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Appraisal

Critically appraised paper: Short-term preoperative exercise training improves exercise capacity and reduces postoperative pulmonary complications in people undergoing lung cancer surgery

Synopsis

Summary of: Licker M, Karenovics W, Diaper J, Frésard I, Triponez F, Ellenberger C, et al. Short-term preoperative high-intensity interval training in patients awaiting lung cancer surgery: a randomized controlled trial. *J Thorac Oncol.* 2017;12:323–333.

Question: Does short-term, preoperative, high-intensity interval training improve postoperative morbidity and preoperative exercise capacity in people undergoing lung resection for non-small cell lung cancer? ***Design***: Randomised, controlled trial with concealed allocation and blinded outcome assessment. ***Setting***: Two hospitals in Switzerland. ***Participants***: Inclusion criteria were adults with proven/suspected non-small cell lung cancer, stage I to IIIA. Exclusion criteria were any contraindication to performing a maximal incremental cardiopulmonary exercise test (eg, uncontrolled cardiac disease, severe pulmonary hypertension). Randomisation of 164 participants allocated 81 to an experimental group and 83 to a usual care group. ***Interventions***: Both groups received advice on being physically active and on risk factor management (ie, healthy nutrition and smoking/alcohol cessation). In addition, the experimental group completed supervised exercise training 2 to 3 times a week in an outpatient clinic. Each session comprised two 10-minute series of 15-second sprint intervals on a cycle ergometer (at 80 to 100% peak work rate) interspersed by 15-second pauses. The two series were separated by a 4-minute rest and each session included 5 minutes of both warm-up and cool-down exercises. Resistance exercises were prescribed on an individual basis. ***Outcome measures***: The primary outcome was a composite end-point that considered both postoperative complications (defined as adverse events that were not transient or self-limiting such as arrhythmias, heart failure, pneumonia or infection at the surgical site) and 30-day mortality. Secondary outcome measures included the 6-minute walk distance. ***Results***: A total of 151 participants completed the study (74 in the experimental group and 77 in the usual care group). Participants in the experimental group attended a median of eight (IQR 7 to 10) sessions. Postoperatively, there was no between-group difference in the number of participants who met the composite end-point with a relative risk of 0.70 (95% CI 0.48 to 1.02). Considering postoperative pulmonary complications only, the intervention had reduced risk compared with the usual care group, with an absolute risk reduction 21% (95% CI 7 to 36, number needed to treat = 5). Post-intervention 6-minute walk distance improved more in the experimental group than the usual care group, with a mean difference of 99 m (95% CI 30 to 168). ***Conclusion***: Short-term preoperative high-intensity interval training appears to improve exercise capacity and reduce the incidence of postoperative pulmonary complications in people undergoing surgery for non-small cell lung cancer. [95% CIs calculated by the CAP Editor.]

Provenance: Invited. Not peer reviewed.

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Commentary

There is unequivocal evidence that exercise is beneficial in cancer care.[1] In lung cancer care, there is growing interest in the delivery of preoperative exercise. After diagnosis, patients can wait up to 28 days for surgery. This is an opportunistic time to use exercise to 'prepare' patients for their upcoming surgery. The key intent is to improve exercise capacity, which is usually achieved with aerobic exercise (± resistance) training. Of note, exercise capacity is a predictor of postoperative pulmonary complications and mortality.[2,3] Preventing postoperative pulmonary complications is an important outcome, as these are associated with prolonged hospital stay, hospital readmissions, and poorer survival.[4]

The paper by Licker and colleagues is an excellent example of a short preoperative exercise program for people with lung cancer. Both groups received lifestyle advice for risk management, including advice to walk for ≥ 30 minutes four times/week (more input than patients currently receive in clinical practice).[5] In addition, the intervention group participated in an outpatient, high-intensity interval training program, and there was excellent adherence (87%). The key findings were that exercise capacity was improved and postoperative pulmonary complications were reduced, compared to usual care. No between-group difference on the primary outcome (composite postoperative mortality-morbidity endpoint) was found. However, the trial was stopped early before reaching the sample size of 178 per group.

This is the largest published trial on preoperative exercise for lung cancer. The findings add to the growing body of evidence supporting preoperative exercise training.[6] Referral to an exercise program should be considered for patients awaiting lung cancer surgery. The cost-effectiveness of preoperative exercise, prior to widespread implementation into lung cancer clinical practice, now needs to be investigated.

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