The impact of medical treatment on physical fitness in patients with esophageal cancer

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Introduction

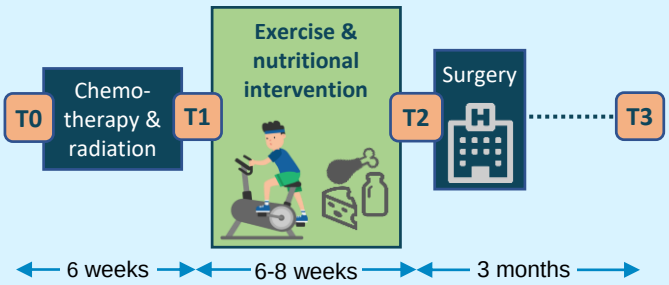
Good physical fitness promotes postoperative recovery. Therefore, perioperative exercise and nutritional programs are increasingly introduced in major oncological surgery. To optimize these interventions, knowledge about the course of physical fitness during medical treatment is required.

Purpose

To investigate pre- and postoperative physical fitness during curative medical treatment of esophageal cancer patients who participated in a preoperative exercise and nutritional intervention.

Participants & Measurements

Inclusion: patients with esophageal cancer, scheduled for esophagectomy. There were no exclusion criteria.



Physical fitness was measured at T0, T1, T2 and T3 in terms of:

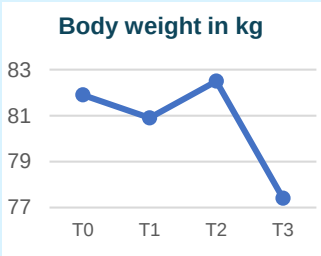
- Body weight
- Exercise capacity (Steep Ramp Test)
- Muscle strength (Hand Grip Strength)
- Fatigue (Short Fatigue Questionnaire, score 4-28)
- Self-reported physical functioning (Physical Functioning Scale of the RAND36, score 0-100)

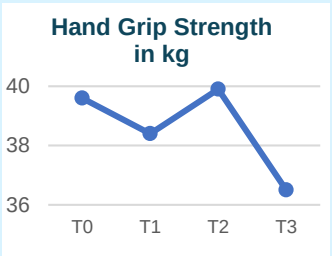
Analysis

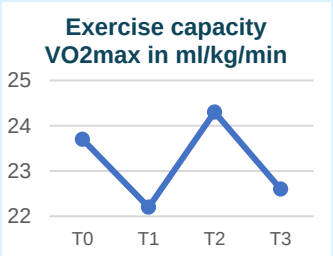
Linear mixed model analyses were used to analyse the course of physical fitness over time.

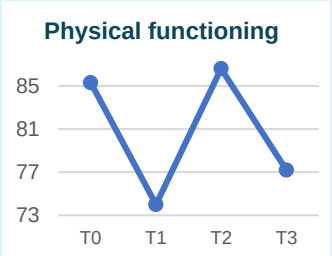
Results

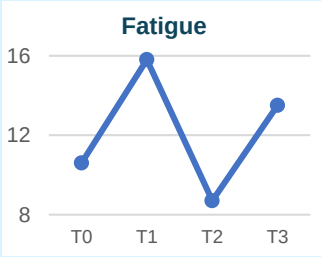
Baseline characteristics (N=243)	
Male, n (%)	188 (77%)
Age in years, mean (SD)	66.1 (9.2)
BMI, mean (SD)	26.3 (4.1)











Physical fitness decreased from T0 to T1 ($p<.05$) and returned to baseline levels at T2 ($p<.05$).

At T3, physical fitness decreased to below baseline levels ($p\leq.001$)

Conclusion & implications

- Physical fitness decreases substantially during neoadjuvant chemoradiotherapy, but restores during a preoperative exercise and nutritional intervention.
- Three months after surgery, patients physical fitness level remains impaired, indicating that postoperative interventions also may be recommended to restore physical fitness after surgery.

- This study is part of the PRIOR project, funded by the foundation 'Vrienden Integrale Oncologische Zorg'
- The Medical Research Ethics Committee Utrecht declared that the study did not require ethics approval
- Special thanks to the physiotherapists from the participating hospitals

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Supplementary results

The course of physical fitness (from before neoadjuvant chemoradiotherapy to three months after surgery).

Measurements	**T0** (n=243)	**T1** (n=225)	P value ΔT0-T1	**T2** (n=173)	P value ΔT0-T2	**T3** (n=151)	P value ΔT0-T3
Body weight (kg)	81.9 (14.9)	80.9 (14.4)	.010	82.5 (12.8)	.605	77.4 (12.1)	<.001
Hand Grip Strength (kg)	39.6 (11.1)	38.4 (10.5)	.013	39.9 (9.2)	1.000	36.5 (8.2)	<.001
Exercise capacity, VO2max (ml/kg/min)	23.7 (5.7)	22.2 (5.3)	<.001	24.3 (4.7)	.112	22.6 (4.1)	.001
Physical functioning (0-100)*	85.3 (19.5)	74.0 (18.8)	<.001	86.6 (17.9)	1.000	77.2 (17.4)	<.001
Fatigue (4-28)**	10.6 (6.3)	15.8 (6.2)	<.001	8.7 (6.0)	.002	13.5 (6.0)	<.001

Results are represented as mean values and SDs.
*Physical functioning scores range from 0 to 100, with higher scores indicating better function.
**Fatigue scores range from 4 to 28, with higher scores indicating a higher degree of fatigue.

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