Clinical and surgical-pathological staging in early non-small cell lung cancer

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Abstract

Staging is of the utmost importance in the evaluation of a patient with non-small cell lung cancer (NSCLC) because it defines the actual extent of the disease. Accurate staging allows multidisciplinary oncology teams to plan the best surgical or medical treatment and to predict patient prognosis. Based on the recommendation of the International Association for the Study of Lung Cancer (IASLC), a tumor, node, and metastases (TNM) staging system is currently used for NSCLC. Clinical staging (c-TNM) is achieved via non-invasive modalities such as examination of case history, clinical assessment and radiological tests. Pathological staging (p-TNM) is based on histological examination of tissue specimens obtained with the aid of invasive techniques, either non-surgical or during the intervention. This review is a critical evaluation of the roles of current pre-operative staging modalities, both invasive and non-invasive. In particular, it focuses on new techniques and their role in providing accurate confirmation of patient TNM status. It also evaluates the surgical-pathological staging modalities used to obtain the true-pathological staging for NSCLC.

Introduction

Lung cancer is responsible for more cancer deaths than the next three most common cancers combined. Each year, 29% and 24% of cancer deaths in males and females, respectively, are attributed to lung cancer. It also represents 15% and 14%, in males and females, respectively, of all new cases of cancer.[1] In particular, non-small cell lung cancer (NSCLC) accounts for approximately 75-85% of all newly diagnosed lung cancers.[2] Surgery remains the best chance for a cure if an early diagnosis is made. However, only one-third of patients are operable at the time of diagnosis. Accurate staging is required to provide precise information about the extent of the disease and to determine the most appropriate therapy in patients with NSCLC.[3] It is also important for estimating prognosis and for clinical trials. The TNM staging system, together with guidelines from the European and North American societies and study groups, is currently used and is usually expressed as clinical and pathological staging.

Clinical staging is carried out before surgery and several different modalities are adopted. It is a truly multidisciplinary process involving imaging, medical and surgical techniques. It determines whether the patient has an early stage tumor and may proceed to direct resection.[4] The important weapons in the armamentarium of the multidisciplinary oncology team include: computed tomography (CT), magnetic resonance imaging (MRI), mediastinoscopy, transthoracic, transbronchial or transesophageal fine needle aspiration (FNA) with or without ultrasound guidance, core needle biopsy, and positron emission tomography (PET) together with CT (PET-CT). The multidisciplinary oncology team employs a variety of specialists, including thoracic surgeons, oncologists and respiratory specialists. The objective remains the most accurate assessment of the stage of NSCLC in order to choose the best treatment approach. The increased use of new techniques should reduce errors in classification of clinical staging when compared against the available gold standard of pathological staging.

Surgical-pathological staging represents the results of histology for all the specimens obtained during surgical resection of NSCLC. It involves the tumor, and hilar and mediastinal lymph nodes from different sites obtained either by taking samples or by complete excision. These specimens can be stained with conventional methods or with immunohistochemical indices and examined under the microscopy. The result represents the true stage of the NSCLC and is used to plan further treatment.

This review critically evaluates the roles of current pre-operative staging modalities, both invasive and non-invasive. It also evaluates the surgical-pathological staging modalities to obtain the true-pathological staging for NSCLC.

Clinical staging of non-small cell lung cancer

In NSCLC, the anatomical extent of disease, as described by the TNM classification, is essential as it predicts prognosis, dictates treatment modalities, and provides a standardized description of the dis-

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Key words: clinical staging, pathological staging, non-small cell lung cancer.

Contributions: the authors contributed equally.

Conflict of interests: the authors declare no potential conflict of interests.

Received for publication: 31 March 2013.
Revision received: 14 July 2013.
Accepted for publication: 26 August 2013.

Oncology Reviews 2013; 7:e7
doi:10.4081/oncol.2013.e7