

Status quo of the endurance performance capacity and physical strength of patients with esophageal and gastric carcinoma

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Background

Exercise therapy or sport therapy for cancer patients aims to improve the quality of life [1]. For patients with esophageal and gastric cancer there are hardly any studies that have analyzed the holistic effects of sport therapy. In order to perform a sport-specific therapeutic intervention for these patients, a diagnosis of endurance performance capacity and physical strength is necessary. The present study aims to quantify for the first time the endurance performance capacity and physical strength for these patients using reproducible measurements.

Methods

In a prospective cross-sectional study a total of 30 inpatients (median age 55 years, minimum 27 years, maximum 76 years, 80% men) with esophageal or gastric cancer were analyzed preoperatively from May to September 2013 with respect to their physical performance. The endurance performance capacity was evaluated using the maximum oxygen uptake (VO₂max) performing spiroergometry [2]. The maximum physical strength of patients was determined using the "8-repetition-maximum" (8RM) test on a leg extension and bench press machine.

Results

The mean relative VO₂max of esophageal and gastric cancer patients of the sample is 22.4 ml/min/kg (SD 5.21). Based on the Kolmogorov-Smirnov test values of the sample are normally distributed. Compared to the reference values of the American Heart Association [3], the endurance performance capacity is classified as "fair" (Table 1). Mean results of leg extension and bench press machine testing of patients are 36.3 kg (SD 14.6), respectively, 39.4 kg (SD 16.3) and, therefore, significantly lower compared to the reference values for healthy subjects of the general population (Table 2).

Table 1: Reference values of relative VO₂max [3]
Males, (ml/min/kg), age-adapted

Age	Poor	Fair	Average	Good	Excellent
20-29	<25	25-33	34-42	43-52	53+
30-39	<23	23-30	31-38	38-48	49+
40-49	<20	20-26	27-35	36-44	45+
50-59	<18	18-24	25-33	34-42	43+
60-69	<16	16-22	23-30	31-40	41+

Conclusions

Preoperative training programs should be conceptualized with regard to the revealed performance deficits of patients with esophageal and gastric cancer (Figure 1). In this way, the potential outcome of overall treatment could be increased and ultimately the quality of life of these patients.

Table 2: 8-RM test results for leg extension and bench press

		Taylor & Fletcher ⁽⁴⁾	Study group
Leg extension	Mean results	50.7kg	36,4kg
	SD	+/- 5.8	+/- 14.6
Bench press	Mean results	57.5kg	39.4kg
	SD	+/- 29.5	+/- 16.3

Figure 1: Conceptual design of training programs for patients

Phase I: - Endurance performance capacity
- Physical strength



Phase II: - Preoperative training programs



Objective: - Overall treatment outcome
- Quality of Life of patients