Understanding small cell lung cancer and its treatment

GLOBAL LUNG CANCER COALITION

Cancer happens when some cells in the body change how they work. Normal cells grow and divide into new cells and die off harmlessly when the body's systems break them down. Cancer cells, on the other hand, divide and grow but do not die off as normal cells do.

The body's immune system may be unable to recognise and control these abnormal cells allowing them to multiply and combine to form a tumour. When this happens in cells in the lungs, it is called lung cancer

Small cell lung cancer (SCLC) is the less common of two main types of lung cancer. It gets its name because the cells that form the tumour are smaller than the cells in other types of lung cancer. When seen under a microscope, a SCLC cell has a large nucleus compared to the overall size of the cell. SCLC is classified as a neuroendocrine carcinoma – the tumour cells have traits similar to the body's nerve and hormone-producing cells.

SCLC can develop in any part of the lungs but it is most commonly seen in and around the major breathing tubes (bronchi) in the central part of the lungs. This lung cancer is rare among those who have never smoked. In countries and regions where smoking is now less common, SCLC makes up only around 10% of all newly diagnosed lung cancers – in the 1950s, it was over 30%.

Rarely, SCLC can be diagnosed at the same time as non-small cell lung cancer (NSCLC), the other main type of lung cancer.

Stopping smoking can improve how you respond and recover from any treatment you may receive. It will also reduce the risk of having a heart attack or stroke that may complicate your cancer care.or antibodies that are given in a drip or an injection in the skin. They stick to their target like a limpet and are quite long-lasting.

Small cell lung cancer responds well to treatment, though how long that response lasts does vary from person to person. Your cancer care team will monitor you very closely during and after your initial treatment.

How is small cell lung cancer diagnosed?

While cancer may be suspected after X-rays or scans, doctors can only accurately diagnose it as SCLC by taking a small tissue sample (biopsy) from the suspected cancer site and looking at it under a microscope.

Doctors will then consider the extent of the cancer in a process called staging, looking at how far the cancer may have spread and if there is any cancer in other parts of the body. Staging helps doctors decide on the best treatments to offer for your cancer.

Most cancers are grouped into stages 1 to 4 (sometimes written as I to IV). Stage 1 means the cancer is small and in one area of the lung (localised), while stage 4 means the cancer has spread to another part of the body (metastatic). These stages are further defined using letters and numbers that relate to the size and number of tumours (T), if the cancer is in lymph nodes (N) and if the cancer has spread (M). This is known as the TNM system.

SCLC can be staged this way, but more commonly it is simply divided into limited stage (roughly the same as stages 1 to 3) and extensive stage (stage 4) to help decide on the best treatment. Doctors may also use the TNM system to refine their evaluation.

Limited-stage SCLC – The cancer is limited to one lung (no metastases) though it may or may not be affecting nearby lymph nodes. Radiotherapy is a common SCLC treatment and the cancer can be described as limited stage if the whole cancer falls within the area safely treatable by a single radiation treatment, sometimes called a field.

Extensive-stage SCLC – The cancer has spread outside the lung, for example to the other lung, or into the liver, bones or brain. The nature of SCLC means that most people are diagnosed at this stage.

Generally, limited-stage SCLC is linked to a better outcome. However, once staging is done, what becomes more important is how completely the cancer responds to treatment.

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Treatments for small cell lung cancer

Your cancer doctor and other healthcare professionals will meet to look at the results of all your tests and assessments before deciding which treatments to recommend. Your treatment plan will vary depending on the stage of your cancer and your underlying health.

A range of treatment options may be available to you. Each type of treatment affects cancer cells differently:

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- **chemotherapy** – kills fast-dividing cells (cancer cells)
- **radiotherapy** – uses high energy X-rays (radiation) to destroy cancer cells while avoiding normal cells
- **immunotherapy** – supports the body's immune system to recognise and kill cancer cells
- **surgery** – used to remove the cancer (only for some people with very early limited-stage disease)

Chemotherapy and immunotherapy are types of systemic treatments, usually given through a drip into your blood.

The most common chemotherapy treatment is a combination treatment of two chemotherapy drugs that work well together. Your cancer care team will speak to you about this approach if they think it is best for you.

A recent advance has been introducing immunotherapy to SCLC treatment plans. Two main types are used:

- immune checkpoint inhibitors (ICI), that may be given alongside chemotherapy
- bi-specific antibodies, also called bi-specific T-cell engagers (BiTEs), given on their own

The BiTE is the newest generation of cutting-edge immunotherapy treatment and may not yet be available where you live. Speak to your medical team to find out.

How immunotherapy works

Immune checkpoint inhibitors attach to proteins on the surface of cancer cells making it easier for the body's own immune system to find and kill them.

Bi-specific T-cell engagers latch on to the cancer cells (similar to ICIs) but, at the same time, also link to the body's T-cells, the cells in the immune system that identify and destroy damaged cells. Connecting cancer cells and T-cells in this way increases the effectiveness of the immune system in doing its job. This treatment has been found to benefit some people whose lung cancer has grown during or after other treatments.

For more information, you can look at our immunotherapy factsheet online.

Treatments are complex and your doctors will explain which ones they may recommend to you depending on your general health and whether you have limited-stage or extensive-stage lung cancer. Many people experience side effects from cancer treatments ranging from mild to severe. Typical side effects can include diarrhoea, joint pains and skin rashes. Most side effects are treated with steroids.

Your medical team will speak to you about side effects that may be caused by your treatment. You can then weigh up any harms against possible overall benefits you may experience. This is a shared decision between you and your cancer care team.

Treating limited-stage SCLC

The mainstay of treatment for limited-stage SCLC is chemotherapy, with radiotherapy to the chest area. The radiotherapy could start alongside or after your first or second cycle of chemotherapy. Some people may not be well enough at first to have radiotherapy. If so, they may receive chemotherapy on its own and radiation to the chest area later.

If your cancer responds to this treatment, you may also be offered radiotherapy to the brain (prophylactic cranial irradiation or PCI) to help prevent cancer developing there. This may sound alarming, but if your medical team think it is a suitable treatment option for you, they will fully explain it to help put your mind at ease.

You may be offered immunotherapy if your limited-stage SCLC remains under control following chemotherapy/radiotherapy treatments. In this situation, it would be an immune checkpoint inhibitor immunotherapy drug. Treatment could last for up to two years.

Surgery is not often used to treat small cell lung cancer but if your cancer is found early, at stage 1, this may be an option for you. If you have surgery for SCLC, you will most likely have chemotherapy after your operation. This is known as adjuvant treatment. If cancer is found in nearby lymph nodes after your operation, you may also receive radiotherapy to the chest area. Some people may then go on to have radiotherapy to the brain (prophylactic cranial irradiation or PCI).

Treating extensive-stage SCLC

The standard first treatment for extensive-stage SCLC is chemotherapy, generally over four to six cycles. Recently, it has been found that adding an immunotherapy drug to the first chemotherapy treatment leads to better outcomes.

To be able to receive immunotherapy, your general health needs to be good and you must not have any conditions that automatically prevent you from having immunotherapy such as a pre-existing autoimmune disease, HIV or viral hepatitis infection, and not be an organ transplant recipient. If your health isn't strong enough to safely manage both types of treatment together, you may receive chemotherapy on its own to avoid potentially severe side effects.

Sometimes radiotherapy to the chest or brain is offered depending on your response to the systemic treatments.

If your lung cancer remains controlled after chemo-immunotherapy, you may then receive further immunotherapy on its own, called maintenance treatment. This treatment would continue until your cancer begins to grow again or because it has to stop for other reasons, such as side effects.

Further treatment

Unfortunately, the benefit of chemotherapy, with or without immunotherapy, does not always last long. However, further treatment with the same or different chemotherapy drugs may be offered if your lung cancer becomes more active again. You may also be offered different immunotherapy treatment

(BiTE drugs, for example) or be able to take part in a clinical trial.

Being offered these treatments depends largely on your overall health and how well you may be able to tolerate them as well as their availability where you live.

If your lung cancer progresses, you may experience an increase in your symptoms and your doctors will speak to you about a range of possible options to manage these.

Treatments that focus on managing these symptoms are called palliative treatments. This may include radiotherapy or drugs treatments such as painkillers. You may receive these treatments alongside your main treatment. Your doctor may refer you to a specialist palliative care team to help manage your symptoms.

Looking ahead

With the introduction of immunotherapy as a possible treatment for small cell lung cancer, options for people with the disease have improved. There is still much work to be done as most treatments happen in a non-curative situation. That said, some people with SCLC are now living longer with a better quality-of-life.

Lung cancer can be separated into several subtypes, based on genetic changes or mutations, that can be seen in the cancer cells. This has already led to effective treatment options for non-small cell lung cancer. Small cell lung cancer is now starting to have these changes identified too so there is some optimism about similar treatments being developed for it. There is extensive research underway to improve medical knowledge about different types of the disease and who may benefit the most from available treatments.

Cancer experts – doctors, nurses and scientists – are researching even better treatment options for SCLC. Your cancer care team may be working on a clinical trial for one of these new treatments. They will give you detailed information about the trial so you can decide if you want to take part. If you decide against it, it will not stop you from continuing to get the best possible care you would have otherwise had.

Clinical trials

A clinical trial is a way of finding out how well new treatments work compared to current treatments. Joining a clinical trial may give you access to treatments that could improve your outcomes, help you live longer or relieve your symptoms.

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