High-intensity training in patients with operable NSCLC improved aerobic performance

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Preoperative high-intensity interval training (HIIT) in patients with resectable non-small cell lung cancer (NSCLC) improved aerobic performance in patients but failed to reduce early complications after tumor resection.

Tumor resection is the leading treatment strategy for patients with early-stage operable NSCLC. Advanced age, cancer stage, associated illnesses and impaired cardiorespiratory fitness are common predictive factors of postoperative complications and long-term survival. Cardiopulmonary exercise testing (CPET) parameters including peak oxygen consumption (peakVo2), anaerobic threshold (AT), and peak heart rate (peakHR) as well as the 6-minute walk test (6MWT) have been shown to help discriminate between patients with low versus high risk of postoperative complications. Exercise rehabilitation programs have been shown to increase cardiorespiratory fitness and quality of life in patients with NSCLC. However, it is not clear how to implement exercise therapy programs into standard care and whether intensity training improves mortality and postoperative complications.

A group of Swiss investigators conducted the largest randomized controlled trial to date evaluating and comparing short-term preoperative HIIT to usual care (UC) in patients undergoing NSCLC resection. Between October 2011 and October 2014, 151 patients with resectable lung cancer were selected and analyzed. Patients were assigned to UC

(n-77) or preoperative rehabilitation based on HIIT (Rehab) (n-74). The time from the date of enrollment to surgery was similar in the two groups (25 days in the UC group and 26 days in the Rehab group) and was within the maximal waiting time of 28 days recommended by the British Thoracic Society. Maximal CPET and the 6MWT were performed twice before surgery. Adverse events were reported according to a modified version of the thoracic mortality and morbidity (TMM) classification system. The primary outcome was a composite end point of postoperative morbidity (30-day mortality or any complications with TMM grade of ?2). Secondary outcomes were measured by the preoperative changes in CPET parameters, the incidence of postoperative complications with TMM grades of ?2, length of stay in the postanesthesia care unit (PACU), and the rate of admission to the intensive care unit.

The results of the study published in the *Journal of Thoracic Oncology*, the official journal of the International Association for the Study of Lung Cancer (IASLC), reported that the UC and Rehab groups were randomized and well-balanced in regards to patient characteristics. During the 25-day preoperative waiting period it was reported that peakVo2 (median +15% [IQR25%-75% = +9% to +22%], p = 0.004) and the 6MWT (median +15% [IQR25%-75% = +8% to +28%]; p < 0.001) increased in the Rehab group, whereas peakVo2 declined in the UC group (median -8%, [IQR25%-75% = -16% to 0%]; p = 0.005). The primary outcome did not differ significantly between the two groups with postoperative complications developing in 35.5% (27/74) patients in the Rehab cohort and 50.6% (39/77) in the UC cohort (p = 0.080). However, the incidence of pulmonary complications was lower in the Rehab cohort compared to the UC cohort (23% versus 44%, P = 0.018), and in particular atelectasis was significantly lower in the Rehab group (12.2% versus 36.4%, p =