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Cardiorespiratory fitness and muscle strength responses to exercise in advanced lung cancer: a systematic review and meta-analysis

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Background: Exercise is increasingly integrated into supportive care for lung cancer, but objective evidence for patients with advanced disease remains limited. We synthesized randomized trials to quantify the effects of exercise on cardiorespiratory fitness and muscle strength in advanced lung cancer.
Methods: PubMed, the Cochrane Library, Web of Science, and CINAHL were searched up to June 28, 2024. Randomized controlled trials enrolling patients with advanced lung cancer and testing an exercise intervention were included. This analysis focused on cardiorespiratory fitness and muscle strength. Effect sizes were pooled as standardized mean differences with 95% confidence intervals using a random effects approach. Subgroup analyses were conducted by fitness assessment (VO2peak vs 6-minute walk test) and strength assessment site (lower limb, upper limb, trunk).
Results: Nine trials met the eligibility criteria. Exercise improved VO2peak compared with control (3 studies, n = 171; SMD 0.38; 95% CI 0.08 to 0.68; I2 = 0%). In contrast, no clear effect was observed for 6-minute walk distance (6 studies, n = 268; SMD 0.24; 95% CI −0.37 to 0.86; I2 = 77%). In an exploratory comparison, trials prescribing higher overall training volumes tended to show clearer gains in VO2peak. For muscle strength, exercise increased lower limb strength (4 studies, 6 datasets, n = 360; SMD 0.91; 95% CI 0.25 to 1.56; I2 = 84%), upper limb strength (3 studies, 4 datasets, n = 221; SMD 1.13; 95% CI 0.52 to 1.75; I2 = 68%), and trunk strength (2 studies, 3 datasets, n = 191; SMD 0.71; 95% CI 0.28 to 1.14; I2 = 34%).
Conclusion: In advanced lung cancer, exercise improves VO2peak and muscle strength, supporting incorporation of exercise into routine cancer care. Future trials should compare exercise modalities and doses, standardize outcome assessment, and determine how gains in VO2peak and strength translate into clinically meaningful endpoints.

Keywords

Advanced cancer, survivorship, physical function, meta-analysis

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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