States and the leading cause of cancer-related death.[1] Every two and half minutes someone in the U.S. is told they have lung cancer.[2] Lung cancer starts in cells of the lung and almost all such cancers are carcinomas. Lung carcinomas are divided into two groups based on how the cells look. One group is called small cell lung cancer and the other group is called non-small cell lung cancer (NSCLC). About 85% of patients with lung cancer have NSCLC.[3]

Symptoms and Causes

Like most cancers, early stage NSCLC rarely causes symptoms that lead individuals to seek medical attention. However, as the disease advances, the experience and severity of symptoms can be completely different from person to person. Factors that influence symptom severity are the same factors that determine diagnosis and include tumor location, size, metastases and how the patient's immune system is responding to the tumor. Many believe that lung cancer is caused by smoking, however lung cancer is not a disease developed strictly in smokers. While smoking does put an individual at higher risk for lung cancer, it only makes up about 80% of all lung cancer deaths with the remaining 20% occurring in people who have never smoked or used tobacco products in their life.[4] Other environmental factors and genetics are associated with developing lung cancer.

Diagnosis and Staging

Once a tumor is identified in the lung(s), doctors will make a diagnosis by performing imaging tests and/or obtaining tissue with a biopsy from the tumor itself or from abnormal lymph nodes. There is no single plan for diagnosis that is best for all patients. The diagnosis plan will depend on the tumor's size, location, patient's health, and doctor's experience. Once a diagnosis is made, a cancer stage is determined based on tumor characteristics and how far the cancer has spread throughout the body. Like most cancers, the chance of successful or curative treatment of lung cancer is much higher when diagnosed and treated in the early stages when it is localized. Unfortunately, because lung cancer doesn't cause obvious symptoms in the earlier stages, diagnosis often comes after it has spread. Recent data show that despite the advances, approximately 84% of lung cancers are diagnosed at later stages.[5]

Molecular Profiling

Medical guidelines recommend that molecular testing should be carried out in blood or tissue from patients with NSCLC to guide treatment decisions for the selection of targeted therapies and immunotherapies. The discovery of predictive biomarkers has improved the ability to select treatments from the rapidly growing number of therapeutic options and manage a subset of patients more effectively with improved overall survival.[6] Molecular tests, such as the blood-based Biodesix Lung Reflex®, identify guideline-recommended druggable mutations and measure the patient's immune status (proteins) related to the disease's aggressiveness and is more broadly associated with lung cancer survival across therapies, stages and histologies.

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[1] Siegel R, Miller K, Jemal A. Cancer Statistics 2018. *CA Cancer J Clin* 2018;68:7-30.
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Stages of Non-small cell lung cancer. National Cancer Institute website. https://www.nccn.org/patients/guidelines/lung-nsclc/index.html. Accessed November 29, 2018.
[4] Lung Cancer Risks for Non-smokers. American Cancer Society. https://www.cancer.org/latest-news/why-lung-cancer-strikes-nonsmokers.html Accessed March 27, 2020.
[5] U.S. National Institute Of Health, National Cancer Institute. SEER Cancer Statistics Review, 1975–2015.
[6] Non-small cell lung cancer. NCCN Clinical Practice Guidelines in Oncology. Version 3.2020 – February 11, 2020.
[7] Howlader N, et al (eds). SEER Cancer Statistics Review, 1975-2016, NCI, Bethesda, MD, https://seer.cancer.gov/csr/1975_2016/

Treatment Plan

Cancer can greatly differ from patient to patient even with a similar diagnosis based on tumor location and tissue origin. Doctors use pathology results, overall health and mobility to assign a performance status score for each patient and other clinical factors to assess overall prognosis. A prognosis is a prediction of the pattern and survival outcome of a disease which may affect what the physician and patient decides about treatment. Based on this evaluation and other diagnostic test results, a doctor can identify the type of lung cancer in order to provide a prognosis and treatment plan. Treatment options can include surgery, radiation therapies, chemotherapies, targeted therapies, immunotherapies, best supportive care, or enrollment into clinical trials.

Life Expectancy

Once cancer enters the lymph nodes and bloodstream, it can spread anywhere in the body. The outlook is better when treatment begins before cancer spreads outside the lungs.

Other factors include age, overall health, and how well the patient responds to treatment. Because early symptoms can be easily overlooked, lung cancer is usually diagnosed in later stages.

Survival rates and other statistics provide a broad picture of what to expect. The 5-year survival rates for all combined stages of NSCLC is 24%[7], which does not account for individual clinical factors or types of therapeutic intervention. Given the uniqueness of each cancer, individual life expectancy is based on many variables specific to that patient.

In recent years, new treatments have been approved for stage IV NSCLC, but even with these advances only a subset of lung cancer patients are surviving longer than previously seen with traditional treatments and heavily dependent on biomarker stratification.