Fitness Assessment for Treatment of Lung Cancer

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Received: 20 Apr, 2020 | Accepted: 09 Jun, 2020 | Published: 15 Jun, 2020

Introduction

Lung cancer is one of the most commonly occurring neoplasms. Overall 5 year survival for lung cancer is around 16% but that for the advanced disease is merely 4% [1]. The evidence suggests that only around a fifth of patients are diagnosed at an early stage of lung cancer, which may be amenable to surgery [1]. Most of the patients with suspected lung cancer undergo systematic investigations in order to confirm histological diagnosis and to establish the stage of the disease. Imaging in the form of a Computed Tomography (CT) of the thorax or a Positron Emission Tomography (PET) scan, provides important staging tools. Positron Emission Tomography has higher accuracy for assessing the mediastinal lymph node involvement and detecting of the distal metastatic disease and therefore providing more accurate staging [2]. The assessment of the mediastinal lymph nodes forms an important aspect of staging as this may differentiate whether the patient may be a candidate for surgical treatment. From the diagnostic perspective when assessing mediastinal lymph nodes there are options of performing a mediastinoscopy, which is perceived as gold standard or Endobronchial Ultrasound (EBUS) and Endoscopic Ultrasound (EUS) [3]. Combined EBUS and EUS were reported to have a very good diagnostic yield and sensitivity comparable with that reported for mediastinoscopy [4]. Other diagnostic tools include navigational bronchoscopy, radial EBUS or CT guided biopsy, which are used for sampling of the peripheral lung lesions [5]. Once the investigations confirm an early stage of lung cancer, which may be amenable to surgery, the next step would be to assess whether the patient is fit to undergo surgical resection. Smoking status requires to be assessed and if the patient is a current smoker, smoking cessation should be undertaken as smoking has adverse effects on the surgical outcomes. Performance status assessment using tools such as the World Health Organisation (WHO) scale allows for the initial estimation of the patients' fitness. Patients' co-morbidities also determine what therapeutic options may be available. The performance status and the presence of co-morbidities are of particular importance not only when assessing for surgery but also in the context of determining patients' fitness for systemic anti-cancer therapy and radical radiotherapy. When assessing the fitness for surgery, tools such as Thoracic Revised Cardiac Risk score ThRCSI help to estimate risks of major cardiac complications [6]. These tools, in order to further stratify the risk of cardiac complications, can be used in conjunction with Electrocardiogram (ECG) and echocardiogram especially in patients who are considered for pneumonectomy [6]. However, there will be a subgroup of patients who have active cardiac condition, risk factors and poor cardiac function. For these patients current guidelines recommend formal assessment by a cardiologist [7]. The patients with cardiac disease should have their medication maximised. In some patients coronary revascularisation may be required including the percutaneous coronary intervention or coronary artery bypass grafting [7].

From the respiratory aspects, all patients should have at least spirometry performed to measure their forced expiratory volume in one second (FEV₁) and forced vital capacity (FVC), which estimate the airflow. Moreover a full lung function testing including lung volumes and the diffusing capacity for carbon monoxide (DLCO) to measure alveolar capillary transfer should be undertaken. For patients considered for radical radiotherapy lung function with FEV₁ and DLCO is required in order to assess whether they are fit to tolerate this type of treatment. It is accepted that patients considered for radical radiotherapy should have DLCO above 40% of predicted. However the current guidelines acknowledge that there is not enough evidence to determine the safe lower level of FEV₁ and DLCO in the context of radical radiotherapy and patients' performance status as well as their co-morbidities need to be taken into account [7]. Nevertheless the most important measurements that affect the decision regarding the fitness for lung cancer surgery are FEV₁ and DLCO as they allow to calculate postoperative FEV₁ and DLCO, which is an estimate of potential mortality and morbidity [8-10]. In fact there are formulas that allow for calculations of estimated post-operative FEV₁, which
In conclusion, fitness assessment prior to a lung cancer surgery forms an important aspect of an investigating pathway for patients with lung cancer. In the context of systemic anti-cancer therapy and lung cancer surgery, performance status together with the patient's co-morbidities is an important fitness decision making tool. The physiological assessment with spirometry and formal lung function testing will allow to measure other physiological parameters including FEV\textsubscript{1}, DLCO and VO\textsubscript{2}max, which stratifies patients' risk for lung cancer surgery. Therefore, when assessing patients' fitness for surgery and other anti-cancer treatment modalities, a systematic approach is required in order to make sure that the appropriate patients are chosen for surgery. At the same time the strategies used to assess fitness for surgery should be robust enough to make sure that the patients are not denied surgical intervention. For these reasons, physicians and surgeons investigating and managing patients with lung cancer should be aware of the array of investigational tools that are used for fitness assessment.

References


Citation: Kastelik JA (2020) Fitness Assessment for Treatment of Lung Cancer. J infect Pulm Dis 5(1): dx.doi.org/10.16966/2470-3176.139