



Review Article

Non-Small Cell Lung Cancer (NSCLC): An Update

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Abstract

Non-Small Cell lung Cancer can be treated with survival benefit providing better quality of life by applying new chemotherapeutic dosing schemes. Though Surgery and Radiotherapy provide good results in non small cell lung cancer, most of the patients turn up to doctors in advanced stages where these facilities can not be offered properly. Combination chemotherapy with carboplatin or cisplatin with Taxotere and Gemcirabine is now a better option. Chemotherapy with carboplatin, Gemcirabine, Taxotere and Novelbine is also a better dosing schemes.

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Introduction

Lung cancer is the commonest cause of death from cancer in men and the second commonest in women. Over all it accounts for 35% of male and 15% of female cancer death. There has been a modest fall of cancer death in men but a continues rise in women. This is related to an increased smoking in women.¹

There are two general types of lung cancer: small cell carcinoma and non-small cell carcinoma. Non-small cell lung cancer is more common, accounting for approximately 80 percent of all lung cancer cases. There has been modest improvement in the survival rate over the past two decades. The slow rate of improvement is due to the fact that we are lacking a satisfactory, widely applicable, screening test that could increase our ability to detect lung cancer at an early stage, when it has the best chance of being cured and the fact that lung cancer is a biologically aggressive disease.²

Classification

There are three major sub-types of NSCLC-

1. **Squamous Cell Carcinoma:** Associated with smoking and found mostly in men and older people of both sexes. This type of NSCLC usually develops in larger, more central bronchi, tends to spread locally and metastasizes some what later than the other pattern, but its rate of growth in its site of origin is usually more rapid than of other types. It accounts for 30 to 35 percent of all NSCLC.
2. **Adenocarcinoma:** More common in women and non-smokers, this type of NSCLC arises from the terminal bronchioles or alveolar walls. It grows more slowly than the squamous cell carcinoma. It spreads to other parts of the body at an early stage, and accounts for 40 percent of all cases.
3. **Large Cell Carcinoma:** This type of NSCLC develops in smaller breathing tubes and is

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generally of substantial size by the time it is diagnosed. It accounts for 5 to 15 percent of all cases.^{2,3}

How It Spreads

Non-small cell cancer can spread through the lymphatic system and through the blood. It can directly invade locally also to involve the center of the chest (mediastinum), the lining of the chest, the ribs or, it is in the top of the lung, the nerves and blood vessels leading into the arm. When non-small cell lung cancer enters the bloodstream, it can spread to distant sites such as the liver, bones, brain and other places in the lung.⁴

Risk factors

- Lung cancer mainly occurs in people between the ages of 50 and 60 who have a history of smoking.
- The male to female ratio remains 4 to 1.
- Workers exposed to industrial substances such as asbestos, nickel, chromium, cadmium, uranium, radon compounds and chloromethyl ether, especially those who smoke.^{5,6}

Diagnosis and Staging

The first step in fighting lung cancer is to make an accurate diagnosis and determine the extent, or "stage" of the disease. The stage of a cancer is assessed using a variety of tests. The stage helps to determine the prognosis and to guide the selection of treatment.

Staging

NSCLC can be classified from stage 0-IV:

Stage 0. Cancer has not invaded through the wall of the breathing tub.

Stage I. Cancer at this stage still remains in the lung and has not spread to the lymph nodes.

Stage II. Cancer has now spread into the local lymph nodes at base of the lungs; cancer is divided into **Stage IIA** and **Stage IIB** depending on the extent of the tumor and lymph node involvement

Stage III. Cancer has spread to the chest wall or the diaphragm, or to the lymph nodes in the center of the chest; cancer is classified as **Stage IIIA**, or **Stage IIIB**.

Stage IV. Cancer has metastasized to other parts of the body.

Table 1: Clinical and Pathologic Findings in Different Stages of NSCLC

Stage	Symptoms and Signs	Diagnostic Tests
Stage I	New or changing cough Pink/Bloody sputum Hoarseness Shortness of breath Increased sputum Recurrent lung infections Weight loss Fatigue	Blood and other tests: Sputum examination for malignant cells. Biopsy or fine needle aspiration.
Stage II	The above (I) plus: Swelling of arm or face	Physical examination: Lymph node enlargement in neck or above collarbone, PET scan to stage the mediastinum. Mediastinoscopy with biopsy.
Stage III	Same above (I)	Physical examination: Same as above plus decreased breath sound or dullness when chest is tapped indicating fluid in the lung.
Stage IV	Same as above (I) plus the following in the tumor has spread: Severe headaches Double vision Pain in bones, chest, abdomen, neck or arms	Physical examination: Same as above plus enlarged liver or other abdominal mass. Bone scan or bone biopsy, CT scan of liver or adrenal glands, liver biopsy, PET, CT or MRI scans of the brain.

Treatment

There are three basic types of treatment for lung cancer – surgery, chemotherapy, and radiation therapy. These treatments may be used alone or in combination according to stages and clinical condition of the patients.^{7,8}

Surgery

Surgery for lung cancer may be used to remove the cancer and some of the surrounding lung tissue, depending on the stage of cancer. Other types of surgery are also used to relieve symptoms of lung cancer. For example, LASER surgery may be used to clear blocked airways to relieve shortness of breath or prevent pneumonia.

There are several types of surgeries that can be used to remove the tumor and cancerous tissue:

- Segmentectomy or wedge resection—removal of part of a lobe of the lung.
- Lobectomy—removal of a lobe of the lung.
- Pneumonectomy—removal of the entire lung.

Radiation Therapy

During radiation therapy, high-energy rays are used to kill cancer cells. Radiation affects only the cancer cells in the limited area in which the rays are directed. Radiation therapy can be used to shrink the size of a tumor before surgery, and can also be used after surgery to destroy any cancer cells that remain in the area that was treated⁹. Radiation therapy or a combination of radiation therapy and chemotherapy can be used instead of surgery.^{9,10}

External beam radiation is the specific type of radiation treatment often used to treat primary lung cancer or lung cancer that had spreaded to other organs for palliation. With external beam radiation, the radiation is delivered from outside the body and focused directly on the cancerous area.²

Brachytherapy is a type of internal radiation therapy. During brachytherapy, the source of radiation is placed close to the surface

of the body or within a body cavity. For lung cancer, a small pellet of radioactive material may be placed directly into the tumor or into the airway next to the tumor. Radiation therapy can also be used to relieve symptoms of lung cancer such as shortness of breath or bone pain of secondaries or palliation for brain metastasis.^{9,10}

Chemotherapy

Chemotherapy with Taxotere in combination with Carboplatin or Cisplatin or Taxotere and Gemcitabine is now a better option. Chemotherapy with Taxotere, Cisplatin, Gemcitabine and Navelbine combination is also better dosing schemes. Chemotherapy with Taxotere and Gemcitabine weekly as a first line therapy for advanced NSCLC can be used, Taxotere lone acts as a good chemosensitizer. It is used for chemosensitization 24 hours prior to hypofractionated radiation.

Docetaxel (Taxotere) is used to treat locally advanced or metastatic non-small cell lung cancer. Clinical trials have shown that Taxotere provides significant benefits for patients with lung cancer who were previously treated with other platinum-based chemotherapy.^{11,12,13}

In conclusion treatment of NSCLC with Docetaxel (Taxotere) in combination with Gemcitabine or Cisplatin or Carboplatin shows better results with survival benefit and minimal toxicity providing better quality of life.

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