Lung cancer

Lung cancer is a common male cancer with a rising incidence in women as well.

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Marthinus Kahl obtained the MB ChB degree at he University of the Free State in 1995. After his internship he worked in the UK for a year. He started working at the Department of Oncotherapy, University of the Free State, in 1998, first as a medical officer and later as registrar, completing the MMed Radiation Oncology in 2002. He has been working as a consultant in the department since 2003.

Lung cancer is one of the most common cancers in men and has a rising incidence in the female population as well. At this stage it is also the leading cause of cancer deaths in the developed world. Despite advances made in the treatment of lung cancer it still has a dismal prognosis, with more than half of the patients diagnosed with advanced lung cancer dying within a year of diagnosis. The purpose of this article is to raise awareness and to hopefully help with earlier diagnosis in order to have a better outcome.

Epidemiology

Thanks to extensive efforts in countries like the USA the incidence of lung cancer is decreasing there. The same cannot be said for the developing world which seems to be the target of tobacco companies. The most important risk factor is smoking (active and passive). Smokers have a 16-fold increased risk of developing lung cancer compared with non-smokers. Asbestos and silica fibre exposure, diesel fumes, air pollution, industrial exposure to nickel and chromium, arsenic exposure, mine work and exposure to radon gas and uranium all increase the risk for lung cancer. Genetic predisposition and previous malignancies also increase the risk of developing lung cancer.

Pathological background

Lung cancers are divided into 2 main groups histologically: small-cell and non-small-cell lung cancer. Differences are on grounds of behaviour, features, treatment and prognosis. The main differences between small-cell lung cancer (SCLC) and non-small-cell lung cancer (NSCLC) are as follows:

- SCLC usually presents as a central tumour
- SCLC has very early metastatic spread, therefore surgery plays a very limited role
- chemotherapy is the mainstay of the treatment
- although SCLC is quite chemo- and radiosensitive, the prognosis is very poor.

NSCLC can be located either centrally or in the periphery of the lungs, and tends to metastasise a bit later than SCLC. Therefore surgery plays a much more important role in the management of NSCLC. Surgery, chemotherapy and radiotherapy all have important roles to play in the treatment of NSCLC. Although not as chemosensitive as SCLC, the prognosis is better, probably because of later metastatic spread.

Approximately 20% of lung cancers are SCLC, the rest are mainly NSCLC. This group is made up mostly of squamous cell, adenocarcinomas and large-cell undifferentiated carcinomas.

Symptoms and signs

Patients with lung cancer often present quite late. This may be due to the fact that the initial symptoms are vague and nonspecific or because the treating health professional didn't think of it in the differential diagnosis. Nonspecific symptoms include weight loss, muscle weakness and clubbing of fingers and toes. Specific symptoms can include recurrent chest infections not responding to antibiotic treatment, dyspnoea, haemoptysis, chest pain due to chest wall infiltration or pleural effusion and hoarseness due to recurrent laryngeal nerve infiltration. The nature of a chronic cough can change. Symptoms due to metastatic spead depend on the site of the metastases as well as the extent of organ dysfunction. Sites of common metastatic spread include the lungs, skeleton, liver, brain, adrenal glands and lymph nodes in the mediastinum and supraclavicular areas.

On examination the patient might be anaemic or have a plethoric appearance due to long-term smoking. In the case of obstructive lesions the patient might be cyanotic and in respiratory distress. Clubbing is often found. The patient can appear wasted and sometimes palpable neck lymph nodes are present. In the case of superior vena cava obstruction, facial and upper limb oedema, as well as distended veins in the head, neck and upper limbs may be seen. Chest wall tenderness, decreased air entry, pleural effusion, a localised wheeze or even a chest wall mass can be present.

One should always do a thorough systemic examination when suspecting lung cancer, to look for possible signs of metastatic spread. This should include checking for vertebral tenderness, hepatomegaly and focal neurological signs.

A simple chest X-ray with PA and lateral views is the first and probably the most important special investigation that should be done. Examples of lung cancer X-rays are given in Figs 1 - 4.

Diagnosis and work-up

A high index of suspicion is crucial. A thorough history (including habits, environment and family history) and physical examination are of the utmost importance. Apart from that, a chest X-ray is the most basic special investigation. If any suspicious lesions or effusions are detected a CT scan can be done. The final proof of malignancy

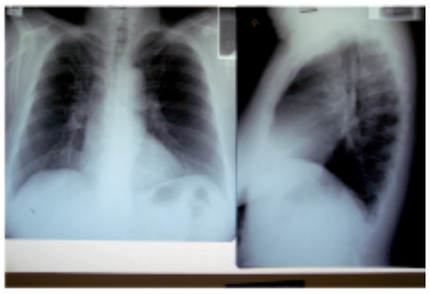

Fig. 1. SCLC – limited stage disease.

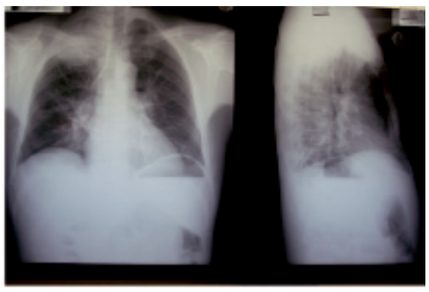

Fig. 2. NSCLC superior sulcus tumour.

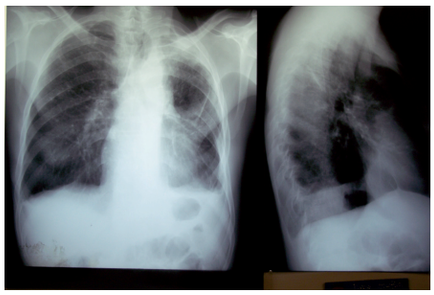

Fig. 3. NSCLC left lung with partial collapse and effusion.

remains a positive cytological or histological diagnosis and for that bronchoscopy, fine-needle aspiration cytology or a biopsy must be done. Pleural fluid can also be sent for cytology. Once the cancer is proven, staging tests need to be done to determine the extent of the disease. These include a CT scan of the chest (if not previously done), abdominal scan, bone scan and imaging of the brain if any central nervous system symptoms are present.

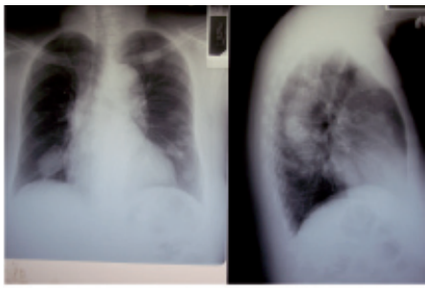

Fig. 4. NSCLC with lung metastases.

Tests that need to be done to determine the most appropriate treatment for each patient include lung function tests, a full blood count, biochemistry including albumin and calcium and an HIV test.

Management

It is important to distinguish between SCLC and NSCLC, as the approaches are completely different. The stage of the disease will also make a difference to the treatment(s) of choice. Urgent problems that need to be addressed first include pain, haemoptysis, severe dyspnoea or respiratory distress, superior vena cava syndrome, hypercalcaemia, paraplegia and brain metastases.

In SCLC the mainstay of treatment remains chemotherapy. In limited-stage disease chemotherapy is started with concurrent radiotherapy early in the treatment course. If the patient has a complete response to the treatment, prophylactic cranial radiotherapy can be considered to reduce the risk of brain metastases. In extensive stage disease chemotherapy is started and radiotherapy can be reserved for palliative treatment of local or metastatic disease.

In NSCLC the staging system is a bit more complicated and the choices of treatment depend on stage, co-morbid conditions and risk factors. For earlier stages, surgery followed by adjuvant chemotherapy may be considered if the patient's functional reserve allows it. If the patient has a high anaesthetic risk but good lung functions, radical radiotherapy with concurrent chemotherapy is an alternative to surgery. In more advanced stages chemotherapy can be used but the patient's performance status must be kept in mind. Very weak patients can do worse on chemotherapy than with best supportive care alone. Palliative radiotherapy can relieve pain, obstructive symptoms and bleeding. It is also necessary to damage the blood-brain barrier in case of brain metastases for chemotherapy to pass in therapeutic concentrations.

Apart from the radical role of surgery in early-stage NSCLC, surgery can also be applied in the palliative setting with fixing of pathological fractures and decompression in spinal cord compression.

Further Reading

1. De Vita T, jun, Hellman S, Rosenberg SA. *Cancer Principles and Practice of Oncology*, 7th ed., 2005. Lippencott Williams & Wilkens.
2. *Davidson's Principles and Practice of Medicine*, 19th ed., 2002. Churchhill Livingstone.
3. *NCCN Clinical Practice Guidelines in Oncology*, 2006. CD Rom. Compiled by the National Comprehensive Cancer Network, USA.

In a nutshell

- Lung cancer is one of the most common cancers in men and has a rising incidence in the female population as well.
- Smokers have a 16-fold increased risk of developing lung cancer compared with non-smokers. Asbestos and silica fibre exposure, diesel fumes, air pollution, industrial exposure to nickel and chromium, arsenic exposure, mine work and exposure to radon gas and uranium all increase the risk for lung cancer.
- Lung cancers are divided into 2 main groups histologically: small-cell and non-small-cell lung cancer. Differences are on grounds of behaviour, features, treatment and prognosis.
- NSCLC can be located either centrally or in the periphery of the lungs, and tends to metastasise a bit later than SCLC. Therefore surgery plays a much more important role in the management of NSCLC.
- Nonspecific symptoms include weight loss, muscle weakness and clubbing of fingers and toes. Specific symptoms can include recurrent chest infections not responding to antibiotic treatment, dyspnoea, haemoptysis, chest pain due to chest wall infiltration or pleural effusion and hoarseness due to recurrent laryngeal nerve infiltration.
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