Invasive and Non-Invasive Advances in Staging of Lung Cancer

Essay

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Abstract

Background: Lung cancer is the most common cause of cancer-related deaths in both men and women in the world, and it accounts for more deaths than breast, prostate, colon, rectal, and pancreatic cancers combined. The 5-year survival rate for primary lung cancer is 16%, compared with 65%, 90%, and 99% for colon, breast, and prostate cancer, respectively. Although the incidence of lung cancer in men is beginning to decline, the incidence in women is rising, such that since 1987, lung cancer has caused more cancer-related deaths in women than breast cancer. More than half of all people with lung cancer will die within 1 year of diagnosis; however, if diagnosed at an early stage, 5-year survival reaches ~50%.

Aims: The aim of this study was to evaluate the recent advances (imaging, bronchoscopic and minimally invasive) techniques in staging of lung cancer.

Conclusion: Finally by the coordination of these techniques staging of lung cancer will be assessed according to the 8th edition of TNM staging system and proper treatment strategy will be clearly decided according to the guidelines recommendations.

Keywords: Invasive, Non-Invasive, Bronchoscopic Staging of Lung Cancer

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List of Abbreviations

ACCP : American College of Chest Physician

AFB : Autofluorescence bronchoscopy

AFI : Autofluorescence imagining

AIS : Adenocarcinoma in situ

ASD : Angiogenic squamous dysplasia

BAC : Bronchioloalveolar carcinoma

BAL : Bronchoalveolar lavage

COPD : Chronic obstructive pulmonary disease

CT : Computed tomography

EBUS : Endobronchial ultrasound

EBUS-FNA : Endobronchial ultrasound guided fine needle aspiration

ECM : Extended cervical mediastinoscopy

EGFR : Epidermal growth factor receptor

FNA : Fine-needle aspiration

HRCT : High resolution computed tomography

IARC : International Agency for Research on Cancer

IASLC : International Association for the Study of Lung Cancer

LNs : Lymph nodes

MIA : Minimally invasive adenocarcinoma

MUS : Mediastinal ultrasound

MLNs : Mediastinal lymph nodes

NBI : Narrow Band Imaging

NSCLC : Non-small cell lung carcinoma

PE : Pulmonary embolism

PEBC : Program in Evidence-Based Care

PET : Positron-emission tomography

PPV : Positive predictive value

SCC : Squamous cell cancers

SCLC : Small cell lung carcinoma

SCM : Standard cervical mediastinoscopy

SUVmax : Maximum standardized uptake value

TBNA : Transbronchial needle aspiration

TEMLA : Transcervical Extended Mediastinal Lymphadenectomy

TM : Transcervical video-assisted mediastinoscopy

VATS : Video Assisted Thoracoscopy

VAMLA : Video-assisted mediastinoscopic lymphadenectomy

WLB : White light bronchoscopy

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Introduction

Lung cancer is the most common cause of cancer-related deaths in both men and women in the world, and it accounts for more deaths than breast, prostate, colon, rectal, and pancreatic cancers combined. The 5-year survival rate for primary lung cancer is 16%, compared with 65%, 90%, and 99% for colon, breast, and prostate cancer, respectively. Although the incidence of lung cancer in men is beginning to decline, the incidence in women is rising, such that since 1987, lung cancer has caused more cancer-related deaths in women than breast cancer. More than half of all people with lung cancer will die within 1 year of diagnosis; however, if diagnosed at an early stage, 5-year survival reaches ~50%[214].

Smoking is the major risk factor for lung cancer, with less common factors including radon and asbestos exposure. Smoking contributes to 80% and 90% of lung cancer deaths in men and women, respectively[215]. The benefits of smoking cessation have been established and should be included in all treatment regimens. This is particularly important in the era of improved cancer treatment and potentially leads to prolonged overall survival. Benefits include improved quality-of-life measures, such as decreased shortness of breath and fatigue, and increased energy, self-esteem, and performance

status[216,217]. Perhaps not as clearly intuitive is the improvement in clinical parameters, such as improved response to chemotherapy, decreased radiation therapy complications, decreased risk of secondary tumor development, and increased survival. The latter likely relates to the prolongation of cancer progression [216,218]. Because the prevalence of smoking has declined in the United States, lung cancer is now more frequent among former smokers than current smokers[219,220].

Primary lung cancers are classified broadly as non-small cell lung carcinoma (NSCLC) or small cell lung carcinoma (SCLC). The former makes up ~85% of cases and the latter 15%. SCLC is distinguished by rapid growth rate, early regional lymph node dissemination, and spread to distant sites. [221,222].Survival percentages for lung cancer drop significantly when only SCLC is considered. Without treatment, median survival from the time of diagnosis ranges between 2 and 4 months. Despite improvements in early diagnosis, advancements in treatment, and dramatic initial response to chemotherapy and radiation, 5-year survival rates for SCLC remain an abysmal 5 to 10%.

In patients with lung cancer who are surgical candidates, complete surgical resection remains the best option for cure. Approximately half of NSCLC cases are localized or locally advanced at the time of diagnosis and are treated by surgical resection alone or by combination therapy with or without resection. In contrast, ~80% of patients with SCLC have metastatic disease at the time of diagnosis.

Because the stage of disease at presentation is directly correlated to survival and is a key determinant of treatment, having a standardized and validated approach to stage the disease accurately is imperative. This is the primary focus of this review article, with an emphasis on the role of imaging and invasive techniques in achieving this goal.