TYPES OF LUNG CANCER

UPDATED NOVEMBER 2020


What you need to know about...

small cell lung cancer






LUNGEVITY

foreword

About LUNGevity

LUNGevity is the nation's premier lung cancer-focused nonprofit, changing outcomes for people with lung cancer through research, education, and support.

About the LUNGevity PATIENT EDUCATION SERIES

LUNGevity has developed a comprehensive series of materials for lung cancer patients and their caregivers, focused on understanding how lung cancer develops, how it can be diagnosed, and treatment options. Whether you or someone you care about has been diagnosed with lung cancer, or is concerned about lung cancer risk, we have resources to help you.

The medical experts and lung cancer patients who provided their valuable expertise and experience in developing these materials all share the belief that well-informed patients make their own best advocates.

In addition to this and other booklets in the LUNGevity patient education series, information and resources can be found on LUNGevity's website at www.LUNGevity.org.

This patient education booklet was produced through charitable donations from:

abbvie AstraZeneca Bristol-Myers Squibb

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introduction

Small cell lung cancer, one of the two major types of lung cancer, accounts for about 15% of all lung cancers. Small cell lung cancer usually originates in the major airways leading to the lungs, from where it can quickly spread to other parts of the body. In addition to existing treatment options, several new treatment approaches are being developed.

This booklet will help you:

- Learn about small cell lung cancer
- Understand the treatment options available for small cell lung cancer
- Understand how to manage the side effects associated with small cell lung cancer treatment
- Consider whether participating in a clinical trial might be right for you

YOU'LL FIND A GLOSSARY TOWARD THE END OF THIS BOOKLET.
Words included in the glossary appear **blue** the first time that they are used in the text.

01 understanding small cell lung cancer

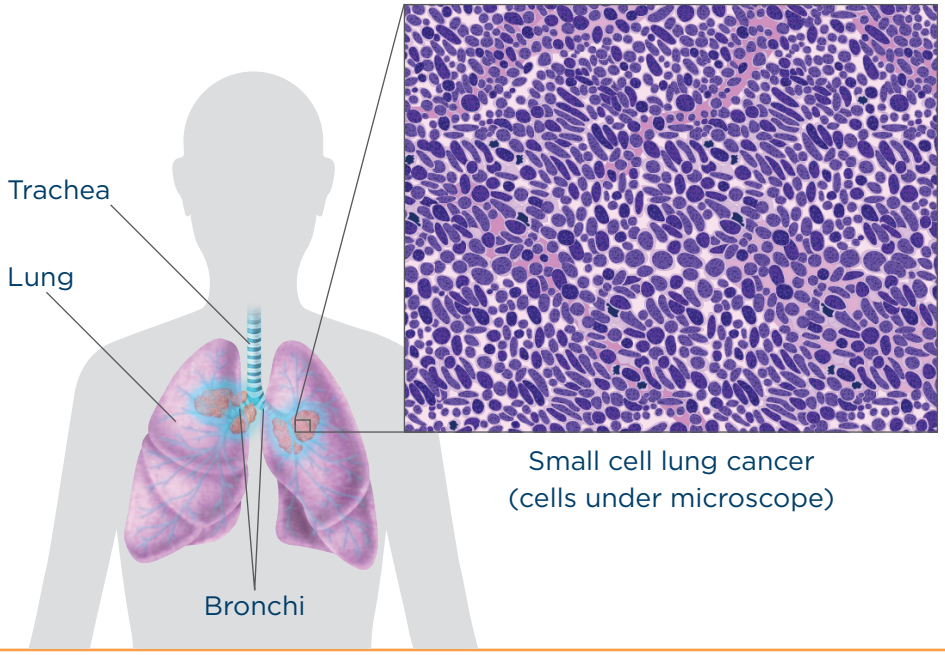
What is small cell lung cancer (SCLC)?

Small cell lung cancer (SCLC) is one of the two major types of lung cancer. It differs from the other major type of lung cancer, **non-small cell lung cancer (NSCLC)**, in a number of ways, including where the cancer begins, the way the cells appear under a microscope, and the way the cancer progresses.

Small cell lung cancer is sometimes also called small cell carcinoma or oat cell cancer.

SCLC derives its name from the way the cancer cells look under a microscope; they are round, oval, or spindle-shaped and smaller than both normal, healthy cells and the cells of the different subtypes of NSCLC.

SMALL CELL LUNG CANCER



SCLC usually begins in the **bronchi**, the major airways in the center of the chest that lead to the lungs, although about 5% of the time it occurs in the **periphery** of the lungs. SCLC is a type of **neuroendocrine tumor**. It is a very aggressive cancer that grows and spreads rapidly.

SCLC accounts for about 15% of all lung cancers. It is diagnosed most often in those with a smoking history.

Symptoms of SCLC

SCLC may not cause any symptoms, especially early in its development. It might even first be detected by tests being done to check on another condition.

The following signs and symptoms may also be caused by many other conditions and are not specific to SCLC. Talk to your healthcare team if you have any of the following:

- Coughing symptoms
  - A cough that gets worse or does not go away
  - Coughing up blood
- Chest symptoms
  - Breathing trouble, such as shortness of breath
  - New wheezing when you breathe
  - Ache or pain in your chest, upper back, or shoulder that doesn't go away and may get worse with deep breathing
  - A hoarse voice
  - Frequent respiratory tract infections, such as pneumonia or bronchitis
- General physical symptoms
  - Feeling unusually tired all the time
  - Weight loss with no known cause and loss of appetite
  - Trouble swallowing
  - Swelling in the face and/or veins in the neck

How can lung cancer affect breathing?

The **tumor** can block off an airway and interfere with breathing. When an airway is blocked, mucus trapped in the lung may become infected, resulting in pneumonia. Lung cancer can also cause fluid to build up in the space between the lungs and the ribs, causing shortness of breath.

If the lung cancer has spread, there may be other symptoms, such as pain in the back or other bones or weakness in the arms or legs. If the cancer spreads to the brain, it may cause headaches, seizures, or vision changes.

In addition, because SCLC is a neuroendocrine tumor and secretes hormones, there may be indicators that SCLC may be present that are called **paraneoplastic syndromes**. These indicators may not be located in tissues or organs to which the cancer has spread. Examples include SIADH (syndrome of inappropriate anti-diuretic hormone), which can lead to low blood sodium levels, among other symptoms; or myasthenia gravis, which may lead to muscle weakness. It is important to note that paraneoplastic syndromes may also be caused by other conditions. If there is no improvement in them with the lung cancer treatment, they will require additional, separate treatment.

Diagnosis of SCLC

How is SCLC diagnosed?

Many different tests are used to diagnose lung cancer and determine whether it has spread to other parts of the body. Some of these tests can also help determine which treatments might work best. The steps and tests used in diagnosing lung cancer include:

- Imaging tests
- Biopsies

The particular approaches used for an individual will depend on a patient's medical history and condition, symptoms, location of the **nodule(s)**, and other test results.

Imaging tests

Imaging tests create pictures of the inside of the body by using **X-rays**, magnetic fields, sound waves, or **radioactive** particles.

Imaging tests cannot confirm that a person has SCLC. However, they provide a lot of information to help put the whole picture together for the healthcare team. Imaging tests may be done before a diagnosis of SCLC, during treatment, and after treatment. They are done for a number of reasons, including:

- To get more specific information about a suspicious area that might be cancerous
- To determine how far cancer may have spread
- To find out if treatment has been effective
- To monitor for possible signs of cancer coming back after treatment

Examples of imaging tests used to help diagnose lung cancer include:

- **Chest X-ray:** A chest X-ray takes pictures of the bones and organs in the chest. A chest X-ray is often the first test used to look for a mass when symptoms are more general. However, chest X-rays may miss small tumors. If you believe that you may have lung cancer, ask you healthcare team for a computed tomography (CT) scan instead of, or in addition to, a chest X-ray.
- **Computed tomography (CT or CAT scan):** This test uses a computer linked to an X-ray machine to make detailed pictures of the inside of the body. Unlike a conventional X-ray, which takes one picture, a CT scanner takes multiple pictures as it rotates around the patient in order to get images from different angles. Three-dimensional (3D) views of the organs and tissues can be created. A CT scan can provide specific information about the size, shape, and position of tumors in the lungs. It also can help find enlarged **lymph nodes** or masses in other organs that might be caused by the spread of lung cancer. CT scans usually only take a few minutes to complete.

- **Magnetic resonance imaging (MRI):** This test is used to find out whether the lung cancer has spread to the brain, spinal cord, liver, or other parts of the body. MRI scans provide detailed pictures of areas inside the body by using radio waves and strong magnets in a pattern that a computer translates into images. It is particularly good for images of the brain and nervous tissue. The patient may need to lie in a scanner for up to an hour or more. Brain imaging is also required to check if a treatment is working. Every patient with SCLC should receive brain imaging after initial diagnosis, and new recommendations suggest regular MRI imaging (every 4 months in year 1 and every 6 months in year 2) even after treatment is completed since SCLC has a high risk of coming back in the brain.
- **Positron emission tomography (PET):** This type of scan is used to help determine whether the lung cancer has spread to lymph nodes, bones, or other organs in the body. (It is less useful in checking for cancer that has spread to the brain.) The patient is injected with a radioactive sugar. Because cancer cells grow rapidly, they absorb more of the radioactive sugar than do most healthy cells. About an hour after the injection, the patient is placed on a table in the PET scanner for approximately 30 minutes while a special camera creates a picture of the areas in the body that absorbed the radioactive sugar. (PET scans are usually used in place of a bone scan in lung cancer.)
- **PET/CT scan:** A combined PET/CT scan can be performed using a machine that does both simultaneously, allowing the comparison of areas of radioactivity as shown on the PET scan with the detailed view of that area as shown on the CT scan.

Biopsies

Biopsies are tests in which small amounts of tissue are removed for examination to find out if a person has lung cancer and, if so, which type. (Liquid biopsies, which check for cancer DNA or cancer cells in the blood, are being tested but are not yet commonly used for SCLC.) There are many different ways to obtain tissue. Depending on which method is used, it can also be determined whether the cancer has spread to lymph nodes or other organs. The tissue or fluid that is removed is sent to a **pathologist**, who examines it and then issues a **pathology report** with the findings.

Having enough tissue available for **biomarker testing** could be an important consideration. Before a biopsy is done, speak with your healthcare team about having the tumor sample profiled. Read the Biomarker Testing section later in this chapter for more information about when biomarker testing might be appropriate.

Below are described the biopsies most commonly used to help diagnose lung cancer:

- **Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA):** EBUS-TBNA is used to access **mediastinal** lymph nodes. A flexible **bronchoscope** fitted with an **ultrasound** device is guided in the trachea (windpipe). Once the bronchoscope is in place, a needle is inserted through the bronchus and into a lymph node to obtain a sample with the guidance of ultrasound.
- **Endoscopic esophageal ultrasound:** This test uses an **endoscope** to access the esophagus. The esophagus is behind the trachea in near proximity to lymph nodes in the chest. The device can be aimed in different directions to observe the lymph nodes and other structures inside the chest to which the lung cancer may have spread. A needle can be inserted through the endoscope to obtain a sample.

- **Mediastinoscopy:** This procedure is used to acquire tissue samples from the mediastinum, which is the area between the lungs. A thin tube through which tissue samples from the nearby lymph nodes along the trachea can be taken is used; the tube is inserted through a small incision in the front of the neck.
- **Mediastinotomy:** This procedure allows access to lymph nodes that are not reachable by mediastinoscopy. The incision is larger and is made between the second and third ribs next to the breastbone. This procedure is sometimes used to biopsy lymph nodes from tumors on the left side.
- **Thoracentesis:** If a patient has a **pleural effusion**, a thoracentesis can be performed to determine whether it was caused by cancer that spread to the linings of the lung. In this process, the skin is numbed and a hollow needle is inserted between the ribs to drain the fluid, which can then be sent to the pathologist for testing.
- **Thoracoscopy:** For staging, this procedure is used to sample tumors and lymph nodes on the outer parts of the lungs to check whether lung cancer has spread to the spaces between the lungs and chest wall and/or spread to nearby lymph nodes and organs. This is a more invasive procedure than the others, and so usually is not the first to be used. (This procedure is also referred to as video-assisted thoracoscopic surgery, or VATS.)

Stages of SCLC

Lung cancer staging is a way of describing where the cancer is located, if and where it has spread, and whether it is affecting other parts of the body. There are treatment options for SCLC at every **stage**, and knowing the stage helps the healthcare team:

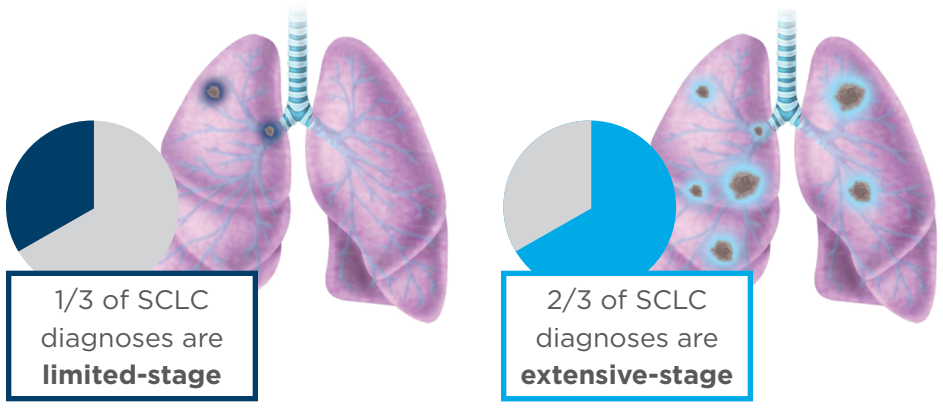
- Understand how advanced your lung cancer is
- Recommend those treatment options that are likely to be most effective
- Evaluate your response to treatment

Note that knowing the stage alone is not enough information to determine the outlook for a patient; there are many factors that go into that.

Traditionally, a two-stage classification system, the Veterans Administration (VA) system, has been used for SCLC:

- Limited-stage means that the cancer is only in one side of the chest: one lung, the tissues between the lungs, and nearby lymph nodes only. About one-third of those diagnosed with SCLC have limited-stage disease at the time of their diagnosis. This stage is based on the largest area that a radiation oncologist (radiation cancer doctor) can safely treat.
- Extensive-stage means that the cancer has spread widely through a lung, to the other lung, to lymph nodes on the other side of the chest, or to distant organs. Extensive-stage lung cancer is **metastatic**.

SMALL CELL LUNG CANCER CLASSIFICATION



More recently, the same system that is used for NSCLC is being used either alone or in combination with the two-stage VA classification system because it helps with treatment decisions. Current National Comprehensive Cancer Network (NCCN) guidelines suggest the dual approach.

This second staging system is called TNM staging. In TNM staging, stages are based on the values assigned to a patient's lung cancer based on three criteria—T (tumor), N (**node**), and M (**metastasis**):

- **T:** The size of the **primary tumor** and where it has grown. The primary tumor is the original, or first, tumor.
- **N:** Whether and how regional lymph nodes are affected by the cancer. Lymph nodes are small bean-shaped structures that are part of the body's **immune system**; regional lymph nodes are those that are in the region around a tumor.
- **M:** Whether there is distant metastasis. Distant metastasis is the spread of cancer cells from the place where they first formed to distant organs, such as the **adrenal glands**, bones, brain, or other lung, or to distant lymph nodes.

The particular combination of TNM values assigned to a patient determines its stage.

Stages using TNM classifications are designated by a number, zero (0) through four. For one through four, the Roman numerals I through IV are used. The higher the stage number, the more advanced the cancer is. Stages I–IV are further divided into substages. Briefly, the TNM stages of lung cancer are:

- **Stage 0:** This is called "in situ" disease, meaning that the lung cancer is "in place" and has not spread from where it first developed.

- **Stage I:** Stage I lung cancer tumors are small tumors that are only in one lung and have not spread to any lymph nodes or metastasized. Stage I is divided into stage IA and stage IB, based primarily on the size of the tumor. Stage IA tumors are no more than 3 centimeters (cm) in the greatest dimension, while stage IB tumors are more than 3 cm but no more than 4 cm in the greatest dimension.
- **Stage II:** Stage II lung cancer tumors are also in one lung, are larger than stage I tumors, may or may not have grown into nearby areas or spread to lymph nodes, and have not metastasized. Stage II is divided into stages IIA and IIB, based primarily on the size of the tumor, whether the cancer has spread to lymph nodes, and which sites the cancer may have grown into. Stage II tumors range from more than 4 cm to no more than 7 cm.
- **Stage III:** Stage III lung cancer tumors are also in one lung, may be larger than stage II tumors, may or may not have grown into other areas or spread to nearby lymph nodes, and have not metastasized. Stage III is divided into stage IIIA, stage IIIB, and IIIC, based primarily on the size of the tumor, whether the cancer has spread to lymph nodes, and which sites the cancer may have grown into. Stage III tumors range to more than 7 cm in the greatest dimension.
- **Stage IV:** Stage IV lung cancer primary tumors are of any size, may or may not have spread to any lymph nodes, and have metastasized. Stage IV is divided into stage IVA and stage IVB, based primarily on the sites to which the cancer has metastasized.

Recurrent lung cancer is lung cancer that has come back after treatment. If there is a recurrence, the cancer may need to be staged again (“restaged”) using the same criteria.

This chart displays how the two SCLC staging classification systems relate to each other:

STAGING CLASSIFICATION SYSTEMS

VA System	TNM System
Limited-stage	Stages I, II, and III (minus certain stage III exceptions)
Extensive-stage	Stage IV (plus certain stage III exceptions)

Biomarker testing

A patient's SCLC may or may not have one of the known **driver mutations** that lead to SCLC or cause it to progress. Among known driver mutations in SCLC are TP53 and RB1, the two most prevalent. In biomarker testing (also called mutation, genomic, or molecular testing), the patient's **DNA** is analyzed to determine whether any of these driver mutations are present. For NSCLC, there are treatments that target several of the driver mutations, so biomarker testing is recommended. However, this is not yet the case for SCLC. There are currently no **U.S. Food and Drug Administration (FDA)**-approved treatments for any of the known small cell driver mutations.

At this time, biomarker testing is not recommended in general for SCLC patients; however, your healthcare team may recommend biomarker testing if you are considering participating in a **clinical trial** for a drug that targets an NSCLC driver mutation or uses a therapeutic biomarker.

More details about biomarker testing can be found in LUNGevity's "What you need to know about biomarker testing" booklet, which can be downloaded at www.LUNGevity.org.

Medical history and laboratory tests

In addition to the stage of SCLC, there is other information about your health that is essential for your healthcare team to know in determining potential treatment plans.

Your healthcare team will gather a complete medical history, and you may have one or more kinds of laboratory tests to assess health factors, including:

- A **complete blood count (CBC)** to check for:
  - **Anemia:** A low number of red blood cells
  - **Thrombocytopenia:** A low number of platelets, which can cause bleeding
  - **Neutropenia:** A low number of white blood cells (WBCs), which can put a patient at increased risk for infection
- **Blood chemistry tests** to check whether your liver or kidneys are working well. The results from these blood tests help the healthcare team decide if you are able to undergo surgery or receive another type of lung cancer treatment.
- **Heart and lung function tests** to check if these organs are working well. Results of these tests will help your healthcare team decide whether you are among the small percentage of SCLC patients who are eligible for surgery.

02 treatment options for SCLC

Deciding on a treatment plan

There are a number of treatment options for SCLC. Which ones are used to treat a specific patient depend on the stage of the cancer, the patient's overall health, including how well the patient's organs are functioning, and the patient's preferences. (A patient's age alone does not predict whether a patient will benefit from treatment.)

You may be as involved in the treatment plan decision as you want to be. Discuss all of the options, understand what the goal of each option is (for example, cure vs. control), consider the benefits and risks of each, check about likely side effects, understand how your everyday life might be affected, find out what the treatment will mean to you financially, and do not hesitate to get a second opinion if you have unaddressed concerns.

It is always a good idea to take someone with you to your appointments to help with questions and take notes.

QUESTIONS TO DISCUSS WITH YOUR HEALTHCARE TEAM WHEN PLANNING YOUR TREATMENT APPROACH:

- What are my treatment options?
- What treatment plan do you recommend for me?
- What is our goal with these treatment(s)? To eliminate my cancer? To slow its growth? To treat symptoms?
- How long will my treatment take?
- When do I need to decide on my treatment plan?
- What are the risks and potential side effects of the different treatment options?
- Will my insurance cover these treatment options?

Currently approved SCLC treatment options

Treatments currently approved for SCLC include:

- Chemotherapy
- Radiation therapy
- Surgery
- Immunotherapy

Following the discussion of the four treatment options is a chart that summarizes how each option is used, by stage, for limited-stage and extensive-stage SCLC.

Lung cancer treatments can cause side effects; for more information about these, read the Managing SCLC Treatment Side Effects chapter.

Chemotherapy

Chemotherapy is **systemic** drug treatment that targets and kills the rapidly growing cancer cells by traveling through the blood to reach the cancer cells wherever they are. Chemotherapy is the only treatment that is a component of the treatment plan for all SCLC patients.

Chemotherapy is usually given **intravenously** to lung cancer patients, through a needle or tube inserted into a vein. Chemotherapy is administered over a specific number of cycles over a set period of time. A cycle may last 3 or 4 weeks: a period of treatment of 1 to 3 days, followed by a rest period so that the body can recover. There are typically 4 to 6 cycles.

For most patients with either limited-stage or extensive-stage SCLC, the chemotherapy regimen most often used is a platinum-based chemotherapy drug, cisplatin (Platinol® or Platinol-AQ®) or carboplatin (Paraplatin®), in combination with etoposide (Etopophos®). Other combinations may be used as well. These include a combination of chemotherapy and immunotherapy (discussed in more detail in later sections) for extensive-stage patients.

SCLC patients tend to have a good initial response to chemotherapy, but the disease inevitably recurs (comes back) because resistance to the treatment develops. In this case, the most appropriate next treatment steps may depend on how quickly the disease comes back.

Most often, a single chemotherapy drug, such as lurbinectedin (Zepzelca™) or topotecan (Hycamtin®), may be used. Later recurrences (the cancer coming back) may benefit from retreatment with the original chemotherapy drugs.

Thoracic (referring to the chest) radiation therapy, discussed in more detail in the next section, is typically given together with chemotherapy for limited-stage SCLC. (If the patient cannot tolerate radiation therapy, combination chemotherapy may be used alone.)

Some patients with extensive-stage disease may also be considered for thoracic radiation if they have a good response to their initial therapy and if their cancer is primarily active in the lungs and chest.

Radiation therapy

Radiation therapy is a type of cancer treatment that uses high-powered energy beams to kill cancer cells.

The type of radiation therapy most often used for treating SCLC is external beam radiation therapy (EBRT). There are a number of EBRT techniques. All of them deliver radiation from outside the body. With EBRT, precise measurements are taken to determine the proper dose of radiation and the correct angles for aiming the radiation beams so they target the tumor in a way that reduces the radiation exposure of the nearby healthy tissue. Treatment is similar to getting an X-ray, but the radiation dose is stronger. Radiation therapy sessions are usually painless and only last a few minutes. A radiation therapy schedule usually consists of a specific number of treatments given over a set period of time.

Radiation therapy is used in two ways for limited-stage SCLC. The first way, described earlier, is as concurrent treatment with combination chemotherapy. When used like this, the radiation therapy begins in either the first or second cycle of chemotherapy. This use of radiation therapy is called thoracic radiation therapy.

The second way radiation therapy is used is called **prophylactic cranial irradiation**. For those limited-stage SCLC patients whose cancer has shrunk after treatment, radiation to the brain may be used because it reduces the risk of the cancer spreading there.

For extensive-stage SCLC patients who have responded to the combination chemotherapy, both thoracic radiation therapy and prophylactic cranial irradiation may be used. Radiation therapy may also be used as a **palliative** treatment for extensive-stage SCLC.

For those patients whose cancer has returned, palliative radiation therapy may be used to ease symptoms.

Surgery

Surgery is a treatment option for only a small percentage of limited-stage SCLC patients. It appears to be effective only among the less than 5% of patients whose limited-stage cancer is also stage 1 cancer, in which the tumors are small (no larger than 4 cm across) and have not spread to lymph nodes.

If surgery is performed, lobectomy, in which the lobe of the lung where the tumor is located is removed, is the preferred type of surgery.

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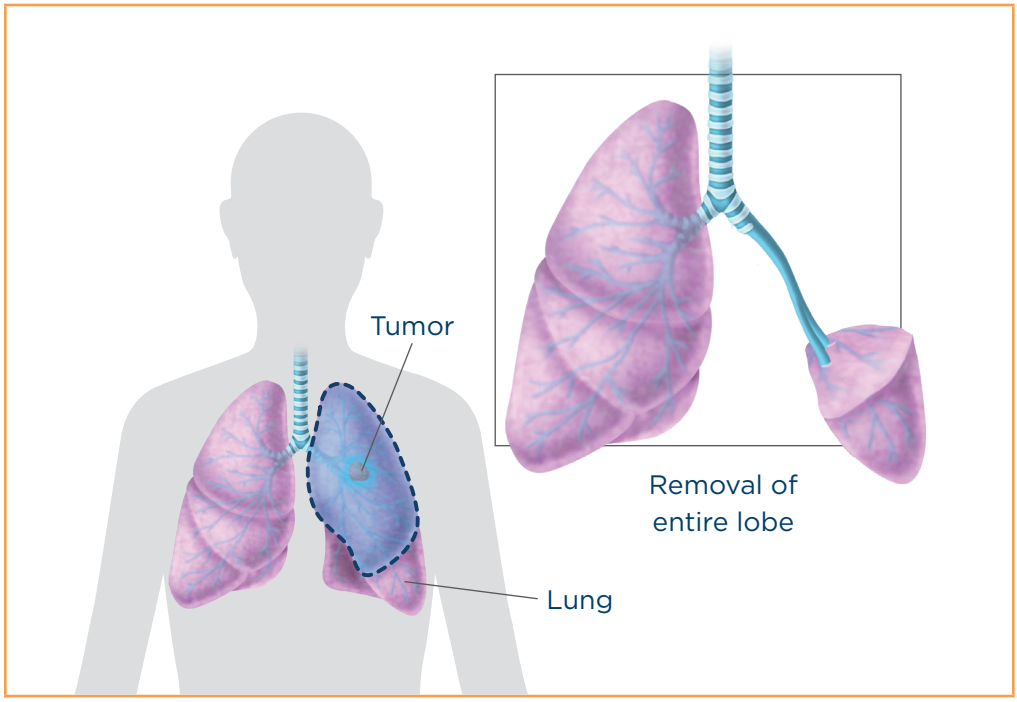

The surgery is followed up with **adjuvant** chemotherapy or a combination of chemotherapy and radiation therapy.

Immunotherapy

Immunotherapy is a type of cancer therapy that increases the natural ability of the patient's immune system to fight cancer. Instead of trying to stop or kill the patient's cancer cells directly, as most other cancer treatments do, immunotherapy trains the patient's own natural immune system to recognize cells and selectively target and kill them.

The FDA has approved four immunotherapy drugs for the treatment of patients with metastatic (extensive-stage or stage IV) SCLC:

- **Atezolizumab (Tecentriq®):** Approved, in combination with carboplatin (Paraplatin®) and etoposide (Etopophos®) as the **first-line therapy** for adult patients
- **Durvalumab (Imfinzi®):** Approved, in combination with etoposide (Etopophos®) and either carboplatin (Paraplatin®) or cisplatin (Platinol® or Platinol-AQ®), as first-line therapy for adult patients
- **Nivolumab (Opdivo®):** Approved for patients who have progressed after treatment with platinum-based chemotherapy and at least one other line of therapy
- **Pembrolizumab (Keytruda®):** Approved for progression on or after platinum-based chemotherapy and at least one other line of therapy

Patients may also be treated with a combination of nivolumab (Opdivo®) and another immunotherapy drug, ipilimumab (Yervoy®), in carefully selected cases.

Summary of guidelines for current SCLC treatment options, by stage

The chart below summarizes the current treatment options for SCLC, per the National Comprehensive Cancer Network (NCCN) guidelines and the latest FDA approvals.

SUMMARY OF TREATMENT OPTIONS

Small cell lung cancer stage	Current treatment option guidelines
Limited-stage (stages I–III)	• Cisplatin (Platinol® or Platinol-AQ®)/carboplatin (Paraplatin®) + etoposide (Etopophos®): 4–6 cycles • Early, concurrent thoracic radiation therapy • Prophylactic cranial irradiation for those who have responded to initial treatment. This should be followed by MRI surveillance. • Surgery (lobectomy) followed by adjuvant chemotherapy (stages I–IIA only and when there are no lymph nodes involved)
Extensive-stage (stage IV)	• Atezolizumab (Tecentriq®) in combination with carboplatin (Paraplatin®) and etoposide (Etopophos®) as first-line therapy for adult patients • Durvalumab (Imfinzi®) in combination with etoposide (Etopophos®) and either carboplatin (Paraplatin®) or cisplatin (Platinol® or Platinol-AQ®) as first-line therapy for adult patients • Cisplatin (Platinol® or Platinol-AQ®)/carboplatin (Paraplatin®) + etoposide (Etopophos®): 4–6 cycles • Prophylactic cranial irradiation may be considered for those who have responded to initial treatment or MRI surveillance • Thoracic radiation therapy for those who have responded to initial treatment **(CONTINUED)**

SUMMARY OF TREATMENT OPTIONS (CONTINUED)

Small cell lung cancer stage	Current treatment option guidelines
Recurrence depending on how long it takes for the cancer to come back	• **Early Recurrence** (<6 months after of treatment start) – Lurbinectedin (Zepzelca™), topotecan (Hycamtin®), or other single agent chemotherapy • **If immunotherapy-naive** (if patient didn't have immune therapy with original treatment): – Nivolumab (Opdivo®) for progression after platinum-based chemotherapy and at least one other line of therapy – Pembrolizumab (Keytruda®) for progression on or after platinum-based chemotherapy and at least one other line of therapy • **Late Recurrence** (>6 months after treatment start) – Original chemotherapy treatment regimen – Lurbinectedin (Zepzelca™) – Palliative radiotherapy as needed for symptom management – Single-agent chemotherapy, e.g., lurbinectedin (Zepzelca™) or topotecan (Hycamtin®)

Finding a clinical trial that might be right for you

In addition to the approved treatments outlined above, researchers are testing several new types of SCLC treatment in clinical trials, including **targeted therapy**, **angiogenesis inhibitor**, and immunotherapy treatments. Clinical trials are considered a good option for SCLC patients, per the NCCN guidelines.

If you are considering participating in a clinical trial, start by asking your healthcare team whether there is one that might be a good match for you in your geographic area.

Below are several resources in addition to your healthcare team to help you find a clinical trial that may be a good match:

RESOURCES TO HELP YOU NAVIGATE YOUR CLINICAL TRIALS SEARCH:

- **LUNGevity Clinical Trial Finder:** https://clinicaltrials.LUNGevity.org/
  - Find available clinical trials by type of lung cancer and geographic location
  - Also find information and links to the medical centers at which these clinical trials are taking place
- **EmergingMed:** https://app.emergingmed.com/lcctal/home
  - LUNGevity partners with this free clinical trials matching service to help you with the decision of whether to participate in a clinical trial; EmergingMed helps you identify lung cancer clinical trials for which you may be eligible
- **National Cancer Institute (NCI):** www.clinicaltrials.gov
- **My Cancer Genome:** www.mycancergenome.org/content/clinical_trials/
  - My Cancer Genome gives up-to-date information on what mutations make cancers grow and related treatment options, including available clinical trials

03 managing SCLC treatment side effects

Lung cancer treatments can cause side effects. Side effects from lung cancer treatment are common, but just because a side effect is common does not mean that you will experience it. Before you begin your treatment for SCLC, discuss with your healthcare team what side effects you might expect and how to prevent or ease them. Speak with your healthcare team if and when new side effects begin, as treating them early on is often more effective than trying to treat them once they have already become severe. Although most side effects go away when treatment is over, some can last a long time.

The side-effect management techniques outlined on the next page are not all-inclusive; your healthcare team will have a more extensive set.

Common side effects of chemotherapy

- **Fatigue:** Fatigue can be treated by relieving conditions related to it, such as anemia and depression. If a patient is depressed, antidepressant medications may be prescribed.
- **Nausea, vomiting:** There are multiple medications available to prevent and treat nausea and vomiting. If one anti-nausea medication doesn't work, then a different one or an additional one can be prescribed. Techniques such as distraction, relaxation, and positive imagery can help change the expectation and fear of nausea and vomiting.
- **Hair loss:** Some chemotherapy drugs may cause hair loss from all over the body. Not all chemotherapy drugs cause hair loss. Certain medications and cold cap therapy may prevent hair loss during chemotherapy.
- **Loss of appetite:** Appetite stimulants and nutritional supplements can be given to improve appetite and reduce weight loss.
- **Diarrhea:** Antidiarrheal medications can be prescribed as needed.
- **Constipation:** Stool softeners and laxatives may help.
- **Peripheral neuropathy:** Sometimes physical therapy and complementary therapies, such as massage and acupuncture, can help. The most common medications to treat neuropathic pain are anticonvulsants and antidepressants. Over-the-counter pain medications may be recommended for mild pain, or prescription non-steroidal anti-inflammatory drugs or analgesics may be prescribed for severe symptoms.
- **Hearing loss and tinnitus:** Ongoing monitoring for early intervention is important; hearing aids and other devices can help.

Sometimes the doses of the chemotherapy drugs may need to be lowered, or treatment may need to be delayed, to prevent the side effects from getting worse.

Common side effects of radiation therapy

- **Fatigue:** Fatigue can be treated by relieving conditions related to it, such as anemia and depression. If a patient is depressed, antidepressant medications may help.
- **Sunburn-like skin changes, such as dryness, itching, or peeling:** Moisturizing creams, showering and bathing with warm water rather than hot, and antihistamines may help.
- **Hair loss:** Hair is lost only in the area being treated. In most cases, hair will grow back.
- **Cough, difficulty breathing, and shortness of breath:** These symptoms can develop as "radiation pneumonitis" up to months after therapy and may require anti-inflammatory medication.
- **Sore throat and trouble swallowing:** Pain and anti-inflammatory medications and speech pathology to learn different ways to swallow may help.
- **Loss of appetite:** A nutritionist can offer a customized plan to improve appetite. Appetite stimulants and nutritional supplements can be given to improve appetite and reduce weight loss.
- **Nausea, vomiting (when the treated area is near the stomach):** There are multiple medications available to prevent and treat nausea and vomiting. If one anti-nausea medication doesn't work, a different one or an additional one can be prescribed. Techniques such as distraction, relaxation, and positive imagery can help change the expectation and fear of nausea and vomiting.

Common side effects of immunotherapy drugs

- **Fatigue:** Fatigue can be treated by relieving conditions related to it, such as anemia and depression. If a patient is depressed, antidepressant medications may help.

- **Pneumonitis and other inflammatory conditions:** Symptoms of pneumonitis, such as cough, difficulty breathing, and shortness of breath, can develop up to months after therapy and may require anti-inflammatory medication. Pneumonitis and some of the other side effects seen with immune checkpoint inhibitors are related to "turning on" the immune system, which then may also attack some healthy cells and cause inflammation. Other examples of this include:
  - Arthritis
  - Colitis
  - Hepatitis
  - Inflammation of the endocrine glands, like the thyroid
  - Nephritis and renal dysfunction

  Inflammation of the thyroid can cause either high or low thyroid hormone levels (hyperthyroidism or hypothyroidism, respectively). Inflammation of the liver can also occur, and so liver function tests may be run periodically to check for that. About half of patients develop some inflammation-related side effects. These are usually easy to manage, but sometimes patients may need to take additional medications, including corticosteroids or thyroid hormone replacement.
- **Upper respiratory tract infection:** Signs and symptoms may include fever, cough, frequent urination, pain when urinating, and flu-like symptoms. Antibiotics can be used for treatment.
- **Rash:** Depending on the severity of the rash, symptoms can be managed with cream corticosteroids, oral corticosteroids, cream antibiotics, or oral antibiotics.
- **Rare autoimmune side effects** are possible as well and may occur weeks or months after the therapy starts, including but not limited to a risk of hypothyroidism, cardiac or kidney damage, or changes in hormone secretion. Tell your healthcare team about any new or unusual symptoms that you develop after starting immunotherapy.

Common side effects of surgery

- **Pain:** Depending on the type of surgery a patient has and how big the incision, the patient's chest and back may be painful for several weeks or longer after surgery. Pain medicines that may help can be prescribed.
- **Fatigue:** A patient should expect to feel more tired than usual after surgery. How long it will take to get back to normal is different for each patient. Rest is very important to recovery.
- **Fluid, blood, or air in chest:** One or more chest tubes are typically placed during surgery to keep the patient's chest cavity free of fluid, blood, and air that collect after lung surgery. The tubes will be connected to a machine that gently suctions the fluid from the chest. These tubes are left in place until the fluid and air have stopped draining. Air leaks typically stop 1–4 days post-surgery.
- **Shortness of breath:** A patient should expect to feel short of breath after lung surgery. The extent of this depends on how much of the lung was removed and how much pain the patient is experiencing. After a portion of a lung is removed, the remaining lung tissue can expand over time and make it easier to breathe. A respiratory therapist can help the patient with breathing treatments after surgery. These treatments may include deep breathing exercises, the use of a **spirometer** to encourage deep breathing and expand the lungs, and medications to help open the airways. In addition, **pulmonary rehabilitation** offers techniques to improve lung function after lung surgery. For example, pursed-lip breathing decreases how often a patient takes breaths and keeps airways open longer. This allows more air to flow in and out of the lungs so that a patient can be more physically active.
- **Loss of muscle:** Patients may benefit from exercise post-surgery. Physical therapy may also be prescribed to help build strength and endurance.

Palliative care

The individual side-effect management techniques described in this chapter can be part of a broader palliative care program for a patient. The goal of palliative care is to prevent or treat the symptoms and side effects of the disease and its treatment. At the same time, it addresses the emotional, social, practical, and spiritual problems that a patient faces. Palliative care improves a patient's quality of life while the patient is receiving standard medical care by anticipating, preventing, and treating suffering. Palliative care can be provided from the time of diagnosis, throughout treatment, and at the end of life. There is evidence to show that palliative care can extend life. The American Society of Clinical Oncology (ASCO) recommends that all patients with advanced cancer receive palliative care early on and concurrent with cancer treatment.

04 lung cancer support services

As already noted, there are many challenges associated with a lung cancer diagnosis. There are also many available services in addition to those offered as part of your palliative care plan that can help you to handle these challenges (including financial challenges). *Take advantage of them.* A good place to start is with members of your healthcare team, including doctors, nurses, social workers, and patient navigators, who can refer you to local services. Free online or telephone help is also available to either directly supply you with or refer you to other support services. For an extensive list of telephone, online, face-to-face, and peer-to-peer support programs; education programs; and financial assistance programs, go to the website of The Lung Cancer Action Network (LungCAN®), a group of lung cancer advocacy organizations, including LUNGevity Foundation, that provides patient and caregiver resources: www.LungCAN.org/access-patient-services/.

05 glossary

Adjuvant—Cancer treatment given after the primary treatment in order to kill unseen cancer cells or to lower the risk that the cancer will come back. Adjuvant therapy may include chemotherapy, radiation therapy, or biological therapy (including immunotherapy and targeted therapy)

Adrenal gland—A small gland that makes hormones that help control heart rate, blood pressure, and other important body functions. There is an adrenal gland on top of each kidney

Angiogenesis inhibitor—A drug or substance that keeps new blood vessels from forming. In cancer treatment, angiogenesis inhibitors may prevent the growth of new blood vessels that tumors need to grow. Also called antiangiogenesis agent

Biomarker testing (mutation, genomic, or molecular testing)—Analyzing DNA to look for a gene mutation that may indicate an increased risk for developing a specific disease or disorder

Blood chemistry tests—A common panel of blood tests that measures the number of electrolytes and other chemicals made in the body. It provides information on how the body's organs, such as kidneys, liver, and heart, are functioning

Bronchoscope—A thin tube-like instrument with a light and a lens for viewing. It may also have a tool to remove tissue; this tissue can then be checked under a microscope for signs of disease. The bronchoscope is inserted through the nose or mouth

Bronchi—Large airways that lead from the trachea (windpipe) to a lung; the plural of bronchus

Clinical trial—A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called clinical research trial or study

Complete blood count (CBC)—A measure of the number of red blood cells, white blood cells (WBCs), and platelets in the blood. A CBC is used to help diagnose and monitor many conditions. Also called blood cell count

DNA—The molecules inside cells that carry genetic information and pass it from one generation to the next. Also called deoxyribonucleic acid

Driver mutation—A change in the gene sequence of a cell that leads to the development or progression of a tumor

Endoscope—A thin tube-like instrument used to look at tissues inside the body. An endoscope has a light and a lens for viewing and may have a tool to remove tissue

First-line therapy—The first treatment given for a disease. It is often part of a standard set of treatments, such as surgery followed by chemotherapy and radiation. When used by itself, first-line therapy is the one accepted as the best treatment. If it doesn't cure the disease or it causes severe side effects, other treatment may be added or used instead. Also called induction therapy, primary therapy, and primary treatment

Immune system—A complex network of cells, tissues, organs, and the substances they make that help the body fight infections and other diseases. The immune system includes white blood cells (WBCs) and organs and tissues of the lymph system, such as the thymus, spleen, tonsils, lymph nodes, lymph vessels, and bone marrow

Intravenous—Into or within a vein. Intravenous usually refers to a way of giving a drug or other substance through a needle or tube inserted into a vein. Also called IV

Lymph node—A bean-shaped structure that is part of the body's immune system. Lymph nodes filter lymph (lymphatic fluid) and store lymphocytes (white blood cells [WBCs]). They are located along lymphatic vessels

Mediastinal—Of the mediastinum, the area between the lungs

Metastatic—Having to do with metastasis, which is the spread of cancer from the primary site (place where it started) to other places in the body

Metastasis—The spread of cancer from the primary site, or place where it started, to other places in the body

Neuroendocrine tumor—A tumor that forms from cells that release hormones into the blood in response to a signal from the nervous system. Neuroendocrine tumors may make higher-than-normal amounts of hormones, which can cause many different symptoms. These tumors may be benign (not cancerous) or malignant (cancerous). One example of neuroendocrine tumors is small cell lung cancer (SCLC)

Node—See lymph node

Nodule—A growth or lump that may be malignant (cancerous) or benign (not cancerous)

Non-small cell lung cancer (NSCLC)—A group of lung cancers that are named for the kinds of cells found in the cancer and how the cells look under a microscope. The three main subtypes of NSCLC are adenocarcinoma, squamous cell lung cancer, and large cell lung cancer. NSCLC is the most common type of lung cancer

Palliative—Describes the care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of palliative care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and emotional, social, practical, and spiritual problems related to a disease or its treatment

Paraneoplastic syndromes—A group of symptoms that may develop when substances released by some cancer cells disrupt the normal function of surrounding cells and tissue

Pathologist—A doctor who identifies diseases by studying cells and tissues under a microscope or with other equipment

Pathology report—The description of cells and tissues made by a pathologist based on what is seen under a microscope. This is sometimes used to make a diagnosis of lung cancer or another disease

Peripheral neuropathy—A nerve problem that causes pain, numbness, tingling, swelling, or muscle weakness in different parts of the body

Periphery—The outermost part or region within a precise boundary

Pleural effusion—Fluid around the lungs

Primary tumor—The original, or first, tumor in the body

Prophylactic cranial irradiation—Radiation therapy to the head to reduce the risk that cancer will spread to the brain

Pulmonary rehabilitation—A medically supervised program to help people with lung disease improve their overall physical, mental, and social functioning

Radioactive—Giving off radiation

Small cell lung cancer (SCLC)—An aggressive (fast-growing) cancer that forms in the tissues of the lung and can spread to other parts of the body. The cancer cells look small and round, oval, or spindle-shaped under a microscope

Spirometer—An instrument used for measuring the air entering and leaving the lungs

Stage—The extent of a cancer in the body. The higher the stage, the more advanced the cancer is. In small cell lung cancer (SCLC), the two classification systems used are the Veterans Administration (VA) system (limited-stage and extensive-stage) and the TNM system (stage 0 to stage IV)

Systemic—Affecting the entire body

Targeted therapy—A type of treatment that uses drugs or other substances to identify and attack specific types of cancer cells with less harm to normal cells. Some targeted therapies block the action of certain enzymes, proteins, or other molecules involved in the growth and spread of cancer cells. Other types of targeted therapies help the immune system kill cancer cells or deliver toxic substances directly to cancer cells and kill them. Targeted therapy may have fewer side effects than other types of cancer treatment. Most targeted therapies are either small molecule drugs or monoclonal antibodies

Tinnitus—A disorder in which a person hears noises such as buzzing, ringing, clicking, or the sound of a pulse, when no outside sound is causing them. Tinnitus may have many different causes, and may be a symptom of another disease or condition. It may be caused by certain tumors and anticancer drugs

Tumor—An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancerous) or malignant (cancerous). Also called neoplasm

Ultrasound—A procedure that uses high-energy sound waves to look at tissues and organs inside the body

U.S. Food and Drug Administration (FDA)—The agency in the U.S. federal government whose mission is to protect public health by making sure that food, cosmetics, and nutritional supplements are safe to use and truthfully labeled. The FDA also makes sure that drugs, medical devices, and equipment are safe and effective, and that blood for transfusions and transplant tissue is safe

X-ray—A type of radiation used in the diagnosis and treatment of cancer and other disease. In low doses, X-rays are used to diagnose disease by making pictures of the inside of the body. In high doses, X-rays are used to treat cancer

06 notes

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