Lung Cancer and Pain

Lung cancer is the most common cancer worldwide, accounting for 1.2 million new cases globally each year. Risk factors include smoking, including passive smoking; exposure to asbestos, benzene, radon, and air pollution; genetic predisposition; and pre-existing lung diseases such as tuberculosis or congestive obstructive pulmonary disease. At diagnosis, approximately 25% of people with lung cancer have chest pain. Other symptoms of lung cancer may include dyspnea, wheezing, cough, and hemoptysis. Conversely, 25% of those diagnosed with lung cancer have no symptoms at presentation.

Epidemiology of Lung Cancer
There are two main types of lung cancer, including non-small-cell lung cancer (NSCLC) and small-cell lung cancer (SCLC).

Non-small-cell lung cancer: The most common type is NSCLC, comprising approximately 80% of all lung cancers. Approximately half of these cancers are adenocarcinomas, often, but not solely, associated with smoking. Squamous cell carcinomas comprise approximately 30% of NSCLC, and their prevalence is decreasing. Large-cell carcinomas, often referred to as undifferentiated carcinomas, are the least common type of NSCLC. The 5-year survival rate is approximately 15%, although survival for those diagnosed with advanced stages (III and IV) are 8% and 2%, respectively.

Small-cell lung cancer: The other 20% of lung cancers are SCLC, most commonly associated with cigarette smoking (only 1% of these tumors occur in nonsmokers). The most aggressive of lung cancers, SCLC tends to metastasize rapidly, and most patients are diagnosed with widespread disease. As a result, 5-year survival rates are 5–10%.

Mesothelioma: Although not technically a tumor of the lung tissue, mesothelioma is a relatively rare cancer that can affect the pleural lining. It is almost always associated with exposure to asbestos. Pleural effusions are common, leading to pain and shortness of breath. Five-year survival rates are less than 10%.

Diagnosis and Treatment of Lung Cancer
The diagnosis of lung cancer can be made with a variety of imaging techniques, including chest radiography (X-ray), standard or helical computerized axial tomography, and magnetic resonance imaging or positron emission tomography. Surgery as a therapeutic option is reserved for limited stage tumors. Radiotherapy is often employed to control or reduce tumor growth, usually with palliative intent. Standard chemotherapy is used, along with newer targeted therapies, such as erlotinib (which targets the epidermal growth factor receptor) and bevacizumab (which acts to impair angiogenesis).

Pain Syndromes in Lung Cancer
In a meta-analysis of 32 studies, the prevalence of pain in those with lung cancer was 47%. Pain affected 27% of outpatients with lung cancer and 76% of those in palliative care. The majority had pain due to the cancer (73%) and cancer treatment (11%). In a prospective study of lung cancer patients being treated by a palliative care service, the prevalence of pain was 90%, with the most common sites being the chest and lumbar spine.

Tumors in the lung can lead to chest pain and dyspnea. Lung cancer most often spreads to the liver, the adrenal glands, the bones, and the brain—all sites in which tumors can lead to significant pain. Common syndromes include bone pain, headache secondary to brain metastases, and right upper quadrant and right shoulder pain referred from the liver when cancer has metastasized to this organ. Tumors in the upper apex of the lung can invade the brachial plexus, leading to pain radiating down the arm.

Pain Management in Lung Cancer

The management of pain due to lung cancer is based on a thorough history and physical examination. Nonopioid analgesics, opioids, and adjuvant analgesics (such as anticonvulsants and antidepressants) are warranted. Nonsteroidal anti-inflammatory drugs, including cyclooxygenase-2 (COX-2) inhibitors, are particularly effective in relieving bone pain. Corticosteroids such as dexamethasone can be of particular benefit in reducing bone pain, referred pain due to liver metastases, headache pain due to brain metastases, and chest pain and dyspnea due to the primary tumor or lymphatic spread. Given once daily due to their long half-life, these agents have the added advantage of improving appetite and decreasing lethargy. Pain due to bone metastases can be treated with external radiation therapy. A single fraction of 8 Gy is as effective as higher fractionated doses in the acute relief of pain, although higher fractionated doses lead to longer duration of pain relief with fewer skeletal-related events. Bisphosphonates are recommended in combination with radiotherapy. If these agents are ineffective, radiopharmaceuticals may be effective. In some cases of isolated bone metastases in a patient with an expected survival of more than 1 month, surgical fixation of the weight-bearing bone may be indicated. Interventional procedures, such as nerve blocks, may be useful.

Smoking cessation after lung cancer diagnosis can be difficult but should be encouraged. A recent large telephone survey revealed that lung cancer patients who continued to smoke after diagnosis reported higher levels of pain and other lung cancer complications, such as shortness of breath and fatigue, than nonsmokers and former smokers.

References

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