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REVIEW

Integrating pulmonary rehabilitation into the multidisciplinary management of lung cancer: A review

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Summary
Introduction: Lung cancer is the number one cause of cancer related deaths. It is increasingly recognized that a multidisciplinary approach to the diagnosis and management of patients with lung cancer represents the ideal model for health care delivery. Given the high incidence of comorbid lung disease in lung cancer patients, strategies targeted at improving or optimizing these conditions may improve outcomes. Pulmonary rehabilitation (PR) has proven to be a useful management strategy for patients with chronic lung diseases including chronic obstructive pulmonary disease, interstitial lung disease and pulmonary hypertension.
Discussion: PR improves both exercise capacity and dyspnea. The effects of PR have also been studied in patients with lung cancer prior to and following surgical resection. Investigators have demonstrated significant improvements in six minute walk distance and lower extremity strength. In addition, patient recovery time is shorter when inpatient pulmonary rehabilitation is integrated prior to or following surgery. There are also positive reports regarding the benefits of exercise training in lung cancer patients receiving definite chemotherapy and radiotherapy. Pilot studies have demonstrated improvement in dyspnea scores as well as exercise capacity objectively measured by six minute walk distance. PR also offers an educational component in which patients have the opportunity to be educated regarding management of their disease as well as discuss goals of care.

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Conclusion: PR can be included as the standard of care for patients with advanced lung cancer with the goal of optimizing quality of life. Here, we provide a review of the current knowledge regarding PR in the management of patients with lung cancer.
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Introduction

Lung cancer is a devastating disease that carries tremendous social and economic burden. While the overall five year survival remains poor, targeted therapeutics, early detection and multidisciplinary approaches to diagnosis and management are all likely to contribute to improved outcomes. One key component to an integrated approach to patients with lung cancer is the consideration of smoking related comorbidities and complications related to chemo- and radiotherapy. Pulmonary rehabilitation (PR) has emerged as a cost effective intervention and has been proven to improve the quality of life of patients with chronic lung diseases, particularly Chronic Obstructive Pulmonary Diseases (COPD). Patients who suffer from such chronic pulmonary diseases including COPD and pulmonary fibrosis often have diminished exercise capacity and increased respiratory symptoms. These pulmonary diseases often coexist with lung cancer. Lung cancer incidence in patients with COPD is 8.5% [1] and 6—15% in patients with interstitial lung diseases [2—4]. In addition, patients with lung cancer are particularly susceptible to pulmonary complications from both radiotherapy and chemotherapy and at higher risk for post-surgical complications. The primary goal of PR is to improve pulmonary symptoms in a multidisciplinary and personalized manner. To date, the role of PR in the setting of lung cancer therapy remains relatively unexplored. Here, we review the current literature regarding the potential role for integrating PR into the management of lung cancer with a particular focus on the appropriate timing for such an intervention.

Pulmonary rehabilitation

Chronic respiratory conditions can lead to an increase in ventilatory requirements with muscle fatigue and reduced exercise capacity which may ultimately impact quality of life [5]. PR is an evidence-based, multidisciplinary comprehensive exercise program targeted to patients with symptomatic chronic respiratory diseases [6]. The goal of such an exercise program is to optimize pulmonary function and thus the patient's ability to function despite disease. PR integrates exercise and educational interventions into an individualized treatment program. A standard PR protocol consists of three sessions of thirty to ninety minutes per week for 6—8 weeks consisting of individualized aerobic exercise and strength training. Patients enrolled in PR have access to several types of training including: treadmill, stationary bicycle, NU-Step, upper body resistance training and training in breathing techniques. The benefits of exercise training in patients with cardiopulmonary diseases such COPD have been well documented [6—8] in the literature. The Joint American College of Chest Physicians clinical practice guidelines reviewed all available evidence on the effects of PR in COPD. They highlighted statistically significant improvements in six minute walk distance, lower and upper extremities muscle strength, and health status measures (Health Related Quality of life, St. George's Respiratory Questionnaire, Short form 36 health survey) [7]. PR also reduced COPD exacerbations and number of hospital days [7]. PR has also been shown to improve exercise capacity and quality of life in patients with restrictive lung disease and pulmonary hypertension receiving medical therapy [9,10]. PR also integrates an educational component that includes nutrition, smoking cessation, breathing exercises,