Epidemiology and various methods involved in diagnosis of small cell lung cancer.

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Abstract

Lung cancer is the most prevalent cause of cancer death, accounting for over 27% of cancer deaths in the United States in 2014. Small Cell Lung Cancer (SCLC) accounts for roughly 15% of all lung cancers. SCLC has a five-year survival rate of only 6%, which is less than one-third of the rate for non-small-cell lung cancer (18%). Combination SCLC is a type of SCLC that consists primarily of SCLC but also includes some NSCLC tumours.

Keywords: Epidemiology, Small cell lung cancer, MDCT, PET/MRI.

Introduction

Symptom evaluation, clinical exam, risk factor assessment (e.g., smoking), and imaging such as chest X-ray and chest computed tomography are all important clinical inputs in evaluating patients with lung cancer (CT). SCLC, on the other hand, is still a pathological diagnosis that requires biopsy tissue. While imaging is important in the diagnostic process, it cannot be utilised to definitively differentiate SCLC from NSCLC, other kinds of lung cancer, or non-cancerous diseases (i.e., differential diagnosis).

The multidetector CT scan is frequently used to determine whether, where, and how to biopsy. Depending on the location and size of the mass as well as patient variables, biopsy may be conducted using one of various procedures (e.g., bronchoscopy, CT-guided percutaneous biopsy, Endobronchial Ultrasound (EBUS), Endoscopic Ultrasound (EUS) [1]. Staging involves identifying the severity of the disease and guiding treatment decisions. One of two approaches is commonly used to stage small cell lung cancer.

According to the National Cancer Institute, around 70% of SCLC cases presented with advanced stage cancer, another 21% had regional dissemination such as mediastinal nodal involvement, and only 5% were localised between 1975 and 2008. (The other 4 percent were unstaged). The liver, adrenal glands, bone, bone marrow, and brain are the most prevalent locations of SCLC metastases [2].

Magnetic Resonance Imaging (MRI) creates three-dimensional pictures of the body using magnetic fields and radio waves. MRI, unlike PET and CT, does not employ ionising radiation and so does not expose the patient to radiation dangers. In the same way that contrast agents can enhance a CT scan, paramagnetic contrast agents can be used during an MRI examination to provide additional information on the nature of a mass. MRI is a structural and functional imaging technique with wide availability, high spatial resolution, and high soft tissue contrast resolution; it is particularly useful for detecting and characterization of lesions within tissues, even those as small as a millimetre in size, as well as for evaluating the internal architecture of organs/tissues such as the brain, spinal cord, breasts, bone marrow, muscles, tendons, ligaments, cartilage, and other solid organs. To improve diagnostic accuracy, functional imaging capabilities such as diffusion-weighted imaging and magnetic resonance spectroscopy may be used. MRI tests take longer and are often more expensive than MDCT, and certain patients with implanted electrical or metallic equipment or claustrophobia are unable to undergo them [3].

PET/MRI scanners that combine the sensitivity of PET with the anatomic detail of MRI are a relatively new technological advancement. PET/MRI is a hybrid molecular/structural imaging approach that combines the benefits of PET and MRI into a single examination. It also has a lower radiation dosage than PET/CT and potentially better PET quantification and motion correction. PET and MRI, on the other hand, are not widely available, are not currently reimbursed by insurance companies, are more expensive in terms of instrumentation than PET/CT, MDCT, and MRI, take longer to perform, and require additional personnel training in terms of safety, protocol optimization, and study interpretation [4].

EUS is an endoscopic procedure that uses ultrasonography to visualise structures within and adjacent to the esophageal wall. EBUS is a bronchoscopic procedure that uses ultrasonography to visualise structures within and adjacent to the airway wall. These procedures are minimally invasive and can be done as an outpatient procedure. Even for lymph nodes that are

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subcentimeter in size or located near blood vessels, patients with suspected lung cancer spread to mediastinal lymph nodes may undergo preoperative (or intraoperative) EBUS guided biopsy and/or EUS guided biopsy for real-time minimally invasive pathologic mediastinal N staging. The hilar and mediastinal lymph nodes that surround the tracheal bronchial tree are sampled with EBUS, whereas additional lymph nodes in close proximity to the oesophagus can be sampled with EUS. These techniques are used in the staging of patients with lung cancer (most commonly non-small cell lung carcinoma (NSCLC)), as accurate N staging is critical for determining the best therapeutic approach (i.e., surgical *vs*. non-surgical therapy), especially since the sensitivity and specificity of CT, MRI, and FDG-PET/CT for non-invasive N staging of lung cancer are not 100% [5].

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