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Improvements in physical performance and health-related quality of life one year after radical operation for lung cancer

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SF-36;
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Abstract
Micro abstract: This study assessed physical performance and health-related quality of life one year after lung cancer surgery and investigated the potential association between both outcomes. We found that the walked distance was associated with the subjective perception of the physical functioning. Patients improved health-related quality of life, reaching values similar to a healthy reference population.
Background: Resuming an acceptable level of lifestyle and health-related quality of life after lung cancer surgery has become an important issue. We aimed to evaluate the course of recovery of physical performance and health-related quality of life following pulmonary resection for lung cancer, as well as examine the potential association between these outcomes.
Methods: In an observational design, we assessed 78 individuals radically operated for lung cancer. We measured health-related quality of life (SF-36), six-minute walk test (6MWT) and lung function (spirometry) three weeks (baseline), four and twelve months after surgery. SF-36 values were compared to an age- and gender-matched reference population.
Results: The mean age was 65 years (SD9), 59% were males. Thoracotomy was performed in 77% of the cases. Compared to baseline values, we found significant improvements after one year in SF-36

Abbreviations: HRQoL, Health-related quality of life; 6MWT, Six-minute walk test; FEV_1, Forced expiratory volume in one second; FEV_1%, Forced expiratory volume in one second as percent of predicted value; FVC, Forced vital capacity; SF-36, Short Form health-related quality of life questionnaire; PCS, Physical component summary; MCS, Mental component summary; ASA, American Society of Anesthesiologists risk-score

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physical and mental component summary components of large effect size (0.8 and 0.9 respectively). Values for both SF-36 summary components were comparable to those of the reference population. The improvement in 6MWT was of moderate effect size (0.6). We found a positive association between 6MWT and the SF-36 domain for physical functioning (β=0.05, 95% CI [0.00;0.09], p=0.03) one year after surgery.

Conclusion: Individuals who were radically operated for lung cancer improved health-related quality of life one year after surgery, reaching values similar to a healthy reference population. The walked distance was positively associated with the subjective perception of physical functioning. The clinical significance of these findings deserves further investigation.

1. Introduction

As life expectancy following pulmonary resection for lung cancer increases, the ability to resume an acceptable lifestyle and health-related quality of life (HRQoL) becomes an important issue after surgery and end treatment [1]. Lung cancer survivors present lower values in mental domains of HRQoL compared to persons with other types of cancer [2], or to the general healthy population [3,4]. Respiratory distress, rather than ventilatory impairment, has been suggested to negatively influence several domains of HRQoL [5,6]. Not surprisingly, a recent study found that lung cancer survivors adopt a more sedentary activity level six months after surgery, compared to levels prior to the diagnosis [7].

Exercise interventions for individuals with different cancer types are associated with benefits in cardiorespiratory fitness and HRQoL [2], but there is relatively little information on the effects of exercise training in the population after lung cancer surgery. In a recent systematic review, the authors identified three randomised controlled trials involving 178 patients and concluded that exercise training may potentially increase exercise capacity, as measured by the six-minute walk test (6MWT), following lung resection [8]. The degree of functional recovery is an important outcome, since studies suggest that this may be directly associated with survival [9,10]. There are conflicting reports on the impact of surgery on HRQoL during follow-up periods of six months or longer. One review reports on partial recovery of physical functioning over time with no other quality-of-life scales affected [11], while Poghosian et al. [12] report on worse or declining physical function six months and two years after surgery. Meanwhile, there is consistency in the literature regarding long-term reduced mental and physical HRQoL, compared to the general healthy population [12,13].

The main purpose of this study was, therefore, to evaluate the course of recovery of physical performance, lung function and HRQoL from the early post-operative period up to one year after pulmonary resection for primary or secondary lung cancer. Furthermore, we examined the potential association of physical performance on HRQoL during the follow-up period. We hypothesised that there was an improvement in physical performance and HRQoL over time, with a positive association between outcomes.

2. Materials and methods

2.1. Participants, study design and setting

This was a single centre observational study, including 78 patients initially recruited to a trial investigating the effects of exercise training on HRQoL and physical performance in patients radically operated for lung cancer [14]. Fig. 1 illustrates the study's flow chart and provides details for decision on eligibility and exclusion. Lung resections were performed using muscle sparing lateral or posterolateral thoracotomy or video-assisted thoracoscopy, according to the need and surgeon's preferences. Postoperative pain management was primarily achieved by thoracic epidural infusion. Patients were recruited from the Department of Cardiothoracic Surgery, Aalborg University Hospital, between February 2006 and September 2009. The selection of the study sample and the inclusion- and exclusion criteria has been described in details previously [14]. In short, eligible patients were those radically operated for primary lung cancer or solitary metastatic lung tumour, able to understand written and spoken Danish, living within a radius of 80 km from the hospital and who were able to perform a 6MWT. During the first four months after the surgery, patients in the intervention and in the control group participated in an exercise training program consisting of home-based strength and aerobic exercise training supplied by up to three individual counselling sessions with a nurse. Furthermore, patients in the intervention group received 10 one-hour sessions of supervised out-patient, group-based exercise training. We have previously reported study results, where we found that supervised exercise training, compared to unsupervised training, conferred no additional improvement in aspects of HRQOL four months after surgery, except for the bodily pain domain. Both groups reached comparable values of HRQoL and physical performance one-year after the surgery [14].

2.2. Ethics

The main study was approved by the local ethics committee (VN/2004/72) and registered at ClinicalTrials.gov (NCT01-048762). Written consent was obtained from all participants prior to inclusion.

2.3. Outcomes

Physical performance, lung function measured by spirometry and HRQoL, were assessed three weeks after surgery